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U N C L A S S I F I E D

AGENCY FOR INTERNATIONAL DEVELOPMENT

Washington, D.C. 20523

PROJECT PAPER

INDIA
TRADE IN ENVIRON. SERVICES & TECHNOLOGIES
386-0530

U N C L A S S I F I E D

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT DATA SHEET

1. TRANSACTION CODE: A (A = Add, C = Change, D = Delete)

Amendment Number

DOCUMENT CODE: 3

COUNTRY/ENTITY: INDIA

3. PROJECT NUMBER: 386-0530

4. BUREAU/OFFICE: ASIA 04

5. PROJECT TITLE (maximum 40 characters): Trade in Environ. Services & Technologie

6. PROJECT ASSISTANCE COMPLETION DATE (PACD): MM 09 DD 30 YY 97

7. ESTIMATED DATE OF OBLIGATION (Under B. below, enter 1, 2, 3, or 4)

A. Initial FY 92 B. Quarter C. Final FY 96

8. COSTS ($000 OR EQUIVALENT $1 =)

A. FUNDING SOURCE	FIRST FY 1992 B. FX	C. L/C	D. Total	LIFE OF PROJECT E. FX	F. L/C	G. Total
AID Appropriated Total	3,100	1,100	4,200	17,809	7,191	25,000
(Grant)	(3,100)	(1,100)	(4,200)	(17,809)	(7,191)	(25,000)
(Loan)	( )	( )	( )	( )	( )	( )
Other U.S. 1.						
Other U.S. 2.						
Host Country		1,400	1,400		10,800	10,800
Other Donor(s)						
TOTALS	3,100	2,500	5,600	17,809	17,991	35,800

9. SCHEDULE OF AID FUNDING ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE 1. Grant	2. Loan	D. OBLIGATIONS TO DATE 1. Grant	2. Loan	E. AMOUNT APPROVED THIS ACTION 1. Grant	2. Loan	F. LIFE OF PROJECT 1. Grant	2. Loan
(1) ARDN						4,200		25,000	
(2)									
(3)									
(4)									
TOTALS						4,200		25,000	

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each)

11. SECONDARY PURPOSE COD

12. SPECIAL CONCERNS CODES (maximum 7 codes of 4 positions each)

A. Code

B. Amount

13. PROJECT PURPOSE (maximum 480 characters)

The Purpose of this project is to assist Indian industries to adopt environmentally sound practices while promoting sustainable linkages between U.S. and Indian firms.

14. SCHEDULED EVALUATIONS

Interim MM 09 YY 94 MM YY Final MM 09 YY 97

15. SOURCE/ORIGIN OF GOODS AND SERVICES: ☒ 000 ☐ 941 ☒ Local ☐ Other (Specify)

16. AMENDMENTS/NATURE OF CHANGE PROPOSED (This is page 1 of a ____ page PP Amendment.)

Clearance: CO: W.C. Graham

17. APPROVED BY

Signature

Title: Steven P. Mintz
Director (Acting)
USAID/INDIA

Date Signed: MM 09 DD 21 YY 92

18. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION

MM DD YY

TRADE IN ENVIRONMENTAL SERVICES AND TECHNOLOGIES

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LIST OF ABBREVIATIONS

AID	Agency for International Development
AFI	Assisting Financial Institutions
APCTT	Asia Pacific Center for Technology Transfer
ASSOCHAM	Associated Chambers of Commerce
Bank L/Comm	Bank Letter of Commitment
BOD	Biological Oxygen Demand
CARA	Chemical Assessments & Related Activities
CETP	Common Effluent Treatment Plant
CIDCO	City and Industrial Development Corporation
CII	Confederation of Indian Industries
COD	Chemical Oxygen Demand
CPCB	Central Pollution Control Board
DEA	Department of Economic Affairs
DFI	Development Finance Institution
EPA	Environmental Protection Agency
EP3	Environmental Pollution Prevention Project
ESCAP	Economic and Social Commission for Asia and the Pacific
EST	Environmental Services and Technologies
EXIM	Export-Import Bank of the United States
FICCI	Federation of Indian Chambers of Commerce & Industry
FY	Fiscal Year
GIIC	Gujarat Industrial & Investment Corporation
GITCO	Gujarat Industrial & Technical Consultancy Organization
GNP	Gross National Product
GOI	Government of India
HCC	Host Country Contribution
IBRD/IDA	World Bank
ICICI	Industrial Credit & Investment Corporation of India
IDBI	Industrial Development Bank of India
IFC	International Finance Corporation
ITCOT	Industrial and Technical Consultancy Organization of Tamil Nadu
K	Thousand
KG	Kilograms
LOP	Life of Project
mg/l	Milligrams per liter
m3	Cubic Meters
MITCON	Maharashtra Industrial & Technical Consultancy Organization
MOEF	Ministry of Environment and Forests
NEERI	National Environmental Engineering & Research Institute
NGO	Non-Governmental Organization
OHEA	Office of Health & Environment Assessment
OPIC	Overseas Private Investment Corporation
OTA	Office of Technical Assistance,
OTIS	Online Technology Information Service
PACER	Program for Acceleration of Commercial Energy Research
PACT	Program for the Advancement of Commercial Technology
PCB	Pollution Control Board

PID	Project Implementation Document
PIL	Project Implementation Letter
PPIES	Pollution Prevention Information Exchange System
RFP	Request for Proposal
Rs	Rupees
SPCB	State Pollution Control Board
TA	Technical Assistance
T&I	Trade and Investment
TDE	Office of Technology Development & Enterprise
TDS	Total Dissolved Solids
TDICI	Technology Development & Investment Corporation of India
TEST	Trade in Environmental Services & Technologies
UN/U.N.	United Nations
US/U.S.	United States
USAEP	United States-Asia Environmental Partnership
USAID	United States Agency for International Develpment
USEPA	United States Environmental Protection Agency
USETI	United States Environmental Training Institute
US&FCS	United States & Foreign Commercial Service
WHO	World Health Organization

PROJECT AUTHORIZATION

Country: India
Project: Trade in Environmental Services and Technologies

Project No.: 386-0530

1. Pursuant to Section 103 of the Foreign Assistance Act of 1961, I hereby authorize the Trade in Environmental Services and Technologies (TEST) (Project) for India (the "cooperating country") involving planned obligations of not to exceed Twenty-Five Million United States Dollars ($25,000,000) subject to the availability of funds in accordance with the annual OYB allotment process, to help in financing the foreign exchange and local currency costs of the Project. The planned life of the project is five years from the date of initial obligation.

2. The project is designed to address India's industrial pollution problems through long term linkages between U.S. and Indian environmental services and technologies (ESTs) providers and consumers. The project, besides financing the purchase of ESTs, will demonstrate the commercial viability of the EST sector by producing ESTs through long term arrangements such as licensing agreements and joint ventures between U.S. and Indian firms. A.I.D. funds will be disbursed through the Industrial Credit and Investment Corporation of India (ICICI) for financing: (1) loans and conditional grants to firms; (2) technical assistance (TA) including trade and investment tours and support for information networks; (3) support to the implementing developmental finance institutions, i.e., ICICI and (4) support to trade and professional associations.

3. Goods and services financed by A.I.D. under the Project shall have their source, origin and nationality in the United States except as indicated below. Approximately Five Million U.S. Dollars ($5,000,000) in local source procurement is authorized for EST equipment and incidental services pursuant to Handbook 1, Supplement B, Section 5B4a(b) because support for local EST equipment manufacturers is important for the success of the Project. In addition, local source procurement is authorized for the categories of goods and services listed in Handbook 1, Supplement B, Section 18A1c.

SIGNATURE: Steven P. Mintz
Steven P. Mintz
Director (Acting)

DATE: 9/21/92

Clearances:
PDI: JDTarter
TDE: JGrayzel
CO: WGraham
RLA: Mark Ward
PDPS: TMahoney

Draft

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1. EXECUTIVE SUMMARY

The Trade in Environmental Services and Technologies (TEST) Project goal is to increase environmental protection and enhance the productivity of Indian industry on a sustainable basis. The Project purpose is to assist Indian industries to adopt environmentally sound practices while promoting sustainable linkages between U.S. and Indian firms. The five year Project will provide $20 million for loans and conditional grants and $5 million for technical assistance, promotion, information networks, and institutional support.

Air and water pollution, and an inability to safely dispose of hazardous waste, are major environmental, health and economic problems. The National Environmental Engineering Research Institute (NEERI), in cooperation with the Central Pollution Control Board (CPCB) and the World Health Organization (WHO), began a 12 year study in 1990 of air pollution in ten Indian cities. The study places Bombay, Calcutta and Delhi among the world's ten most polluted cities and reveals that industry contributes 74% of the total emissions in Calcutta and 48% in Bombay. Fourteen geographic areas and 17 industrial subsectors that are the most heavily polluted and polluting have been identified by the Ministry of Environment and Forests (MOEF). However, India has not undertaken any nationwide studies that describe the effects of pollution on the health and well-being of its people, or on agriculture, forests and animals.

Public awareness led by non-governmental organizations (NGOs) and the media is growing. Sufficient laws are on the books and in a February 1992 policy statement the Government of India (GOI) clearly stated that pollution control is a priority. The enforcement agencies are in place but need upgrading. Industry's response is mixed: there is some progress, but much resistance.

Rather than focussing on an industrial subsector and/or a geographical area, the approach to accomplishing the Project goal and purpose is to identify technology gaps in environmental services and technologies (ESTs) in India and match those gaps with technologies in which the U.S. has comparative advantage. Using this approach means that the U.S. and Indian firms who address the technology gaps through TEST will be working across sectors and geographical areas, thus spreading the beneficial environmental effects while also gaining larger EST markets. The Project will be demand driven, so these matches may change over the course of the Project.

A survey of Indian companies conducted by a USAID sponsored consultancy team in April-June 1992 revealed that critical obstacles to the implementation of pollution control projects are:

1. Lack of available and affordable financing for investments in ESTs.

2. Limited awareness of pollution problems and their effects.

3. Limited awareness of and access to quality ESTs.

TEST will address these obstacles via:

1. The provision of dollar and local currency financing for procurement of U.S. and Indian ESTs.

2. A major marketing campaign which will include upgrading the flow of information between U.S. suppliers and Indian customers (through the existing Indian information network and available U.S. databases) and making individual contacts with potential U.S. suppliers.

3. The promotion of the Indian market to U.S. suppliers.

4. The establishment or improvement of long-term linkages between U.S. and Indian firms.

The Project will be implemented by the Industrial Credit and Investment Corporation of India (ICICI), chosen because of its overall capabilities and its track record in implementing other USAID projects. A U.S. institutional contractor will undertake the TA activities. The Project will provide funds to assist ICICI in placing a representative with the institutional contractor in the U.S. The Office of Technology Development and Enterprise (TDE) will appoint a project officer who will monitor the Project.

2. PROJECT RATIONALE AND DESCRIPTION

2.1 BACKGROUND

2.1.1 THE POLLUTION PROBLEM

Air and water pollution, and an inability to safely dispose of hazardous waste, are major environmental, health and economic problems. To begin to assess the air pollution problem in India, the National Environmental Engineering Research Institute (NEERI), in cooperation with the Central Pollution Control Board (CPCB) and the World Health Organization (WHO), began a 12 year study in 1990 of air pollution in ten Indian cities. Data collected so far indicate that urban populations are exposed to high levels of carcinogenic agents. The study places Bombay, Calcutta and Delhi among the world's ten most polluted cities and reveals that industry contributes 74% of the total emissions in Calcutta and 48% in Bombay. Other studies show that small scale industry may contribute 60-65% of total industrial pollution. Fourteen geographic areas and 17 industrial subsectors that are the most heavily polluted and polluting have been identified by the Ministry of Environment and Forests (MOEF). However, India has not undertaken any nationwide studies that describe the effects of pollution on the health and well-being of its people, or on agriculture, forests and animals.

Some scattered evidence does exist. In the 1970's inhabitants of various neighborhoods in the industrial areas of Bombay had yearly increases of hepatitis, cancer, tuberculosis and respiratory disease. Negative effects were also observed in plant life. Pesticide residues were found in food supplies. But no attempt was made to link these diseases to specific pollutants as opposed to general unsanitary conditions. One conclusion was that since it is the poor who live in the most polluted areas, they would benefit the most from an environmental clean-up.

2.1.2 PUBLIC AWARENESS

The people of India have demonstrated their concern for environmental degradation and health problems caused by pollution. The reforestation projects, the public movements to prevent wanton deforestation (e.g., the tree preservation "Chipko" movement), and the projects to provide safe drinking water in the rural areas - all attest to a long-standing concern for environmental issues. Hardly a day goes by without a feature article in the press about an environmental issue or a public response to a local pollution problem. Non-governmental organizations (NGOs) are playing a major role in creating awareness and fostering change. At an April 1992 international conference, India was cited for its "mass-based environmental movement." At a May 1992 national workshop for NGOs on environment and development, the Minister of Environment and Forests called the NGOs "the eyes and ears of the ministry" and asked them to propose environmental priorities for funding.

2.1.3 GOI POLICY AND ITS IMPLEMENTATION

Formal recognition of industrial pollution problems dates from 1974 with the passage of the Water (Prevention and Control of Pollution) Act. This was followed by the Air (Prevention and Control of Pollution) Act of 1981, the Environment (Protection) Act of 1986, and the Hazardous Wastes (Management and Handling) Rules (1989). Most recently (March 1992), the Environment (Protection) Rules were amended, requiring mandatory submission of environmental audit reports by industry. (See Annex D for a list of key pollution related acts and rules.) To further publicize and strengthen the Government's position, the GOI issued a Policy Statement for Abatement of Pollution dated 26th February 1992. (See Annex E for the full statement). In May 1992, the GOI authorized an Environmental Tribunal which will be able to impose civil penalties (fines) and assess compensation for damages - a much quicker method than criminal actions, which can take years to reach trial.

Implementation is basically through the MOEF, which has the authority to close non-complying plants. However, the MOEF has delegated much of the enforcement to the CPCB and the various State Pollutions Control Boards (SPCBs). The SPCBs also have the authority to establish more stringent standards in their own states. The CPCB retains the responsibility for collection of data, establishment of standards, technical training, advising the GOI and informing the public of government policy in water and air pollution control and abatement. The responsibility for data collection means that the CPCB must maintain a laboratory for analysis of samples. These, of course, include the samples that are taken in the course of monitoring effluents, which is also the responsibility of the CPCB, and it is this responsibility that suffers from limited staff, in view of the enormous number of operating industrial units. While enforcement of standards and consenting to new industrial construction is the province of the SPCBs, they share with the CPCB the responsibility for giving site clearance to new industrial construction. Both the CPCB and many of the SPCBs require Environmental Impact Analyses of large and medium scale industrial units under a list of industries determined by the GOI. Some states, for example Maharashtra, have lengthened that list to cover additional industries.

There appears to be consensus among donors that the laws and regulations are adequate and the necessary enforcement bodies are in place. The problem is seen as one of actual enforcement.

2.1.4 INDUSTRY'S RESPONSE TO GOVERNMENT AND PUBLIC PRESSURE

Given the diversity of industry, its geographic spread, and lack of reliable studies, information concerning effective pollution prevention and control programs is limited. Indian experts express divergent views on the actual situation. A 1989 survey by the Federation of Indian Chambers of Commerce of all scales of industrial plants received 400 responses. About 86% said they had treatment programs, with 44% claiming to have reached at least 96% of the government standards for toxicity levels in waste water. These were mostly the largest units. (Note that those companies responding were also among the most likely to be using

pollution control technology.) Of interest to the TEST Project is that only about half of the respondents felt that the technology needed to reach the minimum national standards was available in the country. The respondents ranked the overall problems in reaching standards as follows:

1. Available and affordable financing.

2. Awareness of pollution problems and their effects.

3. Awareness of and access to quality environmental services and technologies (ESTs).

Annex F, provided by the Pollution Control Division of the National Productivity Council (NPC), presents the views of industry, in a qualitative manner, by scale of operation and subsector. The NPC suggests that only the large scale operations, and especially multinationals, demonstrate a strong positive response to addressing their industrial pollution problems. That is because the constraints identified above are most easily overcome by the large scale firms. The TEST Project, although not targeting a specific industrial scale, will most likely assist medium scale firms, which presently have the most difficulty overcoming the above constraints. There are strong indications from both the GOI and State Governments, and industry, that pollution prevention and control, though in its infancy in India, is a growth industry with a promising future.

Protests from industrial groups and some state governments over restrictions placed on their development plans are strong indications of increased enforcement. From both political and social standpoints it is difficult to close extant production facilities. The enforcement focus is on new or expanding facilities as it is easier to hold up new construction than to remedy faults in existing plants. Therefore it is likely that TEST, as demand driven, will address prevention and clean technology approaches in new facilities more often than end-of-pipe solutions in existing facilities.

2.1.5 GAPS IN POLLUTION PREVENTION AND CONTROL TECHNOLOGY

The TEST Project goal is to increase environmental protection and enhance the productivity of Indian industry on a sustainable basis. The Project purpose is to assist Indian industries to adopt environmentally sound practices while promoting sustainable linkages between U.S. and Indian firms. Rather than focussing on an industrial subsector and/or geographic area, the approach to accomplishing the Project goal and purpose is to identify technology gaps existing in India and match them with technologies in which the U.S. is considered to be the leader, or at least competitive with Europe and Japan. The identification of technology gaps and their subsector and geographic concentrations are presented in Annex G. Since it is possible to meet only a small part of India's total needs with the funds available to the TEST Project, a study matching technology gaps with both industrial subsectors and geographic areas was conducted. Below is a summary of the findings of the study. These findings are based on site visits, interviews and a literature search by a USAID sponsored design consultancy in April-June 1992.

A preliminary screening of the industrial subsectors identified by the GOI indicated that not all of them would provide equally significant opportunity for trade in ESTs. Responses from representatives of industry, government, consulting firms, and the laboratories involved in tackling pollution problems showed that there are certain technological gaps that were consistently noted as being common to most of the subsectors.

Some geographical areas identified by the GOI do not necessarily overlap with the technology gaps identified (and the consequent trade opportunities). For example, areas such as Singroli, Durgapur or Visakapatnam, though highly polluted, represent a general environmental degradation problem rather than a problem arising from specific technology gaps in industrial pollution prevention and control.

The technology gaps identified involve specific equipment, monitoring and instrumentation, and know-how that apply to pollution prevention, abatement, and remediation. These technology gaps overlap industrial subsectors and many critically polluted geographical areas. A prospective supplier will be able to market the product in question depending on the demand, regardless of the subsector or geographical area.

Focussing on these technological gaps makes it possible for U.S. suppliers, either directly or in collaboration with Indian distributors or joint venture partners, to reach a wider market. In this way, the funds available for the TEST Project would have the widest impact on India's problems in air and water pollution abatement and hazardous waste management by fostering direct importation of equipment, the establishment of distributorships and joint ventures, the purchase of technology through licensing arrangements, and by making available the know-how to perform the necessary related services. In the process, TEST will create sustainable cooperation with U.S. suppliers of ESTs.

The pollution problems for which technological gaps were noted are:

1. Water and air pollution control.

2. Handling, reduction, and/or economic use of solid wastes.

3. Management and disposal of hazardous wastes.

4. In-plant control to reduce waste production, reduce use of process water, and improve efficiency in the use of energy and materials.

5. Reduction of noise pollution.

The major technology gaps that have been identified to deal with these problems can be summarized as follows:

1. Removal/reduction of dissolved solids from waste-water streams.

2. Recovery and reuse of chemical resources from waste-water streams, atmospheric emissions, and solid wastes.

3. Systems for removing special pollutants from waste water, atmospheric emissions, and manufactured products.

4. Handling and management of hazardous wastes.

5. Reduction of color, odor, and biological/chemical oxygen demand loads in waste water.

6. Reduction of particulates (suspended particles), sulfur dioxide, and oxides of nitrogen emitted to the atmosphere from industrial processes.

7. Availability of adequate instrumentation for monitoring and analysis in control of both water and air pollution.

These gaps have been identified and analyzed (see tables and maps in Annex G).

For each technology gap, by taking into account the number of subsectors and the number of states in which they are located it is possible to create a priority ranking. This ranking is based on a combination of the largest number of subsectors and states where they are found in order to highlight the greatest potential market as well as where to concentrate project promotional and information activities (see Table G.1 in Annex G).

2.1.6 USES OF THE TECHNOLOGY GAP TECHNICAL ANALYSIS

Since the Project will be demand driven, there is no way to predict how the use of project funds will match the identified technology gaps. The point is that no sound pollution control project will be turned down even if it comes from a state or a subsector outside those identified as priorities. But the priority listing will serve several important functions:

1. It will help determine where to concentrate the limited budget resources for publicizing and marketing the TEST Project in India.

2. It will be a tool in the Project effort to interest U.S. firms in supplying ESTs to India.

3. If properly publicized it should promote understanding of India's industrial pollution problems, and consequently more attention to solutions.

2.2 PROJECT RATIONALE AND ITS RELATION TO USAID'S STRATEGY

2.2.1 PROJECT RATIONALE

The reasons for undertaking the TEST Project flow from the above background section. In summary they are:

1. The need to assist Indian industry to increase productivity.

2. The enormity of the problem and its impact on human well-being and the economy in general.

3. The world-wide implications of pollution in a country of India's size and industrial base.

4. Growing Indian awareness of the country's pollution problems and the desire to attack them.

2.2.2 RELATIONSHIP TO USAID STRATEGY

With regard to USAID's newly approved strategy, the TEST Project directly addresses the objectives of increased productivity by promoting use of more efficient, cleaner technologies; and promotion of healthier families by mitigating industrial pollution. The strategy paper points out that "two constraints on Indian businesses are energy shortages and environmental degradation" and that "the ability of Indian firms to be competetive in both the near and long term is closely linked to the country's rapidly deteriorating environmental situation."

2.3 PROJECT DESCRIPTION

2.3.1 GOALS AND OBJECTIVES

The goal of the Project is to increase environmental protection while enhancing industrial productivity on a sustainable basis. Its purpose is to assist industry to adopt environmentally sound practices while promoting sustainable linkages between U.S. and Indian firms. In achieving its goal and purpose TEST will emphasize technology gaps that were identified during project design. Indian companies and American suppliers will be encouraged to take advantage of TEST through a combination of financial incentives, marketing and promotional activities, an enhanced two way flow of critical information, and the development of business linkages. By the end of the Project there will be:

1. Increased use of U.S. technology and equipment.

2. A strengthened information network linking American suppliers and Indian users, which will increase both groups' understanding of how Indian and U.S. firms can do business.

3. More long term relationships between Indian and U.S. enterprises.

Accomplishment of the above will result in a reduction in pollution and higher productivity.

2.3.2 PROJECT ELEMENTS

The Project is composed of a $20 million financing component and $5 million in support activities (technical assistance, grants to trade and professional organizations, and support to the implementing agency).

2.3.2.1 FINANCING

According to an informal survey conducted in conjunction with the Project design, the lack of available and affordable financing was the number one obstacle to the purchase of ESTs. A senior officer of the Industrial Credit and Investment Corporation of India (ICICI) confirmed that banks are not likely to lend for either local pollution control projects or importation of pollution control goods and services - only for joint ventures. TEST will assist in overcoming this constraint with a financial component (to be managed by ICICI) of $20 million for loans and conditional grants.

A. Loans

Loans will be made for funding the purchase of U.S. or Indian ESTs, for the establishment of facilities in India for the production of pollution control or abatement equipment, for the establishment of environmental service firms, and for transaction costs associated with such projects (joint ventures, licenses, etc.). Such loans will be denominated in dollars, but will be repaid in rupees at ICICI's dollar/rupee exchange rate in effect at the time of the first disbursement of each loan. The schedule of interest and principal repayments will be made in accordance with the requirements of the Project as determined in negotiation between ICICI and the borrower. Interest will be payable in rupees at competitive rates (those generally applied by ICICI in a similar market for medium term loans in accordance with the risk category applicable to the borrower).

B. Conditional Grants

Conditional grants under TEST are defined as funds disbursed to a recipient under agreement, but without a specific schedule for repayment. However, the agreement will stipulate that upon the completion of the Project financed by the grant and commencement of operations, a percentage of sales will be returned to ICICI on a periodic basis until such time as a maximum of 200 percent of the amount of the grant has been received. Payments will be in rupees; the total to be repaid to ICICI will be determined at the rate of exchange in effect at the time that the first payment under the dollar grant was disbursed. The percentage of sales and the periods of repayments will be determined by ICICI in negotiation with the recipient.

The conditional grant may be a useful tool to promote the manufacture of U.S. technology in India under license, or within a joint venture relationship, where investment capital is scarce and/or there is uncertainty about the adaptability of the U.S. technology to the Indian environment. An example would be conditional grants to undertake "concept evaluation" of pollution control alternatives for specific facilities or projects. This would be undertaken by U.S. consulting firms in collaboration with Indian partners. These should lead to bankable projects to be financed by TEST. Some of the costs must be borne by the user in order to show serious intent. But the grant will make the high cost of the U.S. partner affordable. TEST can also fund

field investigations and evaluation of engineering solutions for specific projects on the same principle. The reason for such funding is that there are several areas in which considerable adaptation, applications and engineering development is needed. The resolution of these will lead to commercial technologies or applications.

Conditional grants will be authorized by ICICI for purposes which include project pre-offer feasibility studies for major transactions which appear to be bankable, travel for potential licensing or joint venture partners, legal fees, and other start-up expenses. As pointed out in Annex I, there are a number of existing Indo-U.S. joint ventures that are at a standstill. A major reason is the inability of the ultimate user to obtain necessary and affordable financing. TEST should help break this bottleneck.

C. Host Country Contribution

The Host Country Contribution is estimated at $10.8 M. This contribution comprises:

1. Costs relating to the establishment of new firms, or the expansion of existing firms, to manufacture U.S. pollution control equipment in India under license or within the framework of a joint venture.

2. Rupee loans to cover local costs in connection with the installation or enhancement of pollution control imported from the U.S. This category also includes end-user costs of operationalizing TEST-acquired ESTs in major projects such as are contemplated in the sugar and aluminum industries, among others.

3. Rupee equity, loans, or expenditures made by Indian engineering or consulting companies in connection with the acquisition, transfer, and application of U.S. ESTs under the auspices of the TEST Project.

4. Rupee costs incurred by ICICI and other Indian participants in the Project.

The underlying assumptions are that:

1. In a joint venture, about half of the cost to establish the new firm will be in the form of rupee equity or loans.

2. When expanding or building a new facility to manufacture U.S. technology under license, a substantial portion of the total investment will be in rupees.

3. The one-time installation of imported U.S. pollution control equipment will require local rupee costs.

4. The adaption and marketing of U.S. ESTs by Indian engineering or consulting firms, and installation costs borne by the end-user will result in substantial local rupee costs.

These assumptions will be modified by experience as the Project progresses.

ICICI, as the Agent of the GOI, will be responsible for tracking and reporting local rupee expenditures associated with the TEST Project.

D. Other Financial Sources

The prospective Indian user of project funds may find it necessary to borrow from financial institutions other than ICICI. TEST contemplates this possibility. Other rupee lenders, assisting financial institutions (AFIs), might be commercial banks when short-term rupee credit is needed, or national or state industrial development financial institutions with whom the prospective borrower has a relationship.

In general, commercial banks lend short-term, up to one year, which would be appropriate financing if the user were importing relatively low value instruments, pollution monitoring equipment, or even subassemblies from the U.S. This financing supplies a working capital need which is beyond the purview of both national and state level development finance institutions. In such an event, the commercial bank would provide the rupees which would be transferred to ICICI, and ICICI would provide the foreign exchange to cover the import. The borrower would repay rupees to the commercial bank in due course.

There is a problem in that banks have been slow to lend for pollution control projects. Also, borrowers have been reluctant clients, as commercial banks charge higher interest rates than does ICICI when using IBRD/IDA and other donor monies. As the IBRD/IDA project demonstrates the viability of pollution control loans, the banks should be increasingly open to developing this kind of portfolio.

2.3.2.2 TECHNICAL ASSISTANCE

Technical assistance will be available from the institutional contractor through ICICI to clients in conjunction with or independent of the financing components. This assistance will be provided for:

1. Identifying appropriate ESTs to solve a pollution abatement or control problem for a firm.

2. Locating potential partners for licensing agreements or joint ventures for manufacturing U.S. pollution control equipment in India, or for establishing environmental service firms.

3. Arranging trade and investment (T&I) tours for Indian or U.S. EST firms to meet potential buyers or sellers of ESTs or joint venture partners.

4. Upgrading the information network capabilities of Indian organizations which are already importing and distributing database information on U.S. EST suppliers.

5. Promotion of the Project.

The promotion component will begin immediately. Project start-up will begin with a major campaign to market the TEST Project to both potential U.S. and Indian clients, and U.S. ESTs to potential users. On the U.S. side this will include promoting the Indian market to U.S. suppliers. This campaign will initially target Indo-U.S. joint venture partners, chambers of commerce, trade associations, etc.

For the longer-term, while promotion will continue, the information networking component will be critical. It is necessary to improve the existing information network. A first step is increasing the two way flow of information matching Indian needs for technical information and EST imports with U.S. capability to meet the needs. This activity overlaps with the linking of U.S. and Indian firms, described in the next section. While firms with current business arrangements can benefit from improved information, the number one targets are those U.S. and Indian companies not yet doing business with each other. The critical elements of an Indian information system are being put in place. Quite apart from the TEST Project, this network includes organizations whose purpose is to access foreign data banks; and intermediate organizations (chambers of commerce and trade associations) that receive this information from the primary Indian data importers - or receive it directly - and pass it to their members, the ultimate users. There is in place a nascent multi-channel network reaching from the U.S. and other countries to Indian companies that must use ESTs. There is a reverse flow of information from potential Indian customers to U.S. businesses - though this is weaker than the inbound flow to India.

Given this situation, it is not necessary to create new organizations, but to concentrate upon making the current network more effective. Annex J explains in detail the elements, the information network, the information requirements identified by Indian companies, and how TEST should approach improving the current system. The key linkages and approaches expressed in Annex J are summarized below.

What is in place is a three tiered network - primary data sources, intermediate data sources, and ultimate users. What complicates the picture is that the intermediate levels and ultimate users can and do bypass the network and go directly to the U.S. supplier or a U.S. data bank.

Four importers of information on U.S. EST-related companies are:

1. The Confederation of Indian Industries, New Delhi, which is establishing a Technology Information Service under a European Community project.

2. NEERI, Nagpur, which in cooperation with USEPA and its Environmental Information Clearinghouse is establishing an online information service which will include commercial and technology vendors, technical information packages, and ways to handle specific problems.

3. UN-ESCAP Asian and Pacific Center for Transfer of Technology (APCTT), Bangalore, which has already established an Online Technology Information Service (OTIS) oriented at small and medium enterprises and has identified pollution control, environmental engineering, waste recycling and utilization, and clean technologies as primary foci.

4. Foreign Commercial Service of the U.S. Department of Commerce.

Groups of institutions play important intermediary roles at both the national and state levels. Examples are the Federation of Indian Chambers of Commerce and Industries (FICCI), the Associate Chambers of Commerce and Industries (ASSOCHAM), the Indian Chemical Manufacturers Association, the CHEMTEK Foundation, and various state level chambers and industry associations. They disseminate information to members firms through pollution control panels, seminars, and trade fairs, as well as providing technical assistance to industries. They also promote exchanges, tours, visits and contacts with overseas organizations and businesses. These agencies can benefit from TEST as well as contribute to its promotion.

Another group are agencies such as the industrial and technology consultancy organizations in Gujarat, Maharashtra and Tamil Nadu; the National Productivity Council's Pollution Control Cell; and the state industrial and investment corporations. Some of these agencies have multi-disciplinary technical consultancy staff capability and offer services to small and medium businesses on payment of fees and also provide assistance in technology acquisition, collaboration and other related business development services. Yet another group of such service providers are business and consulting firms who provide similar assistance to clients in new business development.

The ultimate users of the information will be the companies in India, particularly medium and some small enterprises, interested in developing business relations with companies in the U.S. The information will be available to them through the organizations mentioned above.

It is difficult for most Indian companies to access U.S. ESTs. The reasons for this may be the perception by U.S. companies about the future of the EST market in India and the general difficulties encountered in doing business in India. The Indian companies that were contacted during

project design estimated the size of the industrial pollution control market at over $100 to $150 million per year, most of it serviced locally, but growing at about 25% per year. There is need for creating awareness among U.S. business about the potential and growing opportunities in India in the EST sector.

In India business groups and other agencies expressed a critical need for information on U.S. manufacturers of all types of ESTs. It was suggested that information of the following type will facilitate trade and business development between Indian and U.S. companies:

1. Listing of the major manufacturers of pollution control equipment, machinery and instruments in the U.S. in the fields of air pollution control, water pollution control, hazardous waste disposal and incineration systems.

2. Listing of U.S. industrial pollution control engineering consultants and service providers as well as firms providing R&D and analytical and testing services.

3. Listing of Indian companies desiring U.S. EST technologies and joint ventures and their needs.

4. Information about U.S. EST trade fairs, expositions, conferences and EST industry association events.

The project will assist ICICI in placing an ICICI representative with the U.S. institutional contractor. This ICICI representative will work with the U.S. institutional contractor to strengthen the information network from the U.S. side. (ICICI has proposed opening a representative office in the U.S. and it is possible that this could occur during the life of the TEST Project. Such an office would encompass activities other than TEST. Whatever the nature of ICICI's official presence in the U.S., the Project will support only that person or activities directly related to TEST.) The first task will be to undertake an EST survey in the U.S. and develop a business database which can be used by Indian companies to identify and locate U.S. suppliers of ESTs. There are a number of sources that can be tapped for input into the database. The survey will cover the information suggested by Indian companies. The survey team will have access to the numerous data banks already existing in the U.S. (See Annex J for examples). This initial effort will involve collating available information and feeding it into the network through primary and intermediate recipients. The U.S. institutional contractor, working with the ICICI representative, will cull through the various databases and identify a group of promising companies and associations for follow-up with promotional materials and, in some cases, personal contact. This is a core element in the marketing campaign. In addition TEST will, through ICICI and the institutional contractor:

1. Assist U.S. EST business sector participation in trade and technology fairs in India; arrange technology expositions and catalogue exhibitions; arrange trade and investment tours by U.S. and Indian businesses to determine commercial opportunities. These activities are useful in bringing the U.S. and Indian business and experts together and will encourage business contacts and deals.

2. Facilitate U.S. EST business participation in workshops, seminars, and industry association conferences.

3. Organize seminars and training programs in cooperation with scientific, technical and business associations in India to introduce TEST Project activities and U.S. EST initiatives of significance to Indian needs.

While not critical to the success of the TEST Project, a longer term and more permanent relationship in the upgrading of the information network is presented in Annex J. This would directly assist in keeping the information flow on track after the termination of the TEST Project. CII is suggested as an organization that could support TEST and maintain linkages after TEST ends; some grant support to CII would be necessary. Annex J also lists other Indian associations that could play an active role in TEST.

2.3.2.3 GRANTS TO TRADE AND PROFESSIONAL ORGANIZATIONS

Grants will be provided to trade and professional organizations to better serve their memberships from either the standpoint of industries that must address pollution abatement and control, or the EST providers. ICICI will award grants to assist these organizations to better serve their membership with:

1. Policy information, studies and reform.

2. Regulatory information.

3. Technical information.

2.3.2.4 ACCESS TO QUALITY ENVIRONMENTAL SERVICES AND TECHNOLOGIES

While the elements of the TEST Project already discussed - improved financial terms, marketing, and information flows - are the most important components of TEST, more can be done to link U.S. and Indian companies, especially those not now engaged in trade.

The activities below fit into both the critical start up marketing campaign and the longer term aim of increased Indian U.S. linkages.

The conventional technology transfer mechanisms followed by Indian companies are :

1. **Company Representation and Distributorship**

   These include trade and business houses, small and large, who represent U.S. manufacturers in India as representatives or distributors of U.S. company products and equipment. Quite a few U.S. manufacturers have a presence in India through such arrangements.

2. **Technical Know-How Licensing Arrangements**

Another group is the manufacturing or service/consulting type of companies which have tie-ups with U.S. companies through licensing for technical know-how. Such arrangements in the EST area are rather limited compared with other sectors. But the number of Indian companies looking for such arrangements with U.S. companies is growing.

3. **Joint Ventures**

Joint ventures with equity participation is the preferred arrangement by many Indian companies, but often difficult to implement. During the past few years Paramount, Sudarshan Chemical, Mysore Kirloskar, Thermax, and Four Eyes Research in India have entered into arrangements with Andersen 2000, Radian, Snyder General Corporation, Kaiser Aluminium & Chemical Corporation and Amclyde Engineered Products in the U.S. These are all recent business arrangements.

There are a number of practical problems, i.e., high up-front costs, in attracting U.S. companies to India; they are described in depth in Annex I. The sheer size of the U.S. market is a major constraint. The U.S. market is estimated at about $97 billion (of this $8 billion in the professional services market) and growing rapidly. This leaves limited incentive for many U.S. firms to seek overseas markets, particularly in a country such as India which has a reputation as a difficult place to work, and where the sale of U.S. pollution control technology and equipment has been small. Therefore, a major effort at marketing opportunities in India is required. The aim is to establish linkages between U.S. and Indian companies.

Existing joint ventures or those now under discussion have the capability to jump start the TEST Project. They will be the first target of the TEST promotion and marketing campaign. The best way to promote new joint ventures is to demonstrate the success of existing ones. Annex I contains an illustrative list of nine existing joint ventures that could benefit from TEST Project inputs; these ventures represent particularly good opportunities for the use of conditional grants. In addition, both Indian and U.S. companies interested in new joint ventures are listed and will be targeted.

Companies of all sizes need assistance in identifying business opportunities, locating technology suppliers, undertaking feasibility studies, and negotiations. Such services are being provided by intermediaries who specialize in venture management, collaboration services, undertaking technology searches/sourcing, and identifying partners. At the present time there is lack of such service providers in the EST sector.

2.3.2.5 U.S. INSTITUTIONAL CONTRACTOR ROLE

In order to make intermediaries more effective, the U.S. institutional contractor, working with ICICI, will:

1. Make available market and business information generated through studies in the U.S. and India. It will also acquaint them with the TEST Project objectives and available Project support.

2. Provide potential clients with a list of qualified consulting firms in the EST sector.

3. Maintain liaison with, and provide guidance to, clients in making or implementing U.S. linkages, through intermediaries participating in the Project.

4. Organize seminars and conferences to promote awareness of TEST.

5. Assist in organizing and arranging exchange of visits between U.S. and Indian parties, or arrange for representative Indian groups to visit U.S. firms offering competing technologies.

6. Create a list of U.S. sources of ESTs of particular interest to the Project; maintain and expand this list; and transmit the information to ICICI and the first level of the Indian information network.

7. Promote the TEST Project in an appropriate manner to these firms, and identify parties interested in participating in the Project as supplier, licensor, or joint venture partner.

8. Identify U.S. technology suppliers interested in initiating a Project linkage via use of the conditional grant feature.

9. Assist intermediaries and their clients in making contact with specific U.S. firms, or groups of firms, to discuss possible linkages.

10. Identify U.S. associations or other groups that could continue the fulfillment of these functions on a permanent basis following the completion of TEST.

11. Explore involving U.S. pollution control agencies.

The U.S. institutional contractor will include one full time U.S.-based coordinator for the first three years of the contract. This coordinator will travel to India three to four times per year spending approximately one month per trip. The U.S. coordinator will be supplemented by short term technical assistance, both U.S. and Indian, as needed. This combination of resources will provide expertise in ESTs, international marketing, the specifics of Indian pollution problems, information networks, and financial and legal issues.

2.3.2.6 ICICI ROLE

ICICI was selected as the Indian financial institution most capable of implementing TEST, based upon ICICI's general capabilities and success in implementing other USAID projects. The criteria used in selection and the reasons for choosing ICICI are detailed in Annex K. The Implementation Plan discusses the responsibilities of ICICI and how it will organize to handle them.

ICICI sees this not as a five year Project but as a permanent part of its lending program, and believes it has much of the in-house capability to manage TEST. ICICI will work with the U.S. institutional contractor and will contract for additional local assistance as needed. The ICICI representative to be based with the U.S. institutional contractor will present a distinct advantage for the TEST Project by contributing first hand knowledge of the Indian market.

2.4 DONOR ACTIVITIES OF SIGNIFICANCE TO THE TEST PROJECT

A number of donors have programs in the pollution field. Three are of special relevance to the TEST Project.

2.4.1 THE IBRD/IDA PROJECT

The largest project is that of the IBRD/IDA. Of its total budget of $260 million, IBRD/IDA will furnish $155.6 million, with Indian sources providing the rest in local currency. The IBRD/IDA Project will concentrate its attention on waste water and solid materials in chemical and related industries in four states - Gujarat, Maharashtra, Tamil Nadu and Uttar Pradesh in public sector programs. In this respect it has a preliminary list of 20 industrial estates and other sites for possible construction of common effluent treatment facilities. IBRD/IDA will finance some pollution abatement schemes in the same sectors when proposed by individual enterprises. Grant funded demonstration projects are included. In addition, there will be technical assistance to upgrade the four SPCBs and some technical assistance will be provided to the MOEF and certain development finance institutions. Since the IBRD/IDA project is already underway it might attract the enterprises most ready to enter pollution control programs in those states where TEST will concentrate its marketing campaign. But it is likely that IBRD/IDA will stimulate the EST market, thus encouraging U.S. companies to seek joint venture partners. And since IBRD/IDA can only cover a small portion of the target group and area, it might also encourage the use of other donor efforts. TEST, in contrast to the IBRD/IDA project, will concentrate on technology gaps instead of industrial subsectors and geographical areas, on private sector as opposed to public sector entities, on individual firms instead of industrial estates, and on longer term linkages in the EST area rather than purchases per se.

2.4.2 THE NORDIC PROJECT

The Norwegians are planning activities in the pollution field. They are considering upgrading SPCBs in Madhya Pradesh and Rajasthan. Other proposed elements include demonstration projects to test Norwegian pollution control technology under Indian conditions, so as to convince potential buyers of its value. They will also contract with a consultancy firm to identify potential joint venture partners in Norway. The purchase of Norwegian technology will come from a $20 million loan fund with a 6% interest rate.

2.4.3 GERMAN AID

The Germans are particularly interested in joint ventures. In May 1992 they sponsored a consultancy to identify opportunities in the Indian market via technology gaps. This information will be supplied to medium sized German firms, which, with government encouragement, will seek out trade and investment opportunities in India.

3. IMPLEMENTATION PLAN

3.1 Implementation Responsibilities

3.1.1 ICICI

The implementing agency for the Project will be ICICI, a developmental finance institution based in Bombay. The key organizational unit within ICICI will be the TEST Group located in ICICI's Technical Development Division in Bombay. The TEST Group will be established as a separate unit, ultimately consisting of five or six full-time officers, including a TEST Group Manager, and four or five principal officers including two pollution abatement technology specialists for air and water, and secretarial support staff. TEST Group staffing may be augmented from time to time with local consultancies to provide the project analysis and monitoring that ICICI deems necessary.

The TEST Group will coordinate all activities under the Project, including identification and/or evaluation of project proposals, project promotion, the establishment of a working relationship with the CPCB and SPCBs as appropriate, and coordination with the institutional contractor on a continuing basis. The TEST Group will approve all Project funded activities (except loans and conditional grants, which will be approved by a Committee of Directors composed of ICICI officers, including at least two divisional directors); and will closely monitor all activities supported by the TEST Project. The Group will solicit technical reviews from the Project's U.S. institutional contractor or from local consultants as necessary for the evaluation of client proposals. The TEST Group will draw on the other considerable resources of ICICI as necessary to help implement the Project. Also, the Project is providing funds to assist ICICI in placing a representative with the U.S. institutional contractor.

3.1.2 TEST Group Organization

The officers of the TEST Group will have the following responsibilities:

Function	Responsibility
TEST Group Manager	Reports to ICICI Chairman/Deputy Managing Director; responsive to Advisory Council; supervises and administers TEST Project; acts as key contact point for USAID; divides administrative time between loan/grant and technical assistance proposals, and Project promotional activities.
Promotion & Information	Oversees the development and distribution of promotional literature, and organizes targeted educational programs for TEST; works with the CPCB and SPCBs and other pertinent groups. Responsible for Information Network activities.
Proposal Evaluation	Receives and evaluates project proposals for the import of equipment or technology from the U.S., or for the establishment of licensing agreements or joint ventures between Indian and U.S. parties for EST projects.
Loans/Conditional Grants	Oversees loan/conditional grant operations; ensures that all preconditions are met and prepares final documentation for ICICI approval; monitors loan/conditional grant recipient performance on a regular basis. Where major imports are involved, ICICI will explore the possibility of combining TEST resources with U.S. EXIM Bank (or other appropriate) funds.
Technical Assistance	Oversees the technical assistance programs; supports line officers; ensures that technical assistance is properly carried out; coordinates with the institutional contractor.

ICICI is prepared to undertake the duties and responsibilities outlined below. ICICI will require assistance in their performance, and will use the U.S. institutional contractor and/or Indian consultants as needed. ICICI will:

1. Provide potential clients with a list of qualified consulting firms in the EST area as requested. Development of a referral list will be an early priority.

2. Maintain liaison with and provide guidance in making or implementing U.S. linkages through business development consultants participating in the Project.

3. Organize seminars and conferences, in coordination with the TEST Group, to promote awareness of TEST.

4. Organize technical assistance in cooperation with the U.S. contractor.

5. Work with the U.S. institutional contractor in organizing and arranging exchange visits between U.S. and Indian parties by providing grant funds cleared by the ICICI Test Group.

6. Work with the U.S. institutional contractor in arranging for the preparation of feasibility studies, or pollution abatement needs assessments as required.

7. Monitor the functioning of the Information Network from inception, and promote complete distribution of information between levels and to end users and potential licensees or partners.

8. Assist in the technical review of proposals submitted to the TEST Group, as required.

3.1.3 U.S. Institutional Contractor

To help identify and implement key U.S. linkages, USAID will, in consultation with ICICI, select through the competitive bidding process a U.S. institutional contractor. So that Project implementation may begin before the U.S. institutional contractor is on board, as soon as possible after the Project Agreement is signed USAID will enter into an interim arrangement for an individual or a firm (i.e., through an AID/W project buy-in) to begin immediately the tasks assigned to the U.S. institutional contractor which are, inter alia, to:

1. Create a list of U.S. EST providers by accessing existing databases and developing new data in the areas of interest to the Project; maintain and expand this list; and transmit the information gathered to ICICI and the first level of the Indian information network.

2. Promote the TEST Project to these firms.

3. Organize technical assistance.

4. Analyze the costs and benefits of establishing a periodic newsletter to apprise U.S. EST providers of business opportunities in India.

5. Identify U.S. EST providers interested in initiating a possible Project linkage through use of the travel grant feature.

6. Assist Indian grantees in making contacts with specific U.S. firms, or groups of firms, to discuss possible linkages, as desired.

7. Find U.S. associations or other groups that could continue the fulfillment of these functions on a permanent basis following the completion of TEST.

The U.S. institutional contractor will include a full time U.S. based Technical Coordinator for at least three years of the Project. The Coordinator will travel to India three to four times per year, spending approximately a month in India each trip. The Technical Coordinator must be familiar with Indian regulations pertaining to import licenses and duties, foreign investment regulations, and foreign exchange regimes which pertain to license royalty and profit remittances. The Coordinator must also be familiar with the linkage between a firm's export level and ability to purchase foreign exchange for import or remittance purposes. Additional expertise will be supplied via short term technical assistance, both U.S. and Indian, as needed.

ICICI plans to establish a U.S. representative office as part of its Technology Merchant Banking operation in the Technical Development Division. TEST will support this presence. An ICICI presence in the U.S. will assist greatly in providing potential U.S. licensors or investors with first hand knowledge of the Indian market. The U.S. institutional contractor will maintain close relations with the U.S. ICICI office, and coordinate information gathering, Project marketing, and assistance rendered in connection with potential TEST transactions.

3.1.4 TEST Advisory Council

The TEST Advisory Council will be formed by ICICI at the inception of the TEST Project to provide strategic guidance and advice as the Project evolves. The Council will be comprised of representatives of ICICI (2 including the Chair), USAID (1), Ministry of Environment and Forests (1), Ministry of Industry (1), FICCI (1), ASSOCHAM (1), CII (1), NEERI (1), and highly reputed environmental scientists from the private sector and/or academia (2). In addition, the Advisory Council should have U.S. pollution control experts from the private sector and nodal agencies (i.e., USEPA) who would provide a U.S. private sector view and knowledge of the EST trends in the U.S. (2). The Advisory Council will meet every six months with the U.S. participants attending only once per year, beginning with the first meeting.

3.1.5 The TEST Information Network in India

TEST will generate technology specific and industry specific information in the U.S. and transmit it to the first level of the information network in India, ICICI and existing information services such CII and NEERI. Both CII and NEERI have relevant ongoing activities: CII is establishing a Technical Information Service; and NEERI is establishing an on line information connection with the USEPA under a cooperative agreement. Some financing under TEST will be available to assist these and other organizations that might become involved in the Project through two Project elements -- technical assistance and grants to organizations.

The first level entities named above will disseminate pertinent information on U.S. ESTs to groups and institutions such as: industry specific groups (i.e., the National Sugar Manufacturers Association); general industrial interest groups (i.e., the Federation of Indian Chambers of Commerce and Industries); chambers of commerce, or similar organizations at the state level; groups organized by engineering and consulting firms (i.e., the Gujarat Industrial and Technical Consulting Organization); industrial park industry associations; and business development consultants.

TEST information will flow from the U.S. to the first level free of charge. The flow of information from the first level to the second, or to other information users such as business development consultants, may carry a nominal charge to place the service on a self sustaining basis. However, it is important early in the Project that information be disseminated as widely as possible, so ICICI will disseminate information free at least for the first year. Before the end of the first year of the TEST Project:

1. The Indian data bank will be essentially complete so far as information on U.S. firms is concerned.

2. The job of the U.S. institutional contractor (including the work of the interim assistance) to identify continuing sources of pollution control information will be completed.

TEST anticipates that associations participating in the Indian information network will receive inquiries from potential clients regarding specific U.S. ESTs; these requests will be forwarded to ICICI for follow up and action.

Some of the organizations listed are quite active in EST programs and provide counsel to member industries. They also actively arrange trade and investment tours and promote technology acquisition activities. Apart from these activities, these organizations can establish special liaison desks in their offices in cooperation with their U.S. counterparts and trade associations and firms, to promote trade, joint ventures, technology purchases, and other related activities. This will complement the work of the TEST Group.

Still another group of state level agencies (i.e., the Gujarat Industrial Investment Corporation) play an important role in providing technical assistance and technology transfer services to small and medium size industries. They also organize buyer-seller meetings and technology fairs. ICICI is one of the sponsors of several of these state agencies, and has clearly indicated that it will provide seed funding from its own resources for strengthening these agencies' role in delivery of ESTs.

3.1.6 Deal-Making Mechanisms

Indian and U.S. partners may find each other and reach agreement to form a joint venture without Project assistance. Others may find one another but require financial assistance. Still other Indian or American firms may desire to form joint ventures, but need assistance in finding an appropriate partner and possibly financial assistance as well. This is the intermediary's function, be it a business development consultant or merchant bank. If this function proves to be necessary for project success, ICICI will propose for TEST Advisory Council consideration steps it can take to perform the function.

3.1.7 USAID

The Office of Technology Development and Enterprise (TDE) of USAID will appoint a Project Officer for TEST whose responsibilities will include monitoring the Project and helping ensure that its implementation is achieving Project objectives. USAID will appoint a representative to the TEST Advisory Council; the Project Officer may also attend meetings as an observer.

3.2 Clients/Beneficiaries

The Project's Indian clients/beneficiaries will be firms which:

1. Choose to import U.S. ESTs for their own use.

2. Utilize TEST to arrange and/or finance more permanent licensing or joint venture arrangements with U.S. EST providers.

3. Are the end users of technology provided by business development consultants.

Activities may also originate with a U.S. private sector firm.

3.3 Implementation Procedures

The first six months will be devoted in part to appointing staff, forming the TEST Group and Advisory Council, establishing the U.S. based interim assistance, selecting the U.S. institutional contractor, establishing operational systems, and collating and disseminating information. During this period, existing Indo-U.S. joint ventures are expected to submit

several project proposals for the TEST Group's consideration and approval. The TEST Group will design promotional materials and begin an intensive campaign to promote the Project.

The TEST Group will take proactive measures to promote the Project, and to solicit potential client inquiries and (eventually) proposals for review and approval. When ICICI's Merchant Bank or Advisory Division can create a deal by bringing two parties together, they will do so.

3.3.1 Proposal Development and Approval

The TEST Project's ability to make loans or conditional grants with foreign or local currency is designed to provide the user with the maximum flexibility.

TEST proposals submitted to ICICI's TEST Group will be prepared by the prospective client pursuant to guidance furnished to the client by the TEST Group. In addition to the usual financial information and projections, the proposal will contain an estimate of the reduction in pollution which the proposal, if approved, would be credited. If the proposal describes a manufacturing license or joint venture arrangement, the estimated pollution abatement impact would be the product of the pollution reduction estimate per unit sold times the estimated annual unit sales.

If the proposal is submitted by a state level financial institution, the arrangements for loans and collateral extant between the client and the financial institution should be fully disclosed to ICICI if further ICICI financing is requested.

A proposal may be submitted jointly by a business development consultant and his/her client. Since these are apt to be large transactions and may involve technology untried in India, the proposal may take the form of a feasibility study including a history of the technology's use in other countries and independent certification of the benefits of the technology in action. ICICI may decide to approve a conditional grant to cover feasibility study costs. ICICI will specify the data to be included and the scope and depth of the financial information which it wishes to receive. The pollution abatement benefit will form an integral part of these requirements.

TEST Group officers with the particular relevant expertise will first review the proposal. If further information is required, it will be returned to the submitter at this stage for remedial action. If the proposal is accepted for consideration within the TEST Project and ICICI criteria, it is passed to the TEST Group for review. A TEST Group team will then appraise the Project in Bombay and/or in the field. If the TEST Group deems it necessary, it may call upon the services of an

outside technical consulting or engineering firm to review the merits of the technology involved. At this point the Group may reject the proposal, return it to the submitter for still further information, or pass it on to the Committee of Directors for approval. A notional period for the process from receipt of the proposal to approval is three to four months. This period can be expected to shorten as the group gains experience in the EST area.

The Committee of Directors may approve or disapprove the proposal. If approved, the TEST Group will proceed with the preparation of loan or conditional grant documentation, and the eventual disbursement of funds.

3.3.2 Promotion

The TEST Group will proactively promote the Project. Promotion will include direct mailings of literature, seminars, workshops, media promotion, and a TEST newsletter. The TEST Group will ensure intensive coverage of industry sector associations involving the ESTs which have been prioritized, and chambers of commerce located in the geographic areas identified with those ESTs.

Since potential clients cannot be expected to respond to TEST opportunities by mail or by travelling to Bombay, TEST Group officers will travel frequently to visit these selected regions and industrial sectors. The TEST Group will coordinate promotional activities with the U.S. institutional contractor who can inform the interested business development consultants and elicit their participation if appropriate.

ICICI, as the primary TEST coordinator, will also promote TEST to other financial institutions such as state development and finance entities, as well as other entities at the state level such as consulting companies. These entities will be encouraged to promote TEST among their clients.

3.4 Implementation Schedule

Action	
Sign Project Agreement	09/92
Meet Conditions Precedent to initial disbursement	10/92
ICICI appoints TEST Group Manager	10/92
Arrange for interim assistance	11/92
ICICI staffs TEST Group	12/92
ICICI establishes Advisory Council	12/92
Propose lending terms, review procedures and criteria	12/92
Prepare TEST promotional material	12/92
U.S. interim assistance on board	01/93

Begin promotion program in U.S.	01/93
Issue RFP for U.S. Institutional Contractor	02/93
TEST Group receives and reviews proposals from existing Indo-U.S. joint ventures	02/93
First Advisory Council meeting	02/93
Begin promotion program in India	02/93
Approve lending terms and criteria	02/93
Introduce Information Network to first and second level participants	04/93
Begin data base and flow of information from U.S. to India	04/93
Conduct first visits, seminars in priority regions	05/93
Review first proposals	06/93
Select U.S Institutional Contractor	07/93
Second Advisory Council Meeting	08/93
Second round of visits, seminars to priority regions	08/93
Approve first proposals	09/93
Begin disbursement of first approved proposals	11/93
Third round of visits, seminars to priority regions	11/93
Third Advisory Council Meeting	02/94
Reflows of interest begin	02/94
Midterm evaluation	09/94
Institutional contract ends	03/97
Final Evaluation	10/97

4. COST ESTIMATES AND FINANCIAL PLAN

4.1 Overview and Cost Summary

The cost of the TEST Project is $35.8 million (see Table 4.1 Summary Cost Estimate and Financial Plan). A $20 million component of the USAID grant under the management of ICICI will be used for financing the procurement of ESTs on a loan or conditional grant basis. The $10.8 million Host Country Contribution (HCC) will finance the client's rupee contribution in equity or other debt for TEST subprojects. The remaining $5 million of the A.I.D. grant is for technical assistance; trade and investment tours; support for the Information Network; promotion; monitoring and evaluation; audit; grants to associations; and support to ICICI. Contingencies have been estimated at about 4 percent and U.S. inflation at 3 percent. It is assumed that anticipated local currency devaluation will cancel the effects of local currency inflation.

Table 4.1 SUMMARY COST ESTIMATE AND FINANCIAL PLAN

(in $000's)

Cost Component	FY 1993			FY 1994			FY 1995			FY 1996			FY 1997			TOTALS		
	USAID		HCC	USAID		HCC	USAID		HCC	USAID		HCC	USAID		HCC	USAID		HCC
	$	LC		$	LC		$	LC		$	LC		$	LC		$	LC	
I. Financing																		
Loans and Conditional Grants	1,000	272	683	3,500	1,228	2,557	4,000	2,000	3,240	4,000	2,000	3,240	1,500	500	1,080	14,000	6,000	10,800
II. Technical Assistance																		
TA (full time advisor in US)	47	0	0	190	0	0	190	0	0	143	0	0	0	0	0	570	0	0
Short-term consultants US/Indian	38	8	0	130	30	0	130	30	0	133	22	0	130	22	0	558	112	0
Core Cost (20%)	17	0	0	64	0	0	64	0	0	55	0	0	26	0	0	226	0	0
Trade & Investment Tours	25	25	0	25	25	0	25	25	0	25	25	0	25	25	0	125	125	0
Information Network	10	40	0	10	40	0	10	40	0	10	40	0	0	40	0	40	200	0
Promotion	80	50	0	80	50	0	30	25	0	30	29	0	0	0	0	220	154	0
Monitoring, evaluation, audit, Financial Reviews	0	10	0	0	10	0	135	10	0	0	10	0	160	10	0	295	50	0
Subtotal (II)	217	133	0	499	155	0	584	130	0	393	126	0	341	97	0	2,034	641	0
III. Interim Coordinator (Possible buy-in)	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0
IV. Grants to Associations	10	60	0	10	60	0	10	60	0	10	60	0	0	60	0	40	300	0
V. Support to ICICI	50	50	0	100	50	0	100	50	0	100	50	0	100	50	0	450	250	0
VI. Subtotal (II, III, IV, IV)	397	243	0	609	265	0	694	240	0	503	236	0	441	207	0	2,644	1,191	0
VI. Contingency (4%)	56	0	0	164	0	0	188	0	0	180	0	0	78	0	0	666	0	0
VII. Inflation (3%)	42	0	0	123	0	0	141	0	0	135	0	0	58	0	0	499	0	0
VIII. Grand Total	1,495	515	683	4,396	1,493	2,557	5,023	2,240	3,240	4,818	2,236	3,240	2,077	707	1,080	17,809	7,191	10,800

A summary of projected commitments for financing project supported activities during each year is given below:

TABLE 4.2 COMMITMENT PROJECTIONS FOR TEST PROJECT
(in $000's)

FY	1993	1994	1995	1996	1997	TOTAL
AMOUNT	2,010	5,889	7,263	7,054	2,784	25,000

4.2 Sustainability

Three mechanisms have been built into the TEST Project to ensure sustainability:

1. The creation of permanent linkages between U.S. technology sources and Indian users through licensing agreements and joint ventures is designed to generate a continuous flow of U.S. technology beyond the LOP.

2. Reflows from loans and conditional grants will be available to ICICI for local currency lending for EST projects, and should continue to be received for several years beyond LOP.

3. The expertise of the TEST Group in ICICI, gained through experience during the Project, will continue to be available to the institution following the termination of TEST. One can expect that in the future ICICI, as a leading national institution, will continue a major effort in the EST area, lending its own and donor resources. If ICICI is successful, it is expected that other institutions will emulate ICICI and seek donor funding. Even if on a smaller scale, these institutions will contribute to the reduction of the pollution problem.

4.3 A.I.D. Contribution

The A.I.D. contribution of $25 million will fund the purchase of U.S. ESTs for reducing India's industrial pollution problem. A total of approximately $20 million will be provided to firms as loans or conditional grants for the purchase of U.S. and Indian ESTs and for associated local costs. A portion of this amount may be used on a conditional grant basis to facilitate what could become permanent and sustainable Indo-U.S. relationships. The costs covered by these conditional grants will include travel involved in the initiation of specific relationships, pre-feasibility and feasibility studies, or a portion of technology licensing fees which might be required by a U.S. technology owner. The flexibility afforded ICICI in creating a competitive overall financial package is essential to Project implementation.

Of the remaining $5 million, A.I.D. will make available amounts for technical assistance; trade and investment tours between India and the U.S.; promotional expenses; the U.S. institutional contractor; support for the Information Network; grants to professional and business organizations; support to ICICI, including assistance in the establishment of a U.S. presence; monitoring and evaluation; non-federal audits; and contingencies and inflation.

4.4 Summary

The cost estimates shown above are reasonable in that the Project budget was constructed from the "bottom up" beginning with the most easily quantified factors and working toward the most uncertain. The primary assumption concerning the loan and conditional grant line is ICICI's approval to proceed with at least two of the existing joint venture projects which have been identified. This will result in significant project fund commitment in the first fiscal year to cover license and feasibility study costs.

4.5 Disbursement Procedures

Disbursements for Foreign Exchange Costs: Two mechanisms as described below are available to pay the cost of goods and services procured in the U.S. Of these, the first primarily applies to host country contracts, and the second to A.I.D. contracts.

1. USAID may issue direct Letters of Commitment to U.S. suppliers of goods and services, or may make direct payments at the request of ICICI to U.S. suppliers. The payments will be made by USAID directly to suppliers of goods and services on receipt of invoices and supporting documents duly approved for receipt of goods and/or performance of services by the implementing authority, ICICI. Verification of commodity procurement procedures for competition and fair price regulations will be carried out by the Regional Contracting Officer directly or through the Mission financial control procedures of the USAID controller.

2. A.I.D. may contract directly with the U.S. contractors for the supply of goods or services. Payments under such an arrangement will be made directly to the U.S. contractors by A.I.D. and charged to the Project.

Disbursement of Local Currency Costs: Concerning all eligible local currency costs, ICICI will claim reimbursement by directly submitting to USAID Voucher SF-1034 in original and three (3) copies showing the details of payments made (or payments expected to be made in the next ninety days in case of advances approved by the Mission Director). This voucher should be duly certified by an authorized official of ICICI, and may be submitted quarterly, or as often as necessary.

4.6 Financing Methods

The methods of implementation and financing of the various project elements are shown in Table 4.3. Direct reimbursements will mostly be for the local currency component of loans or conditional grants, technical assistance, the Indian side of trade and investment tours, promotion, and grants to associations.

TABLE 4.3 METHODS OF IMPLEMENTATION AND FINANCING

ITEM	METHOD OF IMPLEMENTATION	METHOD OF FINANCING	BASE COST ($000)
Loans and Conditional Grants	Host Country Financing (includes procurement of equipment)	Host Country Reimbursement Direct Payment Direct L/Comm	20,000
Technical Assistance, Trade and Investment Tours, Information Network, Promotion Monitoring, Evaluation, Audit	US Direct Contracting	Direct Payment	2,034
	Host Country Financing	Host Country Reimbursement	641
Interim Coordinator			120
Grants to Associations	Direct Payment	Direct Payment	40
	Host Country Financing	Host Country Reimbursement	300
Support to ICICI	Host Country Financing	Host Country Reimbursement	700

(The total equals $23,835 million and does not include contingency and inflation.)

4.7 Financial Monitoring and Assessment of ICICI Procedures

The Project will be implemented by ICICI, a well managed and established institution with a sound financial position and satisfactory accounting and reporting systems. ICICI's financial control and reporting procedures for the loan and conditional grant mechanisms will follow ICICI's standard operational procedures, subject to special requirements of the TEST Project Grant Agreement, or as further specified by PILs.

Based on experience with other USAID projects, USAID has reasonable assurance that ICICI has the necessary financial management and control systems to implement the TEST Project and to assure adequate accountability.

The Basic Project Implementation Letter will specify ICICI's procedures for reporting to USAID. These will include the following submissions: quarterly financial reports and semiannual progress reports showing actual versus planned implementation, operations, and financial performance; an annual schedule of projected disbursements and utilization of project funds; annual updates of financial projections, and reports on borrowers/grantees receiving assistance in accordance with procedures to be established by USAID; and an annual report of the Host Country Contribution to the Project. If a host country contract of $250,000 or more is proposed under the Project, USAID will make a specific evaluation of contracting procedures of ICICI and/or the contracting entity, as required by A.I.D.'s revised Host Country Contracting Guidelines. Furthermore, USAID may, at its option, conduct accounting and internal control reviews of ICICI and firms taking loans/grants from ICICI. The cost of these reviews will be charged to the Project.

4.8 ICICI Use of TEST Reflows

During the LOP local currency reflows from the payment of interest and principal on loans, and royalties on conditional grants made early in the Project will be deposited to a separate account (see Annex L for a range of estimates). The reflow balances are the property of the GOI. However, the TEST Grant Agreement will stipulate that these balances will be used to make loans or conditional grants to finance ESTs at the discretion of ICICI in the furtherance of the TEST Project goal. These funds may also be used by ICICI to pay its management fee, which will be 2.5 percent of cumulative outstandings at the end of each Project year.

4.9 Audit

ICICI will be required to maintain separate books and records related to the utilization of A.I.D. provided TEST Project grant funds. These shall provide records of the activities financed under the Project relating to loans and conditional grants; technical assistance; trade and investment tours; the Information Network; Project promotion; grants to organizations; and monitoring and evaluation. ICICI will arrange to have its books, records, and TEST Project activities audited annually by an independent auditor in accordance with guidelines to be provided by USAID. These audit reports will be submitted within 30 working days after the completion of the audit. In addition, ICICI's books and records will be available for inspection and audit by the A.I.D. Inspector General and/or any of its representatives. The Project includes the cost for monitoring, evaluation, non-federal audit and payment verification reviews under the technical assistance line item.

5. MONITORING AND EVALUATION PLAN

5.1 Introduction

The TEST Project monitoring and evaluation plan is designed to provide information for three purposes:

1. Monitoring Project inputs and outputs.

2. Monitoring the Project's and implementing agency's performance and compliance with the terms of the TEST Project Grant Agreement.

3. Evaluating Project impact.

The plan includes specifications for project input and output indicators and purpose level impact indicators, and identifies data sources for evaluation information. The plan is designed to minimize the management burden for both USAID and ICICI while still providing necessary and sufficient information for the evaluation of the Project.

During the course of Project implementation, the requirement that project end users and/or participating suppliers of goods or services supply operating specifications or estimates of the pollution reduction capabilities of their technologies will assist considerably in the monitoring and evaluation process. ICICI's TEST Group, with technical assistance as necessary, will refine the monitoring plan at the end of the first year of the Project.

5.2 TEST Project Input and Output Indicators

5.2.1 Input Indicators: Input indicators are dollar amounts expended for each activity, and demonstrate the degree to which Project resources are being expended, as follows:

TEST ACTIVITY	INPUT INDICATOR	TOTAL VALUE/ COST TARGET ($000)
Loans and Conditional Grants	Loans and Conditional Grants approved by ICICI	20,000
Technical Assistance, Trade and Investment Tours, Information Network, Promotion	Technical assistance contracted, # databases created and disseminated, # of seminars	2,675
Grants to Associations	Number of Grants	340
Support to ICICI	Local and U.S. expenditures	700
Interim Coordinator		120

(The total equals $23,835 million and does not include contingency and inflation.)

5.2.2 Output Indicators: The Project is designed to support U.S. or Indian (licensee or joint venture with U.S. partner) firms which will supply ESTs to Indian end users. TEST monitoring and evaluation procedures will collect two types of data. The first is information on direct outputs of TEST activities pursuant to its budget. These outputs are specified below:

TEST ACTIVITY	OUTPUT INDICATOR	TARGET TOTAL
Loans and Conditional Grants	# proposals reviewed # proposals approved amounts disbursed by category	150 50
Linkages Created	# licensing agreements, joint ventures created or activated through TEST	25
Technical Assistance	# person-months	30 (U.S.) 15 (Indian)
Trade and Investment	# tours	10
Information Network	# U.S. firms in Network # potential users receiving data # inquiries received	200 2,000 500

The second type of output indicator concerns the usage of the Project loan and conditional grant monies in terms of the type of EST business financed, and will also serve to track the HCC as required by the Project (since the HCC is defined as the local costs, etc., of a project financed with TEST dollar funds, HCC is an output of the Project). The TEST Group at ICICI will maintain a record of the following:

1. The name and location of the approved applicant.

2. The transaction or deal financed, and the amounts of TEST loan or conditional grant funds committed.

3. The local costs (HCC) involved in completing the Project.

4. The type of pollution problem attacked and the technology involved.

5. The end user target market, if applicable.

6. The baseline pollution data submitted, if applicable.

5.3 TEST Project Impact Indicators

The goal of the TEST Project is to increase environmental protection and enhance the productivity of Indian industry on a sustainable basis. The purpose of the Project is to assist Indian industries to adopt environmentally sound technologies and practices to reduce industrial pollution while promoting sustainable linkages between U.S. and Indian firms.

Each end user applicant under the TEST Project should include as part of its application to the TEST Group:

1. A measurement of the pollution to be treated to provide baseline data for the project.

2. An estimate of the positive impacts to reduce the measured pollution intrinsic in the project proposal. While the TEST approval decision will be based on all factors, the TEST Group can make a rough cost/benefit analysis of the proposal in terms of pollution reduction.

The TEST Group will estimate and record the pollution reduction benefits of all approved projects in accordance with the baseline data submitted and the design specifications for the remedial action to be taken as presented in the proposal.

5.3.1 Measurement Indicators for Identified Technologies:

Technology Gap Treated	Measurement
Water-Pollution Control	
Removal/reduction dissolved solids (TDS)	Temp.,pH, mg/l.
Removal/Reduction biological oxygen demand (BOD) and chemical oxygen demand (COD)	Temp.,pH, mg/l.
Removal/reduction of color	Units
Removal/reduction of special pollutants	Temp.,pH, mg/l.
Air-Pollution Control	
Monitoring instruments	number installed
Removal/reduction of special pollutants	Mg/NM3
Removal/reduction of oxides of nitrogen	Kg/ton
Package scrubbers	Mg/NM3
Solids Handling	
Treatment, handling, disposal of hazardous waste	Tons/barrels
Utilization of fly ash	Tons transformed
Incineration	Tons incinerated

In-plant Control

Clean process technology	Pollution reduction/ year
Reuse/recycle waste water	M3 water saved
Recovery of chromium from waste stream	Kg recovered/year
Reduction of noise pollution	Decibel reduction
Recovery of chemicals	Kg recovered/year

5.4 Demonstration Effect of TEST-Introduced Technologies

Midterm and final evaluations will take note of the Project's impact in introducing U.S. clean technologies in one or two units of an industry. While there is no assurance that in the future the rest of the industry will adopt the same U.S. technologies, if they are proven in one or two cases, SPCBs will put pressure on remaining units to take positive action to reduce their pollution. Final evaluation interviews with the appropriate SPCBs in this regard is recommended.

5.5 TEST-Financed Manufacturing Licensees/Joint Ventures

Having identified the number of such firms in the Output Section of the evaluation, the evaluation will attempt to quantify the pollution reduction impact of these firms.

To keep the cost of performing the midterm and final evaluations under control, an estimate of the positive impact on industrial pollution can be made by taking the pollution reducing specifications of the equipment manufactured and multiplying by the number of units of equipment which have been sold and (presumably) installed. Annual pollution reduction calculations can be made, and depending upon the useful life of the equipment, extrapolated to produce a meaningful estimate.

Firms receiving financing from the TEST Project will provide this information to ICICI or to TEST Project evaluators as part of their loan agreement or conditional grant documentation.

5.6 TEST Group Monitoring Reports

Financial inputs and direct Project outputs can be collected by the TEST Group and reported to ICICI management and to USAID on a semiannual basis. These will include all approved projects involving loan, and conditional grant monies, the information on each outlined in 5.2 (Project Output Indicators), and a status report on each.

TEST Project clients will be required to update the information provided in their application annually, including copies of their latest financial statements, if required by ICICI.

The TEST Group will visit a stratified non-random sample of TEST Project clients annually and verify project status. All clients considered to be

in the large or important category, when including both TEST and HCC funding, should be visited annually if possible. Internal reports of all visits will be maintained, and the visits noted on the semiannual report to ICICI management and USAID. Business performance of a manufacturer, or visible pollution reduction in other cases, should be recorded for future use in the evaluation process.

5.7 Mid-term Evaluation

At the end of Project year two, sufficient data will exist to assess the performance of the TEST Project. The objective of this evaluation will be to identify the effectiveness and sustainability of individual activities, and to recommend midterm corrections to enhance the overall effectiveness of the Project. Approximately four person-months will be needed to carry out the midterm evaluation. Together, ICICI and USAID will develop terms of reference for the evaluation and select the team. USAID will directly contract for the team.

The evaluation will include examination of the number and types of firms financed by the Project and the performance of these firms. It will also include an estimation of TEST's impact on the Project goals to date, on a client by client basis, following the methodology described above. It will also evaluate the TA provided, and trade and investment tours which have taken place. The sustainability of TEST activities will be an important element for the evaluation team to consider.

5.8 Final Evaluation

A final impact evaluation will be conducted at the end of the fifth Project year. It will assess the effectiveness of Project activities and their impacts on the control and abatement of industrial pollution and the establishment of long term linkages between U.S. and Indian EST users and providers.

Five person-months will be required to carry out a thorough final evaluation of the Project. The final evaluation will be jointly planned by ICICI and USAID, and the team will be directly contracted by USAID.

6. SUMMARY OF ANNEXES

6.1 TECHNICAL ANALYSIS - TECHNOLOGY BASIS

In order to best meet the project goal and purpose, it was necessary to determine the EST technology gaps existing in India and match them with technologies in which the U.S. is considered to be the leader, or at least competitive with Europe and Japan. Since it is possible to meet only a small part of India's total needs with the funds available to the TEST Project, a study matching technology gaps with both industrial subsectors and geographic areas was conducted by a consulting team during April-June 1992. Responses from representatives of industry, government, consulting firms, and the laboratories involved in tackling pollution problems indicated that certain technological gaps are common to many of the subsectors.

The technology gaps identified involve specific equipment, monitoring and control instrumentation, and know-how that applies to pollution prevention, control, and remediation. These gaps necessarily overlap with industrial subsectors and many critically polluted geographical areas. ESTs applicable to one industrial subsector are also applicable to many others. A prospective supplier would be able to reach a wider market with a given EST, regardless of the subsector or geographical area.

The major technology needs (gaps) identified can be summarized as follows:

1. Removal/reduction of dissolved solids from waste water streams.

2. Recovery and reuse of chemical resources from waste water streams, atmospheric emissions, and solid wastes.

3. Systems for removing special pollutants from waste water, atmospheric emissions, and manufactured products.

4. Handling and management of hazardous wastes.

5. Reduction of color, odor, and biological/chemical oxygen demand loads in waste water.

6. Reduction of particulates (suspended particles), sulfur dioxide, and oxides of nitrogen emitted to the atmosphere from industrial processes.

7. Availability of adequate instrumentation for monitoring and analysis in control of both water and air pollution.

For each technology gap, by taking into account the number of subsectors and the number of states in which those industries are located, it is possible to create a priority ranking. This ranking is based upon a combination of the largest number of subsectors and states where they are found. This highlights the greatest potential market as well as where to concentrate project promotional and information activities.

6.2 TECHNOLOGY ANALYSIS -- TEST INFORMATION NETWORK FOR INDO-U.S. TECHNOLOGY TRANSFER COOPERATION

The key component is organizing a permanent information network with a two-way flow matching Indian needs for technical information and technology imports with the U.S. capability to meet the needs. While firms with current business arrangements can benefit from improved information, the number one targets are those U.S. and Indian companies not yet doing business with each other. The critical elements of an Indian information system are being put in place. Quite apart from the TEST project this network has organizations that access foreign data banks, and intermediate organizations that receive this information and pass it on to their members, the ultimate users. This is a multi-channel network reaching from the U.S. and other countries to Indian companies that must use ESTs. There is also a reverse flow of information from potential Indian customers to U.S. businesses - though this is not nearly as strong as the inbound flow to India. Given this situation, it is not necessary to create new organizations, but to concentrate upon improving links in the current network.

Four importers of information on U.S. ESTs are:

1. The Confederation of Indian Industries, New Delhi.

2. The National Environmental Engineering Research Institute, Nagpur.

3. The UN-ESCAP Asian and Pacific Center for Transfer of Technology.

4. The Foreign Commercical Service of the U.S. Department of Commerce.

The intermediate organizations include various chambers of commerce, trade associations, and industrial consulting organizations. The ultimate users will be primarily medium and smaller size enterprises. Many Indian companies find it difficult to access information on U.S. technology and business. These companies desire the following kinds of information:

1. A listing of the major U.S. equipment and instrumentation providers.

2. A listing of U.S. industrial pollution control engineering consultants and service providers as well as firms providing R&D and analytical and testing services.

3. A listing of Indian companies desiring U.S. EST technologies, collaborative arrangements, and their needs.

4. Information about U.S. EST trade fairs, expositions, conferences and industry association events.

6.3. TECHNICAL ANALYSIS - TECHNOLOGY TRANSFER THROUGH PROMOTION OF INDO-U.S. JOINT EST VENTURES

The conventional technology transfers mechanisms followed by Indian companies are :

1. Company representation and distributorship.

2. Technical know-how licensing arrangements.

3. Joint ventures.

The sheer size of the U.S. market has been a major constraint. It leaves little incentive for many U.S. firms to seek overseas markets. This is particularly true in a country such as India, which has a reputation as being a difficult place to work and where sales of U.S. ESTs have been small. Therefore, a major effort at marketing opportunities in India is required. The aim is to establish linkages between U.S. and Indian companies.

The business development consultant has an important linkage role. The primary actors in this area are the business, industrial and service organizations from the U.S. as providers and similar groups from India as receivers. Other groups are manufacturing or service/consulting companies that have collaborative arrangements with U.S. companies through joint ventures and licensing arrangements. These are the companies that have vested interest in promoting the flow of U.S. ESTs into India. Existing joint ventures or those now under discussion have the capability to jump start the TEST Project. They should be the first targets of the promotion and marketing campaign - the best way to promote new joint ventures is to demonstrate the success of existing ones.

Companies of all sizes need assistance in identifying business opportunities, locating technology supplies, undertaking feasibility studies, negotiations, and other commercial activities. Such services are being provided by intermediaries who are specialized in venture management, collaboration services, undertaking technology searches/sourcing, and identifying partners. At present there is a lack of such service providers in the EST area.

6.4. TECHNICAL ANALYSIS - U.S. AND INDIAN AGENCIES IN INFORMATION NETWORKING AND TECHNOLOGY TRANSFER

This annex is essentially a listing and description of Indian and U.S. agencies that have a role to play in the information network and linkage programs. They range from EPA to Water for People on the U.S. side to chambers of commerce and consulting organizations on the Indian side. A summary of potential Indo-U.S. linkages which could be funded by TEST, and which could provide early successes, are listed.

6.5 ADMINISTRATIVE ANALYSIS

Based upon six criteria - which include the ability of the institution to finance innovative and advanced technologies, the capacity to finance large projects, and the skilled manpower to manage a major project to USAID's satisfaction - ICICI was chosen as the apex Developmental Finance Institution (DFI). A number of public development banks and private financial services companies were interviewed prior to the selection.

ICICI was founded under the Companies Act in 1955. It is owned about 85 percent by public sector financial entities, with the remainder about equally divided between about 10,000 Indian private sector firms and individuals, and foreign owners. Its shares are publicly traded. ICICI has a strong multi-billion dollar balance sheet, a liabilities to net worth ratio of about 13:1, and profitable operations. It presently pays a 24 percent dividend. ICICI has experience in managing several USAID projects.

ICICI will form a TEST Group with overall responsibility for the TEST Project and will also:

1. Work with the U.S. institutional contractor in arranging technical assistance and trade and investment tours.

2. Arrange seminars in priority regions.

3. Monitor the TEST information network.

4. Constitute a TEST Advisory Council.

The U.S. institutional contractor will gather information on U.S. EST providers and communicate this information to ICICI, promote the Project, and arrange technical assistance and trade and investment tours. TEST will assist ICICI in placing a representative to work with the U.S. institutional contractor.

In operating the Information Network in India, ICICI will work with NEERI and CII, which constitute the first level of entry of information from the U.S. The information will then be disseminated by mail, fax, or in person to a specific contact point in the second level of institutions in the network such as the national and state level industry associations and chambers of commerce, SPCBs and DFIs.

ICICI's TEST Group will be responsible for reviewing and submitting for ICICI approval all loans and conditional grant proposals made under the Project, and has authority for approving all technical assistance. ICICI's TEST Group will also monitor all phases of the Project.

6.6 FINANCIAL ANALYSIS

The financial components of the TEST Project are:

1. A $20 million loan and conditional grant fund to support all types of EST acquisitions and collaborative arrangements.

2. A $10.8 million HCC composed of local currency equity or loans invested in the approved ESTs.

3. A $5 million technical assistance and administrative expense component.

The total Project cost is $35.8 million.

A reflow account of principal, interest, and royalties on loans and conditional grants will be formed. Three models have been created to estimate the amount and timing of reflows:

1. All loans.

2. All conditional grants.

3. A combination of loans and conditional grants.

The outputs, simple future value, compounded future value, and the net present value of each model ($000) is shown below for comparison purposes:

	MODEL 1	MODEL 2	MODEL 3
Recoverable $ Funds Disbursed	20,000	20,000	20,000
Current $ to Reflow Account (total as shown in model)	35,550	40,000	34,000
Reflows compounded at 19 percent per annum	39,044	49,051	41,769
Net Present Value (discounted at 13%)	18,030	13,878	15,259

These calculations highlight, from the standpoint of capitalizing the reflow account, the desirability of making loans as opposed to conditional grants early in the project. The conditional grant mechanism can be used to facilitate Indo-US license and joint venture arrangements. ICICI's TEST Group will be accorded latitude in finding a successful combination of terms and conditions for attracting end user projects.

6.7 ECONOMIC ANALYSIS

The underlying economic premise of TEST is that existing and future U.S. ESTs can assist India to reduce the high social costs and economic inefficiencies created by the negative externalities of excessive industrial pollution. Decades of industrial growth driven by the need to increase domestic production and create jobs has been achieved behind high protective barriers. However, little thought was given throughout the first seven five-year plans to the damage to India's people and environment in the struggle for industrial self-sufficiency. As a result, India's industrial centers rank among the world's most polluted.

The economic and social costs caused by externalities in many geographic regions (the MOEF has identified 14) have not been measured, although more than 130 environmental studies sponsored by NEERI have been completed or are underway. Pollution problems have been identified and studied, but no apparent attempt made to quantify these problems in terms of social cost. Therefore, the baseline for determining the Project's economic benefit cannot be determined.

However, the economic impact of TEST can be estimated at the level of the firm by comparing data obtained during project monitoring and evaluation with baseline data which was supplied with the firm's original project proposal. All prospective Project beneficiaries will be asked to supply baseline pollution measurement data to ICICI with their project application. (Both USAID and ICICI recognize this as potentially sensitive, and will treat it as such). Certain technologies will recapture usable by-products or reduce energy use, producing measurable benefits. Specifications of equipment sold and installed will provide an idealized measure of pollutants which have been taken out of the system, or otherwise neutralized.

During the course of monitoring, and the midterm and final evaluations, an estimate of the overall project benefit can be derived through tracking the type and number of units of U.S. sourced equipment installed under the Project. The operating specifications, when compared with the baseline data, will permit an estimation of the reduction of various pollutants over time. If desired, the evaluators can then translate the reduction of pollutants to dollar terms using acceptable methodology and assumptions. The benefits thus calculated can then be compared against project costs. Large projects can provide post installation measurements to improve the accuracy of project impact for the final evaluation.

6.8 SOCIAL SOUNDNESS ANALYSIS

TEST is designed to respond to India's environmental and development priorities. The Project will provide financing for the procurement of ESTs, and will enhance the flow of relevant information without major disruption of sociocultural systems.

The main beneficiaries of TEST will be U.S. and Indian suppliers and consumers, their employees, and the surrounding communities. Industry may benefit economically through improved profit margins and increased gross revenues. The working conditions and the health of plant employees will be improved by reduced pollution. Local communities will benefit from better living conditions. Additionally, dialogues catalyzed by TEST among the private sector, industry associations, government officials, and NGOs should improve communications - a benefit for future environmental activities in India.

6.9 ENVIRONMENTAL ANALYSIS

According to A.I.D.'s Environmental Procedures, TEST is categorically excluded form an Initial Environmental Examination, Environmental Assessment, or Environmental Impact Statement. A copy of the approved categorical exclusion is included in Annex O. However, it is expected that TEST Project activities will increase production efficiencies and introduce new technologies which will have a significant positive impact on the environment. Further, proposals to ICICI for loans and conditional grants under the Project must include an estimate of the pollution reduction potential due to the proposed equipment or technology.

7. CONDITIONS AND COVENANTS

The Project Grant Agreement will contain the following conditions precedent and covenants:

7.1 Conditions Precedent to Disbursement

7.1.1 First Disbursement: Prior to the first disbursement under the Grant, or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made, the Grantee will, except as the Parties may otherwise agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D. a statement of the name(s) of the person(s) holding or acting in the office(s) of the Grantee as specified in the Project Agreement, and of any additional representatives, together with a specimen signature of each person specified in such statement.

7.1.2 Additional Disbursement: Prior to disbursement under the Grant, or to issuance by A.I.D. of documentation pursuant to which disbursement will be made to finance loans or conditional grants, the Grantee, except as A.I.D. may otherwise agree in writing, furnish to A.I.D., in form and substance satisfactory to A.I.D., documentary evidence that it has:

1. Created a TEST Group within its organization to manage the Project. The Group will include officers responsible for overall management, promotion and information, proposal evaluation, loans and conditional grants and technical assistance, and such other personnel considered necessary to implement TEST Project activities.

2. Established a TEST Advisory Council to provide strategic advice and guidance for the Project.

3. Developed terms, criteria and procedures for the review and approval of TEST loans and conditional grants to firms and joint ventures wishing to import into India environmental equipment, technology or services from the United States. Such terms would include provisions governing the Grantee's retention of reflows from loans and conditional grants repaid by recipients of project assistance.

7.2 Special Covenants

7.2.1 Reporting of Grantee's Project Contribution: The Grantee agrees to furnish to A.I.D. in writing, annually during the life of the Project, a report of the Grantee's contribution (in cash and in kind). The format and content of such report will be mutually agreed to in a Project Implementation Letter.

7.2.2 Evaluations: Within six months of the date of the Agreement, the Grantee will establish a monitoring and evaluation program which will be financed as part of the Project. Except as the Parties may otherwise agree in writing, this program will include an in-depth midterm evaluation and a final evaluation at the end of the Project. The monitoring and evaluation program will include:

1. An evaluation of progress towards attainment of the objectives of the Project.

2. Identification and evaluation of problem areas or constraints which may inhibit such attainment.

3. Assessment of how such information may be used to help overcome such problems or constraints.

4. Evaluation, to the degree feasible, of the overall development impact of the Project in controlling or abating industrial pollution, and the sustainability of the effort.

7.2.3 Training: The Grantee shall make all training under the Project available to their personnel without discrimination on the basis of gender.

7.2.4 Use of Training: The Grantee shall exercise every reasonable effort to require that each of their personnel trained under the Project shall work in activities related to the Project or in activities approved for financing under this Project Grant Agreement, in India, for not less than three times the length of his or her training program.

7.2.5 TEST Advisory Council: The Grantee shall ensure that the TEST Advisory Council remains operational throughout the life of the Project.

7.2.6 Segregated Account for Reflows and Royalties and Utilization Upon Project Completion/Termination:

1. The Grantee agrees that all reflows (i.e., repayments of principal and/or interest) from loans financed under the Project and royalties from conditional grants provided under the Project shall be deposited and maintained by the Grantee in a segregated account and not commingled with other assets of the Grantee. All funds in the account shall be used for purposes of the Grant as set forth in the Project Agreement or in Project Implementation Letters issued pursuant to the Agreement. It is the understanding of the Parties that the Government of India shall hold the beneficial interest in all reflows and royalties and that the Grantee neither has nor shall obtain any present or future beneficial interest, whatsoever, in either the Grant or the reflows and royalties, other than for reimbursement of mutually agreed-upon costs incurred by the Grantee under the Grant.

2. After completion of the Project or upon the termination of the Project Agreement by either Party, A.I.D. and the Grantee shall confer and agree in writing to the utilization thereafter of all funds in said account in a manner consistent with the purposes and objectives of the Project. The requirement set forth herein is in addition to and neither replaces nor modifies any other provision of the Agreement.

3. The Grantee will develop written procedures to ensure that reflows and royalties are deposited and maintained in the manner set forth above.

4. The Grantee agrees to furnish to A.I.D. in writing, semi-annually during the life of the project, a report on deposits to, and disbursements from, the said account.

ANNEX A: NPD APPROVAL CABLE

UNCLASSIFIED STATE 282532

ACTION: AID-2 INFO: AMB DCM POL ECON SCI FAS FCS (8)

VZCZCNEO137
RR RUEHNE
DE RUEHC #2532 2390851
ZNR UUUUU ZZH
R 270847Z AUG 91
FM SECSTATE WASHDC
TO AMEMBASSY NEW DELHI 8454
BT
UNCLAS STATE 282532

27-AUG-91 TOR: 10:34
CN: 62224
CHRG: AID
DIST: AID
ADD:
Proj. TEST

AIDAO

E.O. 12356: N/A
TAGS:
SUBJECT: INDIA TRADE IN ENVIRONMENTAL SERVICES AND TECHNOLOGIES (TEST); NEW PROJECT DESCRIPTION REVIEW

08/28/1991
13:00
ACTION:
PDPS-3
INFO:
NRM
TDE
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D
CHRON

1. APRE CONVENED A COMMITTEE MEETING TO REVIEW THE REVISED TEST NEW PROJECT DESCRIPTION (NPD) ON JULY 18. IN ATTENDANCE WERE REPRESENTATIVES FROM APRE/DR/PD, APRE/DR/TR, APRE/A, MS/OP, AND USAID.

2. APRE APPROVES THE NPD AND DELEGATES PID (OR PAIP, AS THE CASE MAY BE) APPROVAL AUTHORITY TO THE MISSION DIRECTOR. COMMITTEE COMMENTS FOLLOW.

3. AS A POINT OF REFERENCE, THE COMMITTEE ADDRESSED THE POINTS RAISED IN AN EARLIER FAXED MESSAGE FROM APRE/DR/TR TO THE MISSION AFTER REVIEW OF THE FIRST TEST NPD IN LATE APRIL. THESE CAN BE SUMMED UP AS:

A. POSSIBLE DUPLICATION WITH OTHER USAID PROJECTS (IN PARTICULAR, PACT);
B. UNCLEAR POLICY AGENDA;
C. SIMILARITY TO A CIP AND ITS INCIPIENT MANAGEMENT BURDEN; AND
D. INTELLECTUAL PROPERTY RIGHTS (IPR).

NOTE: MISSION REP, JOHN GRAYZEL, INDICATED THAT A RETURNED FAX MESSAGE WAS SENT. REGRETTABLY, WE HAVE NO RECORD OF SUCH A MESSAGE.

4. THE COMMITTEE FELT THE REVISED NPD WAS MUCH CLEARER IN EXPLAINING THE PROJECT CONCEPT AND, THUS, RESOLVING MOST OF THE ISSUES. CONSEQUENTLY, WE RECOGNIZE THAT THE PROJECT IS MUCH LESS LIKE A CIP AND MORE CLOSELY RELATED TO NONPROJECT ASSISTANCE. A RELEVANT EXAMPLE OF THIS TYPE OF PROJECT WAS CARRIED OUT IN TANZANIA (GRAYZEL WILL FOLLOW UP WITH CDIE ON THIS AND OTHER SIMILAR EXAMPLES OF NONPROJECT ASSISTANCE). THE COMMITTEE NOTED, HOWEVER, THAT ALTHOUGH THIS TENDS TO REDUCE THE MANAGEMENT BURDEN, THE POLICY BENCHMARKS MUST BE NEGOTIATED CAREFULLY TO AVOID MAJOR IMPLEMENTATION DELAYS.

5. THE COMMITTEE REITERATED THE NEED NOT TO AVOID IPR. ALTHOUGH THIS PROJECT DOES NOT APPEAR TO BE SUBJECT TO

UNCLASSIFIED STATE 282532

IPR-TYPE CONCERNS, IT IS IMPORTANT THAT PROJECT DOCUMENTATION REFLECT THE MISSION'S CONSIDERATION OF THE ISSUE.

6. QUESTIONS REMAIN REGARDING THE ABILITY OF THE PROJECT TO SELECT SPECIFIC POLICY REFORMS WHICH CAN BE ATTRIBUTED DIRECTLY AND UNILATERALLY TO ENVIRONMENTAL SERVICES AND TECHNOLOGY. HOWEVER, EVERYONE AGREES THAT IT IS FAR TO EARLY TO BE ABLE TO GAUGE THIS ASPECT OF THE PROJECT. CERTAINLY, THE MARKET ANALYSIS OF DEMAND WILL HELP TO ANSWER THIS QUESTION.

7. MISSION IS REMINDED OF THE NEED TO OBTAIN THE APPROVAL OF THE BUREAU ENVIRONMENTAL OFFICER. WE SUGGEST YOU SUBMIT YOUR REQUEST FOR AN INITIAL ENVIRONMENTAL EXAMINIATION WITH THE APPROVED PID/PAIP.

8. FINALLY, IF USAID SHOULD ADJUST THE PROPOSED LIFE_OF_ PROJECT FUNDING OR PLANNED FY 92 OBLIGATION, PLEASE SO ADVISE AID/W.
EAGLEBURGER
BT
#2532

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TRADE IN ENVIRONMENTAL SERVICES AND TECHNOLOGIES

LOGICAL FRAMEWORK

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
SECTOR GOAL Increase environmental protection and enhance the productivity of Indian industry on a sustainable basis.	Improved environmental practices of industrial operations within the project focus. Increased number of private sector firms engaged in providing environmental services and equipment. Increased number of commercial transactions in providing environmental services and equipment.	Selective evaluation/ monitoring of specific operations. Case studies of assisted industries. Selected surveys of private sector firms.	Increasingly effective public pressure for stricter environmental standards. Increasingly effective laws, regulations and enforcement by the Union and State Government. Industry will recognize the economic and financial advantages of sound environmental practices and will increasingly internalize such practices in the cost of production.
PROJECT PURPOSE Assist Indian industries to adopt environmentally sound practices while promoting sustainable linkages between U.S. and Indian firms.	Level of investment in environmental technology and services in selected subsectors. Introduction of new technologies and practices. Upgrading specific industrial units and practices. Repeat sales of U.S. goods and services. Increasing U.S. investment.	Industrial practices surveys. Site visits. Available economic data.	Industry willing to make necessary capital investment for long term gains. Availability of U.S. technology at competitive prices.
PROJECT OUTPUTS Increased use of U.S. sourced technologies and services. Improved pollution control equipment and services in project related industries. A strengthened information network linking U.S. suppliers and Indian users in a two way flow of information. Increased number linkages between Indian consumers and U.S. suppliers.	New applications of U.S. sourced ESTs in India. Number of associations in the system and number of referrals to individual firms. Number of U.S. and Indian firms with commercial transactions. Established links with U.S. environmental organizations.	Surveys and site visits. Tracking of requests and information services supplied by the network services.	Initial import of U.S. goods and services prove successful and have "spread effect". Sufficient U.S. companies interested in doing business in India. Organizations in the U.S. and India who will maintain the information network.

ANNEX B

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
PROJECT INPUTS $20,000,000 for import of U.S. goods and services. Rupee environmental fund. 1. Establish Information network. 2. Provide consultancy services. 3. Carry out workshops, study tours, training programs.	Draw down of funds. Services performed, equipment purchased.	Available import data. Reports from implementing financial institution. USAID Controller records.	FX availability will remain a medium term concern. ESTs will be in demand by business. GOI liberalization policies will continue. Competent U.S. firms can be recruited. Qualified Indian financial institution will agree to manage Project.

A:testlog2

ANNEX B

ANNEX C

D.O. No. 2(16)-AID/89
भारत सरकार Government of India
वित्त मंत्रालय Ministry of Finance
आर्थिक कार्य विभाग Department of Economic Affairs

SUMATI MEHTA
DY. SECRETARY(AC)
TEL. NO. 3014443

नई दिल्ली/New Delhi 20th Oct. 1992

Dear Mr. Mahoney,

This is to confirm our request for assistance for the following three projects :-

1. Innovations in Family Planning Services;
2. AIDS Prevention and Control;
3. Trade in Environmental Services and Technologies.

With regards,

Yours sincerely,

(SUMATI MEHTA)

Mr. Timothy M. Mahoney
Director
Program Development and Project Support
USAID
American Embassy
New Delhi.

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ANNEX D: KEY POLLUTION RELATED ACTS AND RULES

1. The Water (Prevention And Control of Pollution) Act, 1974 as amended by the Amendment Act of 1978
2. The Water (Prevention And Control of Pollution) Amendment Act, 1988
3. The Water (Prevention And Control of Pollution) Rule, 1975
4. The Water (Prevention And Control of Pollution) Second Amendment Rules, 1976
5. The Water (Prevention And Control of Pollution) Amendment Rules, 1989
6. The Water (Prevention And Control of Pollution) Cess Act, 1977
7. The Water (Prevention And Control of Pollution) Cess Rules, 1978
8. The Air (Prevention And Control of Pollution) Act, 1981
9. The Air (Prevention And Control of Pollution) Amendment Act, 1987
10. The Air (Prevention And Control of Pollution) Rules, 1982
11. The Air (Prevention And Control of Pollution)(Union Territories), Rules, 1983
12. The Air (Prevention And Control of Pollution) (Union Territories) Amendment Rules, 1988
13. The Environment (Protection) Act, 1986
14. The Environment (Protection) Rules, 1986
15. The Environment (Protection) Amendment Rules, 1987
16. The Environment (Protection) Third Amendment Rules, 1987

ANNEX E

POLICY STATEMENT

FOR

ABATEMENT OF POLLUTION 1992 .

GOVERNMENT OF INDIA

MINISTRY OF ENVIRONMENT & FORESTS

NEW DELHI 110 003

NO.H. 11013(2)/90-CPW

GOVERNMENT OF INDIA

MINISTRY OF ENVIRONMENT & FORESTS

* * *

Paryavaran Bhawan,
CGO Complex, Lodi Road,
New Delhi 110 003.

Dated the 26th February, 1992

Resolution

Policy Statement for Abatement of Pollution

1. PREAMBLE

The commitment of Government on abatement of pollution for preventing deterioration of the environment is stated here. The policy elements seek to shift emphasis from defining objectives for each problem area towards actual implementation, but the focus is on the long term, because pollution particularly affects the poor. The complexities are considerable given the number of industries, organisations and government bodies involved. To achieve the objectives maximum use will be made of a mix of instruments in the form of legislation and regulation, fiscal incentives, voluntary agreements, education programmes and information campaigns. The emphasis will be on increased use of regulations and an increase in the development and application of financial incentives.

2. THE PROBLEM

2.1 There is an increasing trend in environmental pollution. Water is polluted by four kinds of substances: traditional organic waste, waste generated from industrial processes, chemical agents for fertilisers and pesticides for crop protection and silt from degraded catchments. While it is estimated that three-fourths by volume of the waste water generated is from municipal sources, industrial waste, though small in volume, contributes over one-half of the total pollutant load, and the major portion of this is coming from large and medium industries. For class-I cities of the Country, less than five per cent of the total waste water generated is collected and less than one-fourth of this is treated.

2.2 Ambient air quality trends in the major cities indicate that levels of suspended particulate matter are higher than the prescribed standaards or limits, especially in summer months. Levels of nitrogen dioxide are increasing in urban centres with growing vehicle emissions.

2.3 Environmental problems are becoming larger in scale. The chemical industry generates an increasing quantity of substances every year; adversely affecting essential aspects of the composition of the atmosphere, soil and water. In the industrial high density areas, in addition to the effects on local health and impact on nature, we are confronted with damage to the social and economic functions of the environment.

2.4 With restriction on releases to air and waste water, hazardous chemical wastes are getting diverted to land for their disposal. Earlier concerns with pollution that was visible and degradable are giving way to new types ofpollution with very small quantities of synthetic chemi- cals that are not so visible and are injurious to healthand damage the environment because of widespread use, persistence and toxicity. Reducing the hazards from toxic chemicals is now a primary public concern.

2.5 Human activities are also influencing the composition of the atmosphere. Despite uncertainties and insufficient knowledge, political and scientific decisions concerning environmental change will increasingly be necessary.

2.6 The state of the environment continues to deteriorate. The growth in scientific and technical knowledge has madeit possible to use an ever increasing quantum of natural resources. The increase in population is further enhancing the pressure on the environment. The depletion of forests has been accompanied by increasing amount of pollution affecting atmosphere, soil and water. Some of the damage is irreversible. In seeking a higher quality of life while developed countries need to focus on changing the composition of their processes and products, developing countries will need to

obtain the benefits of economic growth. The policy statement on Abatement of Pollution thus complements the Forest Policy Statement. The Government seeks to ensure that its policies in every sector are based on a set of principles that harmonise economic development and environmental imperatives.

3. FUTURE DIRECTIONS AND OBJECTIVES

3.1 It is not enough for the Government to notify laws which are to be complied with. A positive attitude on the part of everyone in society is essential for the prevention of pollution and wide consultation has been held with those who will ultimately implement the policy.

3.2 A comprehensive approach is taken to integrate environmental and economic aspects in development planning; stress is laid on preventive aspects for pollution abatements and promotion of technological inputs to reduce industrial pollutants; and through reliance upon public cooperation in securing a clean environment to respond to the coming challenges.

3.3 The objective is to integrate evironmental considerations into decision making at all levels. To achieve this, steps have to be taken to:

- prevent pollution at source;
- encourage, develop and apply the best available practicable technical solutions;
- ensure that the polluter pays for the pollution and control arrangements;
- focus protection on heavily polluted areas and river stretches; and
- involve the public in decision making.

4. CRITICALLY POLLUTED AREAS

4.1 Mechanisms will be evolved to reduce local concentration of pollutants in complex industrial sites. Strategies will be developed for areas with high pollution loads where the accumulative effect of the various types of pollutants would be taken into account including pollution of ground water. Existing units in these areas willbe targeted for effective action. New units in these areas will be required to comply with location specific standards for stringent environmental quality objectives. These will include matching waste generators with waste buyers, with the objective of solving waste disposal.

4.2 Setting up of industrial estates, and clusters of small industrial units in rural areas, will include pollution abatement measures as an essential component of infrastructure. In the past, the absence of adequate provision of space for installing treatment facilities and arrangements for disposal of wastes has led to severe pollution of agricultural land and rivers.

4.3 There has been a steady increase in the amount of waste water produced from urban communities and industries. In the coming years, due to rapid growth in population, urbanisation, industrial development and better water supply, the amount of waste water may increase manifold. Generally, these waters are discharged into lagoons or dumped on low lying areas without any pre-treatment, thereby creating sewage pools, contaminating ground waters, salinizing good quality lands around cities, acting as a source of foul smell and breeding grounds for mosquitoes and other pathogens. At many places this waste water is discharged into drains and rivers causing serious water pollution. However, awareness has now grown and more attention is being paid to develop systems to treat sewage waters. For a country like India, conventional treatment plants are costly. In fact, these are beyond the financial means of many small towns. Biological waste water treatment, on land disposal using suitable vegetative cover and resource recovery technologies cannot only be attractive alternative, but also economical, safe and socially acceptable.

4.4 Mining operations will not ordinarily be taken up in ecologically fragile areas. Every mining project shall be accompanied by a mining plan, including an environmental management plan and time bound reclamation programme for controlling the environmental damage and restoration of mined areas.

5. ASSISTANCE FOR ADOPTION OF CLEAN TECHNOLOGIES BY SMALL SCALE INDUSTRIES

5.1 Small scale industries are a special feature of our economy. Government are implementing a scheme for providing assistance for promoting combined facilitiesfor treatment of effluents and solid wastes generated in clusters of small scale units. This scheme will be extended to provide necessary technical support as well.

5.2 While the large and medium industrial units will remain totally responsible for control of their pollution, assistance will be provided to small-scale industrial units, particularly those located in rural areas, to aid the implementation of pollution control measures. This will be achieved by promoting development and adoption of cleaner technologies, including environmentally friendly biotechnology.

6. STANDARDS

6.1 The present standards are based on the concentration of pollutants in effluents and in emissions. The norms will be revised to lay down mass-based standards, which will set specific limits to encourage the minimisation of waste, promote recycling and reuse of materials, as well as conservation of natural resources, particularly water. Since the standards will be source related, they will require for the most polluting industrial processes, particularly those using toxic substances, application of the best available technological solutions, and also be an instrument for technological upgradation.

6.2 To act against potential problems in future, new units will have to conform to stricter standards. They will need to select technologies that produce no or low quantities of wastes and recycle or reuse waste products. Progressively, more strict vehicle emission standards will also be evolved to deal with environmental hazards caused by vehicular traffic.

6.3 Standards will not merely be a regulatory tool but will be mechanism to promote technological upgradation to prevent pollution, conserve resources and regulate waste. For this purpose codes of practice and guidelines will be evolved for specific processes.

6.4 The environmental effects, from production to disposal of products that are hazardous and toxic will be taken into account in the regulations. Chemicals will be reviewed according to level of risk, and where safer alternatives have become available, restrictions will be imposed. Regulations for liability and compensation for damages will supplement standards, to promote greater care and caution, particularly in the management of hazardous waste and remedial action in case of contamination of soil and ground water.

7. FISCAL MEASURES

7.1 While regulatory measures remain essential for the effectiveness of the policy, new approaches for considering market choices will be introduced. The aim is to give industries and consumers clear signals about the cost of using environmental and natural resources. The expectation is that market-oriented price mechanisms will influence behavior to avoid excessive use of natural resources.

7.2 There are at present several fiscal incentives for installation of pollution control equipment and for shifting polluting industries from congested areas. The items for which excise and customs rebate are allowed will be reviewed. This will stimulate the advancement of abatement technologies and create increased demands for the products.

7.3 Economic instruments will be investigated to encourage the shift from curative to preventive measures interalise the costs of pollution and conserve resources, particularly water. A direct economic signal is offered by an effluent charge based on the nature and volume of releases to the environment. The level will be based on the cost of treatment and flow discharged, in order to provide an incentive to set-up treatment plants. The scope of charges will also be extended to emissions and solid waste. Charges provide a continuing incentive towards optimal releases.

7.4 These instruments will also have a distributive effect as the revenues will be used for enforcement, collective treatment facilities, research and promoting new investment.

7.5 The precise choice of economic instruments adopted will be determined by the ease with which releases can be measured, as well as prospective changes in technology and market structures. To deal with the range of pollution problems a mix of regulatory and economic measures will be adopted.

8. INTEGRATION

8.1 Critical policy areas for control of pollution come under different departments and levels of Government. Sectoral Ministries, State Governments, local bodies and agencies responsible for planning and implementation of development projects will be required to integrate environmental concerns more effectively in all policy areas. Local authorities play a key role in abatement of pollution and environmental concerns need to be built into the way they operate. Steps will have to be taken to strengthen governmental and institutional structures dealing with environmental management, especially within the ministries dealing with the sectors of energy, industry, water resources, transport and agriculture and who would develop specific programmes in regard to pollution prevention.

8.2 Policy making, legislation and law enforcement influence each other. The increase in the number of regulations increases difficulties in enforcement. Legislation regulating particular activities will be amended to incorporate and eliminate clashes with environmental criteria. Traditional instruments for monitoring of compliance and investigation of offences are becoming over-burdened. An integrated overview and organisational structure for decentralised environment impact assessments and environmental law enforcement based on cooperation with local authorities will be sought.

8.3 While pollution from specific sources including town and industries have been addressed, non-point pollution from run-off of

agricultural inputs such as pesticides, insecticides, fertilisers, etc. has not been dealt with. This is gaining increasing proportions, which is polluting not only our water bodies but even sub-soil water resources and would affect the health of human beings. A long-term policy for pesticides use, including the introduction of environmentally acceptable pesticides, particularly biopesticides and non-persistent biodegradable ones, and integrated pest management together with the phasing out of the proven harmful toxic and persistent ones, would be formulated in collaboration with the concerned Ministries and infrastructure involved for it's effective implemntation. A similar policy for fertiliser use will also need to be formulated.

8.4 Plant and vegetation in general play a vital role in controlling pollution by regulating the climate and atmospheric equilibrium, protecting the soil and maintaining the hydrological regime. Hence, existing forestsand natural vegetation should be fully protected. The forest and vegetal cover should be restored and increased wherever possible, specially on hill slopes, in catchment areas of rivers, lakes and reservoirs, ocean shores, semi-arid and arid tracts, in around urban centres and industrial establishments. It is necessary to encourage the planting of trees alongside roads, rail lines, canals and on other unutilized lands under State/corporate, institutional or private ownership. Green belts should be raised in urban and industrial areas as well as in arid tracts. Such a programme will also check erosion, desertification as well as improve the micro-climate.

8.5 The Annual Administration Reports of the Ministries will include a chapter on the action taken to follow up the policy statement, and other environmental initiatives they have taken or are proposing.

9. ENVIRONMENTAL AUDIT

9.1 Industrial concerns and local bodies should feel that they have responsibility for abatement of pollution. The procedure of an environmental statement will be introduced in local bodies, statutory authorities and public limited companies to evaluate the effect of their policies, operations and activities on the environment, particularly compliance with standards and the generation and recycling of waste. An annual statement will help in identifying and focussing attention on areas of concern, practices that need to be changed and plans to deal with adverse effects. This will be extended to an environmental audit. The measures will provide better information to the public.

10. ENVIRONMENTAL STATISTICS

10.1 Authoritative statistical data on the environment is vital for Developmental decision making. Resource accounting will be used to give an idea how economic policies are affecting the environment. Current economic accounts are concerned mainly with the volume ofeconomic activity; they ignore expenditures to protect the environment and encourage inefficient use of resources. The collection and integration of environmental, economic and health data will be done to determine the status and to develop a concise set of environmental indicators for monitoring the effects of pollution. Information and access to the public are essential so that everyone knows what is happening to the environment.

11. PUBLIC PARTNERSHIP

11.1 The public must be made aware in order to be able to make informed choices. A high governmental priority will be to educate citizens about environmental risks, the economic and health dangers of resource degradation and the real cost of natural resources. Information about the environment will be published periodically. Affected citizens and non-governmental organizations play a role in environmental monitoring and therefore allowing them to supplement the regulatory system and recognising their expertise where such exists and their commitments and vigilance, will also be cost effective. Access to information to enable public monitoring of environmental concerns, will be provided for.

11.2 Public interest litigation has successfully demonstrated that responsible non-governmental organisations and public spirited individuals can bring about significant pressure on polluting units for adopting abatement measures. This commitment and expertise will be encouraged and their practical work supported.

11.3 Householders, as consumers, make large number of relative small individual contributions, whose cumulative effect is considerable. A system of certifications of goods that are "environmentally friendly" will be set up to make available information to encourage environmental consciousness amongst consumers. This advice will also encourage manufacturers to produce goods that are environmentally more friendly as well as encourage recycling and adequate waste management. Consumer awareness would also be encouraged by involvement of consumer organisations in cooperative testing and dissemination of information relating to environmental friendliness of these products.

11.4 As the present system of jurisprudence does not provide for compensation to individuals for environmental damage, including effects on health and environmental damage caused by pollution, it is proposed to set up special legal institutions to redress this deficiency and also make adequate arrangements for interim relief.

11.5 Greater emphasis will be placed on promoting awareness, undertaking and competence in schools, colleges, and training institutions. Professional and non-governmental bodies will be encouraged to be more active in environmental training and building awareness.

11.6 Society has accepted many practices which cause pollution. Reckless use of loudspeakers, dumping in water bodies, and scattering of wastes are common. Noise nuisance requires specific devices as well as greater consideration for neighbours and there is growing concern that litter has increased in recent years. Social action in these matters by voluntary organisations and individuals will be promoted through knowledge, education, training camps and public information campaigns.

12. This statement is based on considerations of effectiveness, efficiency and availability of financial resources. The responsibility for abatement of pollution is not a duty of the Government alone, it is an obligation on all. The approach mentioned above should indicate how every one can help in achieving a safe and environmentally appropriate environment in our country.

(R Rajamani)
Secretary to the Government of India

ANNEX F: INDUSTRY'S RESPONSE TO PUBLIC AND GOVERNMENT PRESSURES

Over the last few years, the response of industry to both public and government pressure has considerably increased, as obvious from the increasing amount of pollution control equipment being installed. However, the response has not been uniform. The response assessment can be analyzed in four categories:

1. Strong positive response.

2. Lukewarm response.

3. Evasive response.

4. No response.

1. Strong Positive Response

There has been a very strong response from large scale private industrial establishments, especially multi-national companies and new units, in complying with regulations. The major industrial subsectors represented by these companies are petrochemicals, bulk drugs, pharmaceuticals, synthetic and man made fibres, and fertilizers. With small and medium scale private industries and state owned industries in the same subsectors, the response has been weak.

The companies which have shown a strong response form a very small part of the total industrial population, estimated at less than 5%.

2. Lukewarm Response

The remaining large as well as most of medium scale private industries have demonstrated a lukewarm response to public and government pressures. The reasons for this are primarily limited financial capability, limited access to reliable technology, uncertainty over future levels of regulatory pressure, and poor enforcement of rules and regulations. Typically, the response has been better in water pollution control, poorer in air pollution control and almost nil in solid and hazardous waste management. Typical industrial subsectors falling in this category are pulp and paper, sugar processing, cotton textiles, distilleries, and cement.

The large public sector undertakings have also responded to some extent to government pressures. For example, while most of the refineries have installed water pollution control systems, steel plants and coal washeries have not. Similarly, while air pollution control is in place in most of the cement industries, the thermal power stations of the

State Electricity Boards are not particularly responsive. One of the reasons for the lack of response in large public sector units such as thermal power plants, coal washeries, and cement is that these units are mostly in the four sectors where the GOI considers production more important than pollution control. The threat of closure is not taken seriously.

3. Evasive Response

Quite a large number of industries have so far adopted the avoidance approach. Low awareness, lack of social responsibility and limited public pressure contribute to this type of response. Limited access to reliable technology also plays an important role in this category. Medium as well as small scale industries in chemical processing, pesticides, and pharmaceuticals are in this category. The attitude in these subsectors has been one of "wait and see." It is also true that these industries do not have adequate financial or technical capabilities to access solutions. Decades of a closed economy resulted in an attitude of avoidance rather than long-term problem solving. The continuing economic liberalization coupled with increasing government regulation enforcement will contribute towards longer-term approaches to solving industrial pollution problems.

4. No Response

Almost 50% of the GNP of the country is contributed by small scale industries. The GOI provides liberal incentives to encourage industrialization and create employment opportunities. Small scale industries have mushroomed. Effective pollution control systems are not cost effective for individual small scale units and the policy environment and geographic spread make regulation enforcement nearly impossible.

The principal polluting subsectors are electroplating, textile dyeing, tanneries, and chemical processing. Except for common effluent treatment plants, the response in this category is at best sporadic and isolated. Opportunities for pollution prevention, clean processing technologies and package-type pollution control systems hold great promise.

A summary list of type of response, type and size of sector are given below.

Type of Response	Type/size of Sector	Industrial Sub-sector
Strong Positive Response	Large scale private multinationals	Petrochemicals, bulk drugs, man made fibres, fertilizers, refineries
Lukewarm Response	Large scale private, upper medium scale, public sector	Pulp & paper, sugar mills, textile mills, distilleries, thermal power plants, cement, coal washeries
Evasive Response	Medium scale Small scale	Pulp & paper, sugar mills, dyes/intermediates, chemical processing, pesticides, pharmaceuticals
No Response	Small scale	Electroplating, textiles dyeing, tanneries, chemical processing

(Information contributed by the Pollution Control Division of the National Productivity Council, New Delhi, India)

Why a Technology Approach

From the point of view of the technology involved in pollution control, TEST is meant to achieve the following:

Promotion in India of the use of effective, appropriate, and adaptable environmental services and technologies (ESTs), preferably from the United States, in the field of pollution control. Results would be reductions in water and air pollution and the production of hazardous solid wastes, and increased conservation, recycling, and reuse of resources.

This project design follows a market survey that concluded that, "The demands for American technology [in India] are already high..." Equally important is that the survey was based on the identification by the GOI of some 17 industrial subsectors and 14 geographical areas in need of assistance in control of water and air pollution and the management of hazardous wastes. It was apparent, of course, that the funding available for this project could not possibly address either such a broad collection of needs or pollution problems of such magnitude. Thus, the approach initially envisaged for the TEST project in the PID was to focus on those industrial subsectors and geographical areas most in need of ESTs - both know-how and equipment - that could be supplied by the United States and that could be applied to ameliorating, or perhaps even eventually solving, some of the most pressing problems of air and water pollution and hazardous waste management.

A preliminary screening of the industrial subsectors identified by the GOI indicated that not all of them would provide equally significant opportunity for trade in ESTs. For example, in the smelting, oil refining, and steel production subsectors there are relatively few units operating in India; thus one would not expect them to be as attractive to an entrepreneur interested in introducing new technologies as would a subsector that represented dozens or hundreds of operating units. Furthermore, during the project design the responses from representatives of industry, government, consulting firms, and the laboratories involved in tackling these pollution problems demonstrated that there are certain technological gaps that were consistently noted as being common to most of the subsectors.

With regard to the geographical areas identified by the GOI, as noted in the market survey, a preliminary analysis revealed that they primarily deal with concentration of industries in a given area, leading to general

ANNEX G: TECHNOLOGICAL BASIS

Background

The concern of the people of India for environmental degradation and health problems caused by pollution is not wholly of recent origin. The well known biomethanation (biogas, gobar gas plant) schemes fostered by the central government and many of the states, the reforestation projects, the public movements to prevent wanton deforestation (e.g., the Chipko movement), and the projects to provide safe drinking water in the rural areas all attest to a long-standing public and private concern for environmental issues. Formal recognition of the problem of pollution caused by industrial activities, however, dates from 1974 when the need for pollution control was recognized by the Government of India (GOI) with the passage of the Water (Prevention and Control of Pollution) Act. This was followed by the Air (Prevention and Control of Pollution) Act of 1981, the Environment (Protection) Act of 1986, the Hazardous Wastes (Management and Handling) Rules (1989). Most recently (March 1992), the Environment (Protection) Rules were amended requiring mandatory submission of environmental audit reports by industry.

While implementation is basically through the Ministry of Environment and Forests (MOEF), which has the authority to close non-complying plants, it has delegated much of its enforcement authority to the Central Pollution Control Board (CPCB) and the various State Pollution Control Boards (SPCBs). The latter also have the authority to establish more stringent standards in their own states, according to need. The CPCB retains the responsibility for collection of data, establishment of standards, technical training, advising the central government, and informing the public of government policy in water and air pollution control and abatement. The responsibility for data collection means that the CPCB must maintain a laboratory for analysis of samples. These, of course, include the samples that are taken in the course of monitoring effluents, which is also the responsibility of the CPCB, and it is this responsibility of the CPCB that suffers from limited staff, in view of the enormous number of operating industrial units in India. While enforcement of standards and consenting to new industrial construction is the province of the SPCBs, they share with the CPCB the responsiblity for giving site clearance to new industrial construction. Both the CPCB and many of the state PCBs require Environmental Impact Analyses of certain large and medium scale industrial units during this process. Some states, for example Maharashtra, have lengthened the CPCB list to other industries considered equally critical.

environmental degradation, and reflect the government's concern for the ambient environment in the area. These areas do not necessarily represent the technology gaps identified and the consequent trade opportunities. For example, areas such as Singroli, Durgapur, or Visakapatnam, though highly polluted, represent a general environmental degradation problem rather than a problem arising out of technology gaps in industrial pollution prevention and control.

The technology gaps identified involve specific equipment, monitoring and control instrumentation, and know-how that apply to pollution prevention, control, and remediation, which necessarily overlap industrial subsectors and many critically polluted geographical areas. That is, equipment, instrumentation, technological know-how applicable to one industrial subsector would also be applicable in many others. A prospective supplier, therefore, would be able to market the product in question depending on the demand, regardless of the subsector or geographical area. This would also apply, of course, to the skilled services needed for performing environmental audits, environmental impact analyses, and risk analysis and management that are universally applicable in industry and construction.

Focussing on these technological gaps makes it possible for U.S. suppliers, either directly or in collaboration with Indian distributors or joint-venture partners, to reach a much wider market, with more sales, by making the equipment, instruments, and skills to fill these gaps available to the individual manufacturing and processing plants or providers of services actually in need, regardless of subsector or location. In this way, the funds available for the TEST project would have the widest impact on India's problems in air and water pollution control and hazardous waste managment by fostering direct importation of equipment, the establishment of distributorships and joint ventures, the purchase of technology through licensing arrangements, and by making available the necessary capacity to perform the environmentally related services required to deal with the problems of an industrial society. In the process, sustainable cooperation with U.S. suppliers of that equipment, technology, and know-how will evolve.

Technical Analysis

The basis for the approach taken here was the result of the information gathered from site visits, interviews, and additional research. The site visits included industrial estates and individual manufacturing and processing plants. The industrial representives, all of whom expressed both their concerns about pollution problems and the technological gaps they perceived, were plant owners, managers, and operators, in addition to pollution control engineers. Many of them were members of the industry associations that operate within the industrial estates that have been established to move large and medium-scale industries away from urban concentrations.

In addition to the manufacturing and processing industry representatives canvassed, responses were elicited from suppliers of pollution control equipment, instrumentation, and consulting services, officials and members of chambers of commerce and similar groups, the financial institution that will likely administer TEST funds (ICICI), and the Administrative Staff College in Hyderabad, which runs training courses for managers of industrial plants. These too listed their perceptions of technological gaps. Finally, the CPCB, various SPCBs, and several research institutions were also canvassed and they, too, listed the pollution control problems they were facing and noted the technological gaps in which assistance was needed.

The basic approach starts with analysis of the responses, to determine correlations with the original intention of focussing on industrial subsectors and geographical areas. The details of all these responses are presented in Annex G.1, Tables 1, 2, and 3, and the following paragraphs will summarize the results. The responses and the technological gaps subsequently identified include both technologies (processes and systems) and equipment (machinery, instruments and other hardware).

The pollution problems for which technological gaps were noted are:

1. Water and air-pollution control.

2. Handling, reduction, and/or economic use of solid wastes.

3. Management and disposal of hazardous wastes.

4. In-plant control to reduce waste production, reduce use of process water, and improve efficiency in use of energy and materials.

5. Reduction of noise pollution.

The major technological needs (gaps) that have been identified to deal with these pollution problems can be summarized as follows:

1. Removal/reduction of dissolved solids from waste water streams.

2. Recovery and reuse of chemical resources from waste water streams, atmospheric emissions, and solid wastes.

3. Systems for removing special pollutants from waste water,atmospheric emissions, and manufactured products.

4. Handling and management of hazardous wastes.

5. Reduction of color, odor, and biological/chemical oxygen demand loads in waste water.

6. Reduction of particulates (suspended particles), sulfur dioxide, and oxides of nitrogen emitted to the atmosphere from industrial processes.

7. Availability of adequate instrumentation for monitoring and analysis in control of both water and air pollution.

With identification of the technology gaps, the industry subsectors associated with each of them for each of the pollution categories of concern are shown in Annex G.2.

A further step in the analysis is to list, to the extent possible, the number of operating industrial units within each of the subsectors (pesticides, pharmaceuticals, tanneries, petrochemicals, etc.) in each of the states.

The number of industrial units in each category (pesticides, pharmaceuticals, fertilizer, cement, etc.) is listed for each state in Annex G.3. In the case of the officially registered industrial units, i.e., the formal sector, these numbers are known with some accuracy. In some industries, however, (tanneries, for example) less than half the total units are registered, the unregistered units being small operations with no concern or funds for effluent control. In others, such as electroplating and metal finishing, the statistical information is so nebulous that they are shown simply as clusters in the states where they are known to exist. The majority of these units are one or two person operations by a roadside, and although the bath liquids, which are corrosive and dangerous, are generally dumped on the roadway or into whatever sewers are available, the authorities have no hope of regulating, controlling, or even removing these units in the foreseeable future. In the case of energy equipment, such as boilers and small generating units, the actual numbers are similarly vague; even though certain industries obviously must use such equipment, the number of boilers used cannot easily be inferred from knowledge of the number of industrial units. Thus, this category, too, is listed in the table as clusters, where they are known to occur. The upshot of all this is that the conclusions drawn from this table must be recognized as being based on <u>minimum</u> numbers.

This information serves a dual purpose. First, it identifies the geographical areas that contain the industry subsectors that are linked with the technology gaps (Annex G.2); this identification is shown in Annex G.4. Combining this listing with that in Annex G.2 makes possible a simple weighting process that takes into account the number of industry subsectors and the number of states where they occur for each technology gaps within each pollution category that represent the combination of the largest number of industrial subsectors and the largest number of states in which they are operating. This helps to emphasize a manageable number of technological needs, the satisfaction of which has the potential of stimulating the largest number of transactions and of having the broadest impact in meeting pollution control requirements. This shorter list of technological needs, in order of priority, is shown in Table 1. (It

should be noted here that neither this priority list nor subsequent narrowing of choices and suggestions of projects to be undertaken is meant to be exclusive, shutting out all others. They are meant only to provide a means of focussing attention where it seems to be potentially most fruitful at this time.)

At the start of the project, the implementation team should determine the priorities on which they wish to concentrate, given the resources initially available.

Table 1

Technological Gaps in Order of Priority

Water-Pollution Control

1. Removal/reduction of total dissolved solids (TDS).
2. Removal/reduction of chemical and biological oxygen demand (COD and BOD).
3. Removal/reduction of color.
4. Removal/reduction of special pollutants.

Air-Pollution Control

1. Monitoring instruments.
2. Removal/reduction of special pollutants.
3. Removal/reduction of oxides of nitrogen (NO_x).
4. Package scrubbers.

Solids Handling

1. Treatment, handling, disposal of hazardous wastes.
2. Utilization of fly ash.
3. Incineration.

In-plant Control

1. Clean process technology.
2. Reuse/recycle of waste water.
3. Removal of chromium and other metals from waste streams.
4. Reduction of noise pollution.
5. Recovery of chemicals.

Since this shortened list, in some cases, deals with the control of a pollution parameter (e.g., total dissolved solids) rather than a technology, this list was converted into a list of technologies (and instruments) appropriate to meet all the technological needs identified, including the control of pollution parameters (Annex G.5).

The second use of the data in Annex G.3 (the number of industrial units in each state) is to make possible a geographical identification of the preponderance of technological needs (Table 1) in each pollution-control category.

The net result of this process is the series of maps shown in Figures 1-4. For each of the five pollution control categories, the maps show the locations of the major concentrations of industrial units identified with each of the technological gaps. They also indicate the states where the current enforcement of environmental regulations is most likely to stimulate markets for the goods and services available under this project. A general map (Figure 5) shows the number of industry subsectors and the total number of industrial units for those states for which the information is available. It also indicates the priority ranking of the top four states in terms of record for enforcement of environmental standards. Since most industrial units have more than one pollution problem, the number of such problems in each pollution category is shown in Table 2.

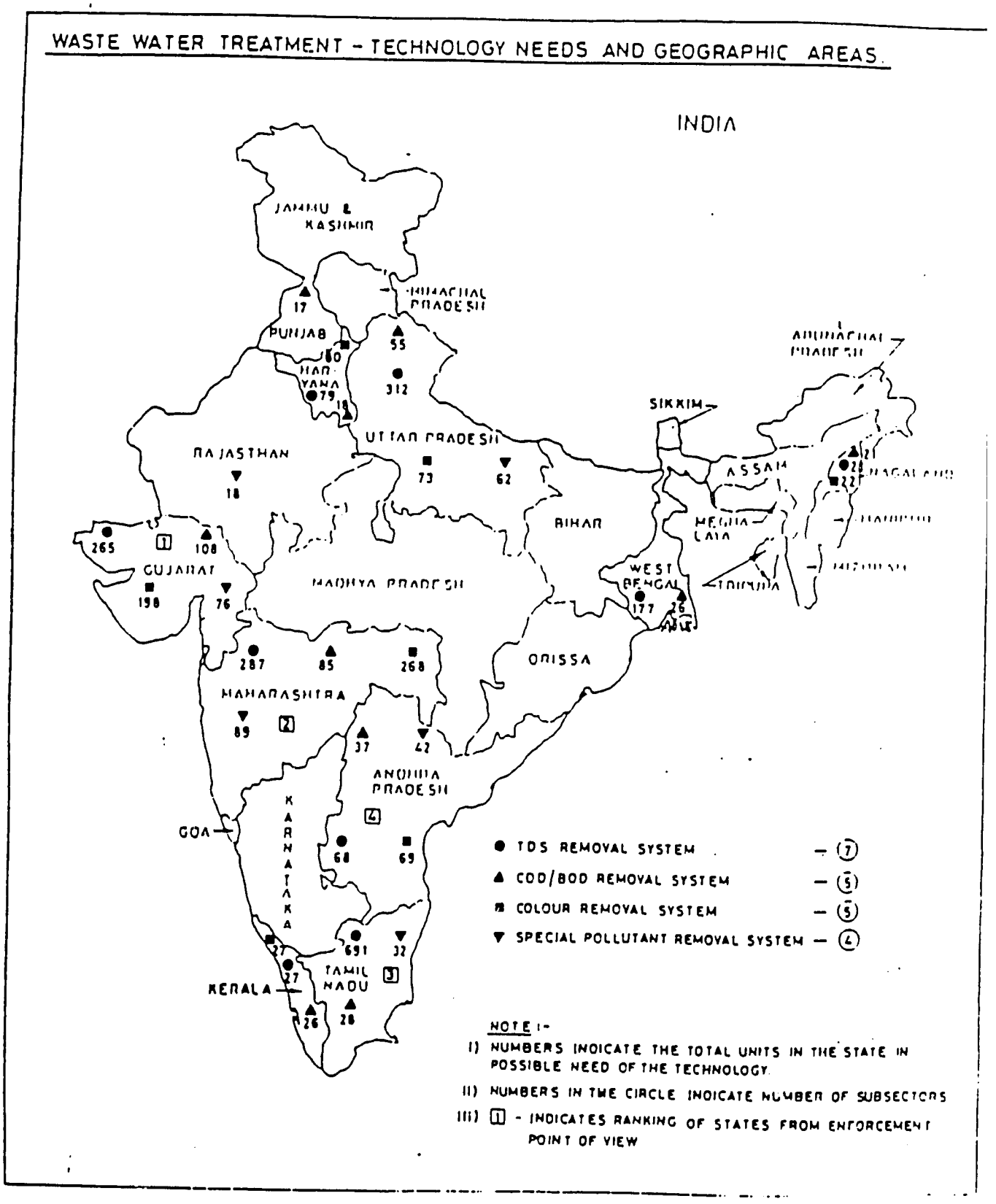
WASTE WATER TREATMENT - TECHNOLOGY NEEDS AND GEOGRAPHIC AREAS.
INDIA
JAMMU & KASHMIR
HIMACHAL PRADESH
PUNJAB
HARYANA
UTTAR PRADESH
RAJASTHAN
GUJARAT
MADHYA PRADESH
BIHAR
SIKKIM
ASSAM
MEGHALAYA
WEST BENGAL
TRIPURA
ORISSA
MAHARASHTRA
ANDHRA PRADESH
KARNATAKA
GOA
KERALA
TAMIL NADU
● TDS REMOVAL SYSTEM — (7)
▲ COD/BOD REMOVAL SYSTEM — (5)
■ COLOUR REMOVAL SYSTEM — (5)
▼ SPECIAL POLLUTANT REMOVAL SYSTEM — (4)
NOTE :-
I) NUMBERS INDICATE THE TOTAL UNITS IN THE STATE IN POSSIBLE NEED OF THE TECHNOLOGY.
II) NUMBERS IN THE CIRCLE INDICATE NUMBER OF SUBSECTORS
III) [1] - INDICATES RANKING OF STATES FROM ENFORCEMENT POINT OF VIEW

FIGURE 1

AIR POLLUTION CONTROL - TECHNOLOGY NEEDS AND GEOGRAPHIC AREAS.

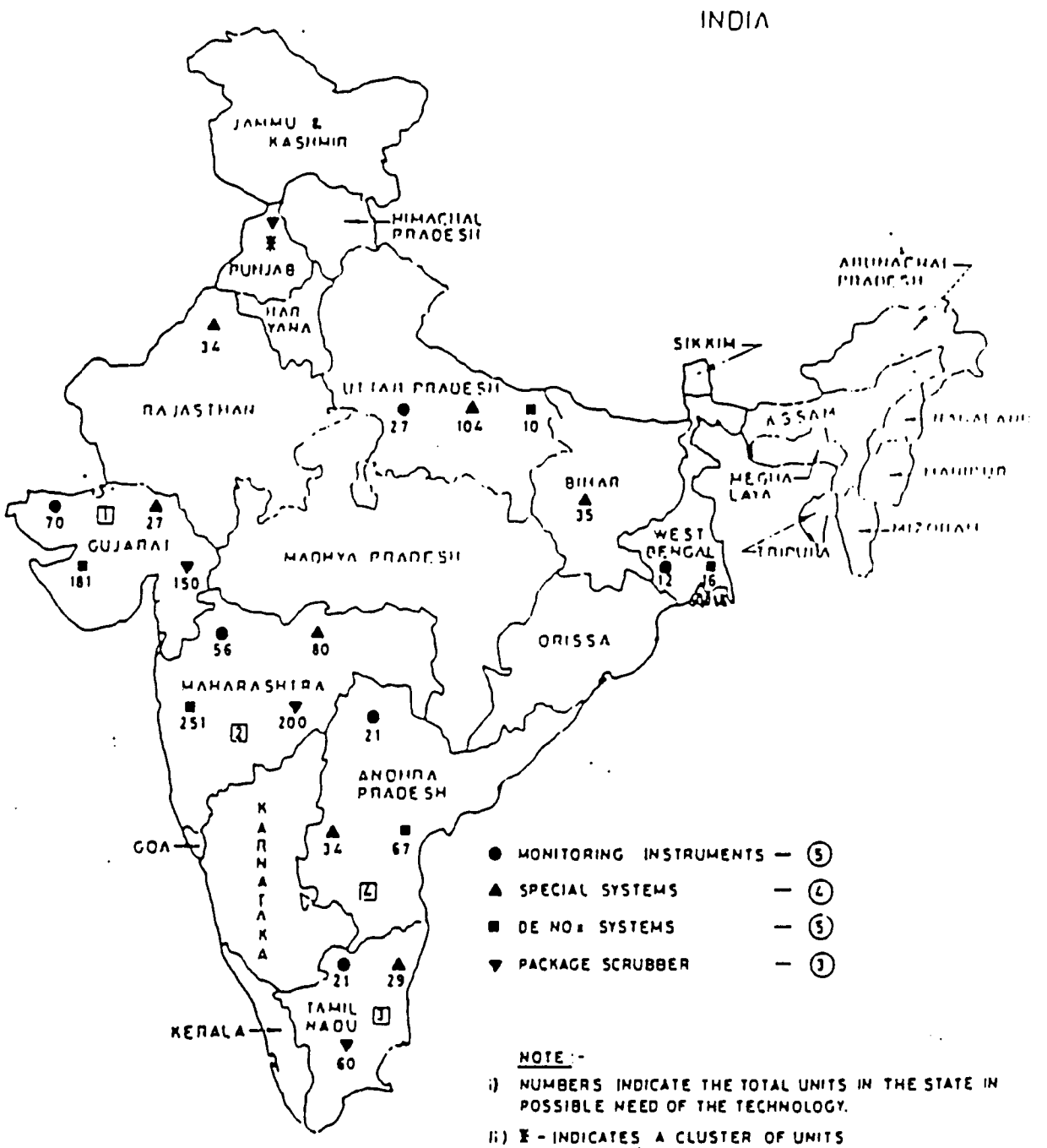

FIGURE 2

SOLID WASTE MANAGEMENT - TECHNOLOGY NEEDS AND GEOGRAPHIC AREAS.

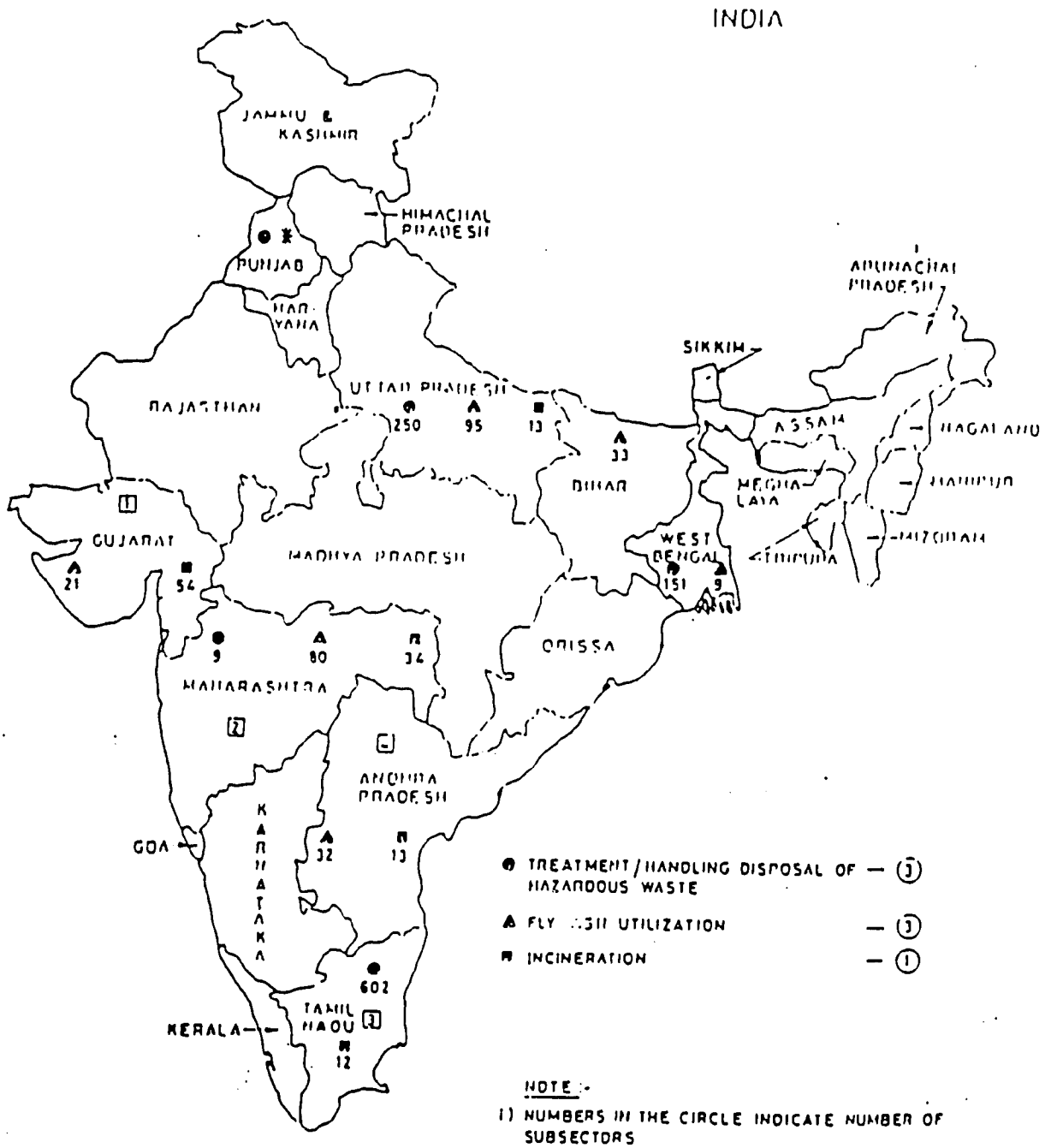

FIGURE 3

IN PLANT CONTROL - TECHNOLOGY NEED AND GEOGRAPHIC AREAS

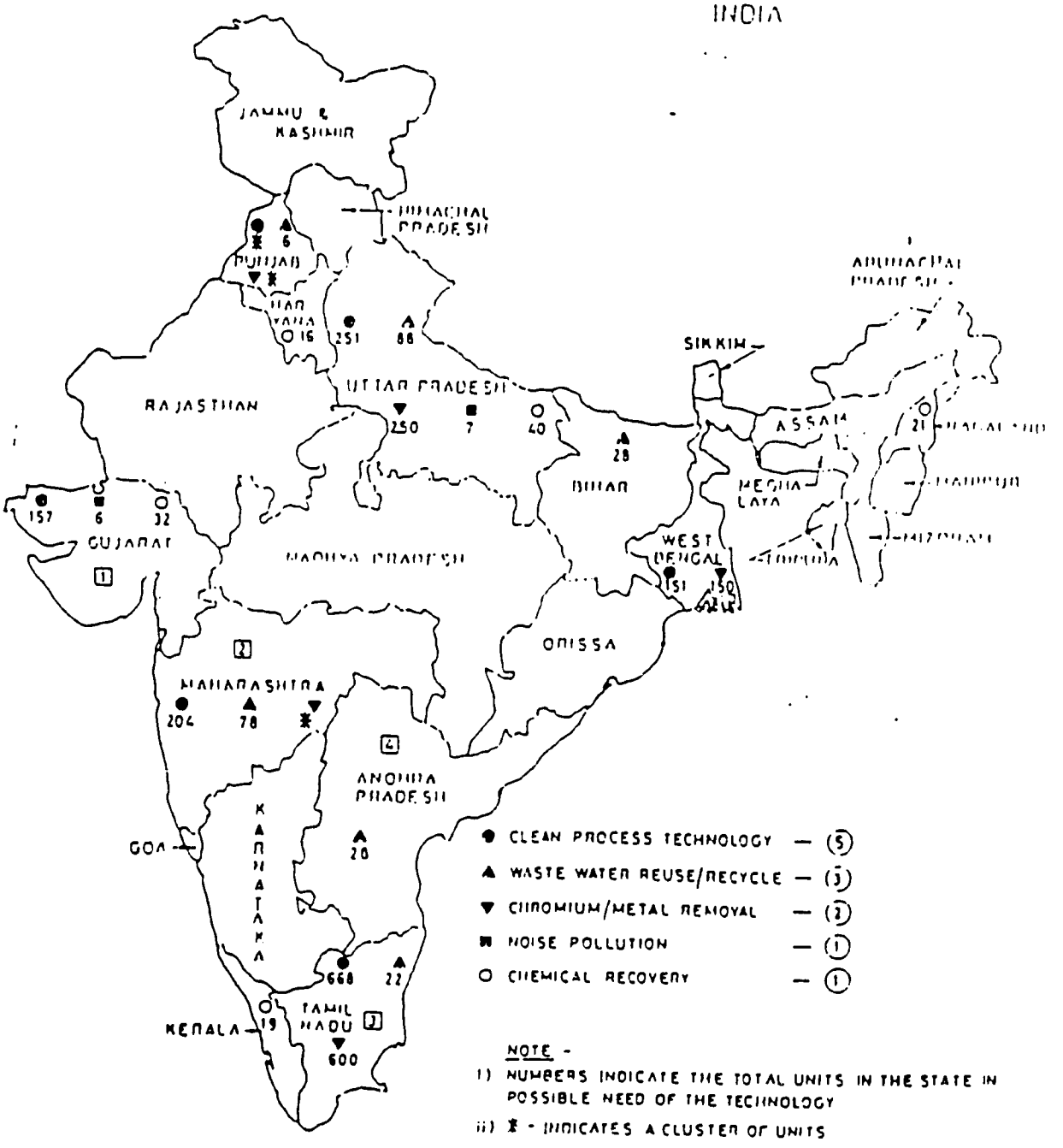

FIGURE 4

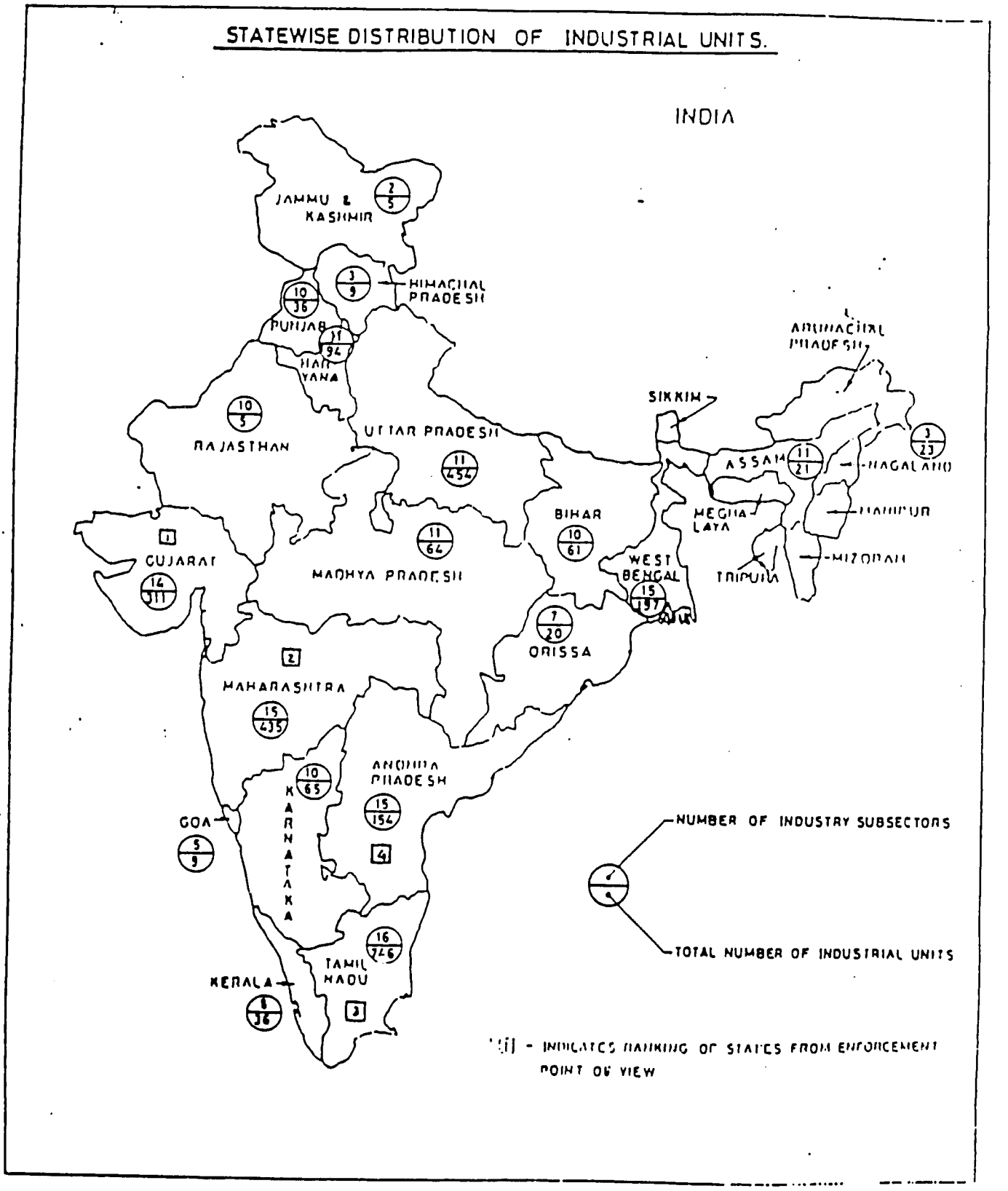
STATEWISE DISTRIBUTION OF INDUSTRIAL UNITS.
INDIA
JAMMU & KASHMIR
2/5
HIMACHAL PRADESH
3/9
PUNJAB
10/36
HARYANA
11/94
RAJASTHAN
10/5
UTTAR PRADESH
11/454
GUJARAT
1
14/311
MADHYA PRADESH
11/64
BIHAR
10/61
WEST BENGAL
15/197
ORISSA
7/20
MAHARASHTRA
2
15/435
ANDHRA PRADESH
15/154
4
KARNATAKA
10/65
GOA
5/9
TAMIL NADU
16/726
3
KERALA
8/36
SIKKIM
ARUNACHAL PRADESH
ASSAM
11/21
NAGALAND
3/23
MANIPUR
MEGHALAYA
TRIPURA
MIZORAM
NUMBER OF INDUSTRY SUBSECTORS
TOTAL NUMBER OF INDUSTRIAL UNITS
[ ] - INDICATES RANKING OF STATES FROM ENFORCEMENT POINT OF VIEW

FIGURE 5

Table 2

POLLUTION CONTROL PROBLEMS IN INDUSTRIAL UNITS AS POTENTIAL MARKETS FOR ENVIRONMENTAL TECHNOLOGIES IN THE FOUR IDENTIFIED STATES

Pollution Control Category	State				
	Gujarat	Maharashtra	Tamil Nadu	Andhra Pradesh	Total
Water	283	349	708	97	1,437
Air	264	365	41	110	780
Solids and Hazardous Wastes	75	123	614	45	857
In-plant Control	189	282	690	28	1,189
Totals	811	1,119	2,053	280	4,263

It should be noted that the market survey that preceded the project design identified three technical areas felt to be in need of assistance under TEST. These were hazardous waste management, ground water remediation, and advanced common effluent treatment plant (CETP) technology. Hazardous waste management is certainly an area where the technological gap is significant in India. Ground water remediation, however, while identified as a serious need by many of the respondents interviewed, has little potential for trade in the near future, at least until the central government and the state governments have identified an agency responsible for this activity. Furthermore, it must be recognized that the technology is still in a developmental stage, even in the United States.

Services Sector - In addition to these processing needs, public and private sector representatives expressed the need for assistance in the methods and techniques of performing environmental audits, environmental impact analyses, and risk assessment analyses for hazardous processes. An estimate has been made of the potential for trade in environmental services by reviewing the responses of representatives of industry, industrial associations, suppliers and manufacturers of equipment, pollution control boards, research institutions, and consultants. The analysis of the responses and the subsequent identification of needs in the service area are shown in Table 3.

Table 3

NEED FOR ENVIRONMENTAL SERVICES

	Industry	Suppliers	Pollution Control Boards	R&D Institutions and Laboratories	Existing Service Organizations
Risk Assessment	+		+	+	+
Environmental Audit	+		+	+	+
Safety Report	+		+		
EIA Carrying Capacity			+	+	
Monitoring Services				+	

ANNEX G.1

During project design, interviews were conducted with representatives from industrial units (owners, chief executives, plant managers, and environmental managers), suppliers and manufacturers of pollution control equipment and monitoring instruments, and representatives of industry associations, CPCB and SPCBs, consultancy services, and academic institutions. The information solicited related to needs in the EST area.

The responses received included needs for technology (processes and systems), equipment (machinery and instruments) and services. These responses were analyzed and translated for each category of respondent (industry, supplier, research institute, etc.) and industry subsector. The analysis is presented in Table 1 (Industry), Table 2 (Suppliers), and Table 3 (Pollution Control Boards and R&D Institutions) below.

Annex G.1

Table 1. Technological Needs and Pollution-Control Categories: Responses of Industry Representatives

	TECHNOLOGY/EQUIPMENT/INSTRUMENTS					
	WATER POLLUTION	AIR POLLUTION	SOLIDS	HAZARDOUS WASTES	IN-PLANT CONTROL	NOISE POLLUTION
PETROCHEMICALS	a. Recycle b. Low-energy waste treatment c. Color removal	a. Odor in control systems b. Solvent recovery c. Fugitive emission control	a. Treatment and utilization of sludges	a. Handling, transport, treatment, disposal	a. Reduction in water use per ton of ethylene	
PESTICIDES	a. BOD reduction b. COD reduction c. Toxicity reduction d. TDS reduction (NH_4Cl, NaCl) e. Instrument to monitor pesticides, up to 10 ppb f. Influent component analyzer	a. Hydrocarbon analyzer		. Incineration with process-control instrumentation		
THERMAL POWER STATIONS		a. Flue-gas desulfurization b. De-NO_x systems c. Continuous ambient-air monitoring - especially portable	a. Fly ash handling and utilization		a. Coal beneficiation b. Better handling systems for coal	

Annex G.1

Table 1. Technological Needs and Pollution-Control Categories: Responses of Industry Representatives (cont'd.)

	TECHNOLOGY/EQUIPMENT/INSTRUMENTS					
	WATER POLLUTION	AIR POLLUTION	SOLIDS	HAZARDOUS WASTES	IN-PLANT CONTROL	NOISE POLLUTION
NITROGENOUS FERTILIZERS	a. Biological nitrification and denitrification for high NH_3 - 1500-2000 mg/l) b. Reverse osmosis to concentrate ammonia waste to 15% c. Fluidized bed for biological treatment d. TDS removal (10,000 mg/l to 300 mg/l for recycle	a. Instrument: continuous monitoring of NH_3 in stack in presence of H_2, CO_2, N_2 b. Particulate control in urea prilling tower	a. Ni catalyst recovery process			a. Silencers for vents b. Reduction of noise levels in compressor house
PHOSPHATIC FERTILIZERS	a. Fluoride removal b. Removal of NH_3 and NO_3^-	a. Fluoride removal	a. handling and utilization of gypsum			
CEMENT		a. Control of NO.			a. Cleaner production technologies	
SUGAR	a. Technology for recycle/reuse	a. Burning of bagasse - control of high particulates, moisture	a. Bagasse ash utilization		a. High efficiency bagasse boilers	

Annex G.1

Table 1. Technological Needs and Pollution-Control Categories: Responses of Industry Representatives (cont'd.)

	TECHNOLOGY/EQUIPMENT/INSTRUMENTS					
	WATER POLLUTION	AIR POLLUTION	SOLIDS	HAZARDOUS WASTES	IN-PLANT CONTROL	NOISE POLLUTION
STEEL		a. Continuous ambient-air monitoring - especially portable b. On-line stack monitors c. Control systems for steel-melting furnace and sintering plants				
DISTILLERIES	a. Economic process for treatment of spent wash b. Color removal	a. Odor control				

Annex G.1

Table 2. Technological Needs and Pollution-Control Categories: Responses of Supplier Representatives

	TECHNOLOGY/EQUIPMENT/INSTRUMENTS				
	WATER POLLUTION	AIR POLLUTION	SOLIDS	HAZARDOUS WASTES	IN-PLANT CONTROL
PARAMOUNT POLLUTION	a. Substitute for atmospheric aeration b. Hydraulically operated instrumentation c. Nitrification/denitrification at higher concentrations d. Reverse osmosis		a. Dewatering of sludges		
HINDUSTAN DORR-OLIVER	Color removal	a. Odor removal b. Adsorption c. Solvent recovery	a. Incineration b. Red mud stacking technology	Incinerator	a. Waste recovery/reuse b. Chemical recovery in small pulp paper
ROSEMOUNT				Management	Reuse/recycle technologies

Annex G.1

Table 2. Technological Needs and Pollution-Control Categories: Responses of Supplier Representatives (cont'd.)

	TECHNOLOGY/EQUIPMENT/INSTRUMENTS				
	WATER POLLUTION	AIR POLLUTION	SOLIDS	HAZARDOUS WASTES	IN-PLANT CONTROL
VOLTAS	a. Design of sewage treatment b. Anaerobic digestors c. Industrial waste-water treatment plant d. API or plate oil separators e. BF sand filtration systems f. High reaction-rate trickling filters g. Biological treatment plants h. Air/steam stripping of dissolved organics i. Tertiary treatment j. Reverse osmosis/electrodialysis k. Instrumentation for waste-water treatment plant		Sludge conditioning and disposal	Incinerator	

Annex G.1

Table 3. Technological Needs and Pollution-Control Categories: Responses of Representatives of Pollution Control Boards and R&D Institutions

	TECHNOLOGY/EQUIPMENT/INSTRUMENTS				
	WATER POLLUTION	AIR POLLUTION	SOLIDS	HAZARDOUS WASTES	IN-PLANT CONTROL
PULP & PAPER	a. Pulp mill effluent for small units b. Color removal c. COD reduction d. TDS reduction		Lime mud utilization/ disposal		Small units - chemical recovery
DYES AND INTERMEDIATES INCLUDING TEXTILE DYEING	a. BOD control b. COD control c. TDS control d. Color removal				
DISTILLERIES	a. Color removal b. BOD reduction c. TDS reduction	Odor control			
STEEL		a. Pollution control from electric arc furnaces b. High-temperature filter bags			
FERTILIZERS		Fluoride control	Gypsum utilization/ disposal		
REFINERIES			Oily sludges		
METAL FINISHING (including electroplating)	Metal recovery		Detoxification of cyanide sludges		Non-cyanide technologies for plating

Annex G.1

Table 3. Technological Needs and Pollution-Control Categories: Responses of Representatives of Pollution Control Boards and R&D Institutions (cont'd)

	TECHNOLOGY/EQUIPMENT/INSTRUMENTS				
	WATER POLLUTION	AIR POLLUTION	SOLIDS	HAZARDOUS WASTES	IN-PLANT CONTROL
TANNERIES	a. TDS control b. Recovery/reuse of chromium c. Anaerobic systems/low-energy systems		a. Treatment and disposal of offal, fleshings, salt, shavings b. Utilization of sludge from ETP c. Treatment and disposal of chromium sludge		Cleaner technologies such as enzymatic dehairing, CO_2 deliming, chromeless tanning etc.
HAZARDOUS-WASTE MANAGEMENT				a. Incineration with proper monitoring instrumentation and air-pollution control b. Molten glass/molten salt technology c. Controlled landfill and liner technology d. Co-disposal with other organic wastes e. Bioremediation	

Annex G.1

Table 3. Technological Needs and Pollution-Control Categories: Responses of Representatives of Pollution Control Boards and R&D Institutions (cont'd)

	TECHNOLOGY/EQUIPMENT/INSTRUMENTS				
	WATER POLLUTION	AIR POLLUTION	SOLIDS	HAZARDOUS WASTES	IN-PLANT CONTROL
MAN-MADE FIBERS	a. Color removal b. TDS reduction c. COD reduction				
THERMAL POWER			Fly ash utilization and disposal		

ANNEX G.2

This table was prepared from the results of the three tables in Annex G.1. Here, under each pollution control category technology gaps that were identified are correlated with the industry subsectors where they are of concern.

LINKAGES BETWEEN TECHNOLOGY GAPS AND INDUSTRY SUBSECTORS

TECHNOLOGY GAP	INDUSTRY SUBSECTOR
<u>Water Pollution</u>	
Removal/reduction, Total Dissolved Solids (TDS)	Dyes and Intermediates, Tanneries, Nitrogen Fertilizer, Pesticides, Pulp and Paper, Man-made Fibers
Removal/reduction, biological/chemical oxygen demand (BOD/COD)	Pesticides, Pulp and Paper, Man-made Fibers, Pharmaceuticals, Electro-plating
Removal/reduction of color	Dyes and Intermediates, Petrochemicals, Distilleries, Pulp and Paper, Man-made Fibers
Low-energy biological treatment	Tanneries, Petrochemicals
Small package treatment plants	Dyes and Intermediates
Nitrification/denitrification system	Pulp and Paper, Nitrogen, Fertilizer
Special pollutant treatment	Pesticides, Phosphorus Fertilizer, Nitrogen Fertilizer, Distilleries
Monitoring instruments	Pesticides, Nitrogen Fertilizer
Fluidized-bed biological treatment	Nitrogen Fertilizer
In-plant control	Petrochemicals, Pulp and Paper
Toxicity reduction	Pesticides

Air Pollution	
Flue-gas desulfurization	Energy Equipment, Thermal Power Stations
Low-cost bag houses	Energy Equipment
High-temperature filter bags	Energy Equipment, Iron and Steel Bags
Package scrubber	Dyes and Intermediates, Energy Equipment, Electroplating
NO_x removal	Dyes and Intermediates, Energy Equipment, Thermal Power Stations, Pharmaceuticals, Cement
High-efficiency scrubber	Dyes and Intermediates
Odor-control system	Petrochemicals, Distilleries
Fugitive-emission control	Petrochemicals, Pharmaceuticals
Monitoring instruments	Petrochemicals, Pesticides, Iron and Steel, Nitrogen Fertilizer, Thermal Power Stations
Special pollutant treatment	Phosphorus Fertilizer, Nitrogen Fertilizer, Iron and Steel, Sugar
Solid Wastes	
Incineration	Pesticides
Storage, handling, transportation, disposal of hazardous wastes	Petrochemicals,Electroplating, plating, Tanneries
Lime-mud utilization and disposal	Pulp and Paper
Disposal of salt, hair, fleshings, etc.	Tanneries
Waste water reuse/recycle	Petrochemicals, Electroplating, Sugar
Recovery systems	Chromium/other metals, Tanneries, Electroplating
Salt	Tanneries
Organic solvents	Petrochemicals
Gypsum	Phosphorus Fertilizer

Nickel catalyst	Nitrogen Fertilizer
Chemicals recovery	Pulp and Paper
Solid-waste utilization	
Sludge	Tanneries, Petrochemicals
Fly ash	Thermal Power Stations, Sugar, Energy Equipment
Oily sludge	Refineries
Noise Pollution	Nitrogen Fertilizer
Others	
Coal beneficiation	Thermal Power Stations
Better materials handling	Thermal Power Stations
<u>Clean Process Technology</u>	
Non-cyanide plating	Electroplating
Enzymatic dehairing	Tanneries
CO_2 deliming	Tanneries
Dry coke quenching	Iron and Steel
High-efficiency bagasse boiler	Sugar
<u>Noise Pollution</u>	Nitrogen Fertilizer, Phosphate Fertilizer

ANNEX G.3

From the numbers in this table, the geographical distribution of industrial units within each subsector is immediately apparent. This information, combined with that in ANNEX G.2, makes possible a simple weighting process that is based on the number of subsectors within a technology need (ANNEX G.2) and the number of states where industrial units in these subsectors occur to the greatest extent. This weighting process permits the creation of a list, in order of importance, of the most important technology needs, in terms of the number of subsectors where they are important in pollution control <u>and</u> the number of states containing the largest number of industrial units needing such technological assistance.

Annex G.3

STATEWISE DISTRIBUTION OF INDUSTRIES IN INDIA

INDUSTRY/ STATE	THERMAL POWER	PESTI-CIDES	DRUGS & PHARMA	INTEG-RATED STEEL PLANTS	MAN-MADE FIBRE	ELEC-TROP-LATING	DYE & DYE INT.	SUGAR	FERTILIZER N	FERTILIZER P	CEMENT	DISTI-LLER-IES	REFIN-ERIES	TANN-ERIES	PULP & PAPER NEWS PRINT & RAYON PULP Large	PULP & PAPER NEWS PRINT & RAYON PULP Small	PETRO-CHEMICALS	ENERGY EQUIPMENT
														-	-			-
ARUNACHAL PRADESH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANDHRA PRADESH	5	13	9	1	1	*	30	27	1	5	23	23	1	-	5	9	1	-
ASSAM	4	1	-	-	1	-	-	2	1	1	1	1	3	-	3	1	2	-
BIHAR	5	2	-	3	-	-	-	28	3	1	5	10	1	-	1	2	-	-
CHANDIGARH	-	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*
GOA	-	1	-	-	-	-	-	1	1	-	-	6	-	-	-	-	-	*
GUJARAT	8	54	16	-	6	*	160	13	6	8	7	8	1	-	2	30	2	-
HARYANA	2	1	1	-	-	*	60	5	1	2	2	4	-	-	1	15	-	-
KARNATAKA	-	9	1	-	-	*	-	21	1	2	6	21	-	-	3	-	1	-
KERALA	-	3	2	-	2		-	2	1	-	-	6	1	-	3	16	-	-
MADHYA PRADESH	3	6	3	1	2	-	-	6	1	3	15	21	-	-	3	1	-	*
MAHARASHTRA	11	34	36	-	7	*	200	69	2	9	4	44	2	-	3	5	9	-
NAGALAND	-	-	-	-	-	-	-	1	-	-	-	1	-	-	1	20	-	-
ORISSA	1	4	-	1	-	-	-	3	2	-	-	7	-	-	4	-	-	-
PUNJAB	2	6	2	-	-	*	-	6	3	4	-	4	-	-	2	7	-	*
PONDICHERRY	-	-	-	-	-	-	-		-	-	-	3	-	-	-	1	-	-
RAJASTHAN	1	2	1	-	2	-	-	23	1	10	10	5	-	-	-	10	-	-
TAMIL NADU	4	12	4	-	3	*	60	20	3	6	8	11	1	600	3	6	2	*
UTTAR PRADESH	7	13	2	-	-	-	-	88	7	9	1	33	1	250	2	38	-	-
WEST BENGAL	7	2	8	1	1	-	-	2	1	3	1	4	1	150	4	11	1	*
DELHI	3	28	1	-	-	*	-	-	-	1	-	-	-	-	-	-	-	-
J & K	1	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-
SIKKIM	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
MEGHALAYA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MIZORAM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRIPURA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MANIPUR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIMACHAL PRADESH	-	-	-	-	-	-	-	-	-	-	1	2	-	-	-	5	-	-

ANNEX G.4

The information listed here is based on the information in ANNEX G.2 plus that in ANNEX G.3. Using the same technological gaps as in ANNEX G.2, it translates the industrial subsectors identified with each of the technology gaps into the geographical areas that contain industrial units within those subsectors as listed in ANNEX G.3.

LINKAGES BETWEEN TECHNOLOGY GAPS AND GEOGRAPHICAL AREAS

TECHNOLOGY GAP	GEOGRAPHICAL AREA
<u>Water Pollution</u>	
Removal/reduction, Total Dissolved Solids (TDS)	Gujarat, Maharashtra, Tamil Nadu, Uttar Pradesh, West Bengal, Andhra Pradesh, Delhi, Nagaland, Haryana, Kerala
Removal/reduction, biological/chemical oxygen demand (BOD/COD)	Gujarat, Maharashtra, Delhi, Uttar Pradesh, Andhra Pradesh, Tamil Nadu, Punjab, Haryana, Kerala, Nagaland, West Bengal
Removal/reduction of color	Gujarat, Maharashtra, Delhi, Uttar Pradesh, Haryana, Kerala, Nagaland, Andhra Pradesh
Low-energy biological treatment	Tamil Nadu, Uttar Pradesh, West Bengal
Small package treatment plants	Gujarat, Maharashtra
Nitrification/denitrification system	Uttar Pradesh, Gujarat, Rajasthan, Maharashtra, Tamil Nadu
Special pollutant treatment	Uttar Pradesh, Gujarat, Rajasthan, Maharashtra, Tamil Nadu, Andhra Pradesh, Delhi
Monitoring instruments	Uttar Pradesh, Gujarat, Maharashtra, Delhi, Tamil Nadu, Andhra Pradesh
Fluidized-bed biological treatment	Gujarat, Uttar Pradesh

In-plant control	Uttar Pradesh, Gujarat, Haryana, Kerala, Nagaland
Toxicity reduction	Gujarat, Maharashtra, Delhi, Uttar Pradesh, Andhra Pradesh, Tamil Nadu
Air Pollution	
Flue-gas desulfurization	Gujarat, Maharashtra, Uttar Pradesh, West Bengal
Low-cost bag houses	
High-temperature filter bags	Bihar
Package scrubber	Gujarat, Maharashtra, Delhi, Tamil Nadu, Punjab
NO_x removal	Gujarat, Maharashtra, Uttar Pradesh, West Bengal, Andhra Pradesh
High-efficiency scrubber	Dyes and Intermediates
Odor-control system	Gujarat, Maharashtra
Fugitive-emission control	Gujarat, Andhra Pradesh, Maharashtra, West Bengal
Monitoring instruments	Uttar Pradesh, Gujarat, Maharashtra, Delhi, Andhra Pradesh, Tamil Nadu, West Bengal
Special pollutant treatment	Uttar Pradesh, Gujarat, Rajasthan, Maharashtra, Tamil Nadu, Bihar, Andhra Pradesh
Solid Wastes	
Incineration	Gujarat, Maharashtra, Delhi, Uttar Pradesh, Andhra Pradesh, Tamil Nadu
Storage, handling, transportation, disposal of hazardous wastes	Tamil Nadu, Uttar Pradesh, West Bengal, Delhi, Punjab, Maharashtra
Lime-mud utilization and disposal	

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Disposal of salt, hair, fleshings, etc.	Tamil Nadu, Uttar Pradesh, West Bengal
<u>In-Plant Control (Reuse/Recycle)</u>	
Waste water reuse/recycle	Delhi, Tamil Nadu, Punjab, Uttar Pradesh, Maharashtra, Andhra Pradesh, Bihar
Recovery systems	
Chromium/other metals	Tamil Nadu, Uttar Pradesh, West Bengal, Delhi, Punjab, Maharashtra,
Salt	Tamil Nadu, Uttar Pradesh, West Bengal
Organic solvents	
Gypsum	Rajasthan, Uttar Pradesh, Maharashtra Gujarat, Tamil Nadu
Nickel catalyst	Uttar Pradech, Gujarat
Chemicals recovery	Uttar Pradesh, Gujarat, Haryana, Kerala, Nagaland
Solid-waste utilization	
Sludge	Tamil Nadu, Uttar Pradesh, West Bengal
Fly ash	Gujarat, Maharashtra, Uttar Pradesh, West Bengal, Andhra Pradesh, Bihar
Oily sludge	
Noise Pollution	Uttar Pradesh, Gujarat
Others	
Coal beneficiation	Gujarat, Maharashtra, Uttar Pradesh, West Bengal
Better materials handling	Gujarat, Maharashtra, Uttar Pradesh, West Bengal

Clean Process Technology	
Non-cyanide plating	Delhi, Tamil Nadu, Punjab, Maharashtra
Enzymatic dehairing	Tamil Nadu, Uttar Pradesh, West Bengal
CO_2 deliming	Tamil Nadu, Uttar Pradesh, West Bengal
Dry coke quenching	
High-efficiency bagasse boiler	Bihar
<u>Noise Pollution</u>	Uttar Pradesh, Gujarat, Rajasthan, Maharashtra, Tamil Nadu

ANNEX G.5

The technological needs considered of most importance, listed in order of priority in Table 1 in the Technical Analysis section, have been translated into a list of processes and equipment needed to meet those needs. This information would be of immediate practical use to potential suppliers of technology and equipment.

Technological Gaps

A. Water Pollution

1. Membrane/ultrafiltration.

2. Electrodialysis.

3. Evaporation and crystallization.

4. Absorption.

5. Chemical oxidation (e.g., ozonation).

6. Biological systems.

   a. Low-energy systems (e.g., anaerobic systems).
   b. Reactor design (e.g., fluidized bed, fixed film).
   c. Biotechnology for specific pollutants.

B. Air and Noise Pollution

1. Monitoring instruments.

   a. Specific pollutants (e.g., hydrocarbons).
   b. On-line/continuous stack monitoring.
   c. Continuous ambient-air monitoring.

2. Control systems.

   a. Specific pollutants (e.g., fluoride).
   b. Package scrubbers.
   c. Silencers and other noise-suppression equipment.

3. Specific preventive equipment.

   a. Low NO_x burners.
   b. Catalytic converters.
   c. Others.

C. Solids and Hazardous Wastes.

1. Hazardous wastes.

   a. Incineration.
   b. Molten-glass/molten-salt technology.
   c. Secured-landfill technology (e.g., liners).
   d. Bioremediation.
   e. Sludge and ash disposal technology.

2. Utilization of fly ash.

3. Process-control and monitoring instrumentation.

D. Clean Technologies

1. Cleaner processes.

   a. Tanneries.
   b. Electroplating.
   c. Pulp and paper mills.

2. Technology for water recycle.

3. Recovery of chemicals and byproducts.

   a. Tanneries.
   b. Electroplating.
   c. Fertilizer manufacturing.
   d. Pulp and paper mills.

ANNEX H: TEST INFORMATION NETWORKS FOR INDO-U.S. TECHNOLOGY COLLABORATION

The focus of the TEST project is on increasing environmental protection and enhancing Indian industrial efficiency via linkages between Indian and U.S. business, industrial and service organizations in the fields of industrial environmental services and technologies (ESTs). Access to information about U.S. ESTs will be a key factor in this effort. Such information is not easily available to companies in India. The recommendations proposed in this section are focussed on business development through strengthening existing information networks rather than creating new networks.

Outside the input of capital funds TEST project implementation can be divided into two interrelated components:

1. Establishment of a permanent information network with a two-way flow matching Indian needs for technical information and technology imports with the U.S. capability to meet the needs.

2. Promoting a network of Indian and U.S. firms and organizations which match importers with suppliers and promote technology transfer arrangements described above that lead to a sustained flow of U.S. technology into India and also support collaborative efforts to develop new technologies. (see annex I for discussion of this component).

H.1 Information Flows-Current Patterns

The initiative for identifying and accessing foreign technologies is undertaken by Indian companies via:

1. Marketing and technical service efforts by foreign companies.

2. Catalogues, literature, and brochures.

3. Trade fairs, exhibitions, and technology expositions.

4. Tours, visits, and exchanges.

5. Professional and technical journals, abstract services, data bases, and search services.

6. Technical consultants, and business specialists.

Indian company executives feel that U.S. companies are not active or visible in the Indian market place in ESTs. The reasons for this may be the perception of U.S. companies about the size and future of the EST market in India and the difficulties encountered in doing business in India.

H.2 Information Exchange Constraints: Need for Coordinated Effort

Business groups and other agencies described a great need to document information on U.S. manufacturers of EST providers and make it available to potential investors in India through appropriate institutional mechanisms. Similarly, there is a need to acquaint U.S. business about Indian EST needs and the growing business opportunities in India.

While there are several institutions in India engaged in information dissemination, an institution needs to be identified which can undertake a coordinating and liaison role between U.S. and Indian organizations in the sector. For example, it could be associated with the U.S. Environmental Technology Market Survey (details of which are given below), disseminate this information to the agencies identified below, and also support TEST Project activities such as:

1. Arranging trade and investment tours for Indian and U.S. companies.

2. Assuring the participation of U.S. and Indian companies in technology fairs and expositions in India and the U.S.

3. Establishing information exchange programs with agencies such as the USEPA, and environmental, industrial and other EST associations.

4. Arranging seminars and workshops in cooperation with local chambers of commerce and industries to promote TEST Project activities.

5. Providing assistance to the U.S. consulting firm identified to undertake the Environmental Technology Market Survey and assuring and monitoring the dissemination of this business database to agencies listed below and others.

6. Providing technical assistance through U.S. agencies such as the USEPA, the Office of Technical Assistance of Massachusetts Environmental Affairs Department, and others to Indian agencies such as the Industrial and Technical Consultancy Organizations in Gujarat, Maharashtra, Tamilnadu, and pollution control cells of various regional chambers of commerce and industries and other industry associations.

7. Establishing links and liaison between some of these organizations, business and project development experts, and similar organizations in the U.S.

8. Providing counselling and business advisory services with the help of business consultants to potential entrepreneurs and companies interested in the EST sector.

The TEST Project will provide funds to perform the activities mentioned above and other related activities for the successful implementation of the TEST Project.

H.3 The Existing Information Networks in India

H.3.1 Primary Organizations Accessing U.S. Databases

The promotion of trade and technology transfer between Indian and US organizations in the EST sector can be achieved through establishing a two-way information exchange using the existing networks and upgrading them. Some of these networks cater to a wide variety of technology and business related information. The TEST project will provide them with dedicated databases and information resources relevant to EST business information and technology briefs from the U.S. Some of these networks include:

1. Confederation of Indian Industries (CII), New Delhi, which is establishing a Technology Information Service under a European Community project.

2. National Environmental Engineering Research Institute (NEERI), Nagpur, which, in cooperation with the U.S.Environmental Protection Agency and its Environmental Information Clearinghouse, is establishing an online information service which will include commercial and technology related databases; technology overviews and descriptions; names of vendors; technical information packages and ways to handle specific problems.

3. UN-ESCAP Asian and Pacific Center for Transfer of Technology (APCTT), Bangalore, which has already established an Online Technology Information Service (APCTT OTIS), is oriented towards small and medium enterprises, and has identified pollution control, environmental engineering, waste recycling and utilization, and clean technologies as primary foci. USAID/R&D/ENR in Washington is considering a collaborative arrangement with APCTT under the AID/W Environmental Protection Prevention Project (EP3). APCTT is likely to be shifted to New Delhi later this year. APCTT OTIS information is available on technology offers and requests; consultants/consultancy organizations; technology transfer/ promotion institutions; and catalogs of technology offers/requests. APCTT can also provide various model contracts and check lists to facilitate technology transfer and services, including a model form of technology purchase contract, a check list for technology license agreements, typical technical provisions of a consultancy contract, a check list for screening know-how agreements or know-how clauses in other agreements, and a check list for, screening patent agreements or clauses in other agreements. APCTT can create a dedicated database of U.S. environmental technologies and service providers and make it available not only in India but in the Asia/Pacific region.

4. The U.S. Embassy Commercial Office has a database and can relay requests for information to U.S. suppliers.

H.3.2 Intermediate Institutions in Information Networking

Institutions which play an important intermediate role at both the national and state level are the Federation of Indian Chambers of Commerce and Industries (FICCI), the Associated Chambers of Commerce and Industries (ASSOCHAM), the Indian Chemical Manufacturers Association, the CHEMTEK Foundation and various state level chambers and industry associations. They disseminate information to member firms through pollution control panels, seminars, trade fairs as well as provide technical assistance to industries. They also promote exchanges, tours, visits and contacts with overseas organizations and businesses.

Another group are agencies such as the industrial and technical consultancy organizations, particularly in Gujarat, Maharashtra and Tamilnadu, the National Productivity Council's Pollution Control Cell, and the State Industrial and Investment Corporations. Some of these agencies have multidisciplinary technical consultancy staffs who offer services to small and medium businesses on payment of fees and also provide assistance in technology acquisition, collaboration services, and other related business development services.

A third group of information and service providers are business specialists and consulting firms who provide similar assistance to clients in new business development.

H.3.3 Users of the Business Information - The Third Level in the Network

The ultimate users of the business information will be the companies in India interested in developing business relations with companies in the US. The organizational components on the Indian side of an information network are in place. They now provide multiple channels of communication from the U.S. to the Indian business community. They need to be upgraded and better linked. Therefore, rather than creating a new institution such as an Environmental Business Center, TEST Project resources will be used to strengthen the activities of the agencies described above through grants for environmental promotion activities. TEST can also establish links with analogous organizations in the U.S. CII is establishing an Environment Management Division to provide advisory and training services to Indian industry in industrial pollution prevention and control, environmental impact assessment, hazardous waste management, clean process technologies, and environmental audits. TEST can support this effort through technical assistance from the private sector, universities, and the USEPA.

H.4 Information Needs: Areas Identified By Indian Companies

The companies that were contacted by the design team identified some of the following areas in which information on U.S. technology providers and technologies is needed:

1. Air Pollution Control - electrostatic precipitators for thermal plants and the cement industry; flue gas desulphurisation.

2. Water Pollution Control - oil water separation; acid recovery from steel pickling operations.

3. Solid Waste Disposal - sand recovery (from burnt sand); incineration systems.

4. Waste Treatment and Recovery - wastes from tanneries, sugar distilleries and dyestuff and chemical plants, fertilizers, pesticides.

5. Industrial waste collection and disposal, toxic and hazardous waste disposal.

6. Industrial and environmental testing and analytical services.

7. Environmental audits, impact analysis, studies and risk analysis.

8. Membrane and reverse osmosis technologies.

9. Process technologies to reduce pollution and recovery of useful and marketable products.

10. Manufacture of industrial pollution control equipment, machinery and instruments.

H.4.1 Type of Information Needed

The companies and other agencies suggested information of the following types will facilitate trade and business arrangements between Indian and U.S. companies.

1. Listing of the major manufacturers of pollution control equipment, machinery and instruments in the U.S. in the fields of air pollution control, water pollution control, hazardous waste disposal and incineration systems; trade catalogues; and literature.

2. Listing of U.S. industrial pollution control engineering consultants and service providers as well as firms providing R&D and analytical and testing services.

3. Information about U.S. EST trade fairs, expositions, conferences and EST industry association events.

H.5 Role of the TEST Project in Strengthening the Information Network

The TEST Project will provide grant funds to undertake the following activities to strengthen the information networks to promote active cooperation between Indian and U.S. firms in the EST field:

1. **U.S. Environmental Technology Market Survey**

   The U.S. institutional contractor will initiate the environmental technology market survey in the US. In undertaking this survey, it will work through the TEST institutional contractor in the U.S. ICICI will also appoint a local technical expert to work with the U.S. contractor to design the study and to project Indian EST demands. This survey will be conducted soon after the Project Agreement is signed. It will be completed and its output made available to the users within six months. ICICI may use the services of a local EST consulting agency to monitor the information flow and analyze feedback from the users. ICICI will provide financial support for this on an annual basis to a consultancy firm. The market survey will collect data in the areas described in section H.4.1.

   There are a number of data bases available to the survey team. The collated information would be passed on to ICICI. The U.S. institutional contractor and the ICICI U.S. based representative would cull the list and identify a group of promising companies for follow up. Those companies would be introduced to the Indian market, potential partners, and the TEST Project.

2. To encourage U.S. EST firms' participation in trade and technology fairs, expositions and catalogue exhibitions in India and trade and investment tours by U.S. and Indian businesses to determine the commercial opportunities that will be undertaken. Approximately five participants from the U.S. and four from India will participate in this program each year for four years of the project. Twenty person months for U.S. participants and sixteen for Indian participants are budgeted for this activity.

3. To facilitate U.S. EST business participation in workshops, seminars, industry association conferences and events.

4. To organize seminars in cooperation with scientific, technical and business associations in India to introduce TEST Project activities and relevant US EST technology initiatives.

H.6 U.S. and Indian Organizations

U.S. and Indian organizations that can serve both the information networking and technology transfer role are discussed in Annex J.

ANNEX I: PROMOTION OF INDO-US JOINT EST VENTURES

With the increasing awareness of industrial pollution problems and demand for environmental legislation compliance, Indian businesses are considering investments in pollution treatment and abatement. Some leading companies are demonstrating commitment to proactive policies and no longer consider environmental spending to be discretionary. However, for many others, the heavy investment for pollution treatment is still a burden. This has implications for U.S. environmental technology imports to India. With U.S. technology, the cost of the project financing and professional service fees for pre-offer work, negotiations, and project work can be a deterrent. The TEST project, through innovative financing mechanisms, can facilitate Indo-U.S. joint ventures. Little institutional project financing is available to industry for pollution control projects. What is available is through credit lines provided by the World Bank and bilateral donors specifically for pollution control projects. The TEST Project will provide project financing for both rupee and foreign exchange costs. The TEST Project resources can also be creatively used to leverage project financing available through these credit lines, e.g., the TEST project can provide conditional grants to Indo-U.S. ventures for pre-offer work, feasibility studies and other commercial components to enable them to successfully bid on such projects. Not a single U.S. company bid on any of the first 20 odd pollution control projects funded through the World Bank project.

I.1 Worldwide Trends

The worldwide market for environmental goods and services is expected to grow rapidly during the next decade, doubling from roughly $300 billion to $600 billion by the year 2000. Annual market growth already ranges from 5 to 25 percent in developing countries. These figures break down into approximately $100 billion for the U.S. and Canada, $100 billion for Europe and Japan, and $100 billion for the rest of the world (based on IFC estimates). Many factors are driving this growth. Rapid industrialization and urban development have placed heavy demands upon antiquated and informal systems of waste management and water treatment. Pollution in many cities has reached such critical levels that the public is demanding improvement in environmental quality. Growth of environmental non-government organizations (NGOs) has increased the pressure for reform. As governments respond with environmental legislation, strengthened environmental protection institutions, and increased enforcement, opportunities are generated for private sector investments in environmental services and technologies (ESTs). Demand for cleaner and more efficient process technologies is increasing as enlightened companies adopt the four "R's" of waste management- reduce, reuse, recycle, and recover.

I.2 Worldwide Market Potential and Opportunities for Private Sector Investment

Urbanization and rapid industrialization with little attention to the environment have resulted in the following problems:

1. Inadequate industrial and municipal waste-water treatment facilities.

2. Lack of disposal, treatment, and storage systems for solid and hazardous wastes.

3. Severe air pollution caused by uncontrolled industrial and vehicular emissions.

4. Pressure on the quantity and quality of water supplies.

The market for waste management and industrial pollution control can be divided into three general categories:

1. Equipment ranging from production technologies that minimize waste and prevent pollution to pollution control equipment, including electrostatic precipitators, waste water treatment plants, bag filters, catalytic converters, and clean fuel burning technologies. The buyer has full responsibility for operating the equipment.

2. Pollution control utilities that provide such pollution control services as hazardous waste treatment. The utility companies obtain and operate equipment, charging the buyer for the service.

3. Monitoring and consulting services, including measurement and analytical services, environmental assessments, and other studies for environmental management.

Growth of the market for environmental goods and services is driven by a number of factors, but especially by public pressure and the presence of a strongly enforced legal and regulatory framework. Other critical factors are political support, a sense of responsibility by private companies, capacity of the population and industry to pay for services, and support by public authorities for the private sector to provide such goods and services as municipal waste water treatment or solid waste disposal. The characteristics of the market are a function of the conditions that affect the behavior of potential buyers. Some of the buyers are:

1. Local authorities.

2. State governments.

3. Central governments.

4. Parastatal enterprises.

5. Large private sector manufacturing concerns.

6. Developers.

7. Small private sector manufacturing concerns.

8. Private consumers.

I.3 U.S. Marketplace & Market Trends

A recent industry survey projects the U.S. EST professional services market at $8.2 billion per year and the market for environmental goods and services in the U.S. and Canada is estimated at $100 billion per year. Remediation activities carried out by industry continue to grow as a result of the U.S. Environmental Protection Agency's direct enforcement of environmental laws, especially the Resource Conservation and Recovery Act (RCRA). A steady flow of government regulations and enforcement frequently prodded by NGO and community pressures, are the main factors in the demand for environmental services.

Increasingly, companies in the U.S. are endorsing pollution prevention or waste minimization; that is, controlling pollution through environmental planning. This proactive policy avoids future problems and yields positive performance dividends. Environmental planning conserves resources, minimizes pollution control costs, and reduces regulatory and litigation expenses. Companies recognize that the environmental impact of a product must be considered throughout the product's life cycle, starting with its design and development and continuing through raw materials acquisition, manufacturing, distribution, use and ultimately disposition. Product stewardship is understanding the environmental, health, safety aspects of a product, as well as the conditions of use during the entire life cycle of the product, and providing effective guidance on how environmental exposure should be controlled and monitored.

The market for environmental planning and engineering services at the state and local government level in the U.S. are a growth area. Each year the U.S. produces in excess of 180 million tons of trash from households and businesses. This large volume of material and a desire to minimize disposal have stimulated the growth of a $2 billion-per-year recycling industry, resulting in many by-products. Government agencies are also required to comply with all the environmental regulations that apply to the private business sector. Another growth area is environmental restoration programs. It is estimated that to remediate all DOD and DOE hazardous waste sites will cost in excess of $400 billion over the next 20 to 40 years.

I.4 Implications for The TEST Project

The above analyses of the U.S. market place has implications for the TEST Project. U.S. EST professional service companies are fully occupied with domestic work, and the domestic demand is growing. US companies will not be easily attracted to foreign business opportunities unless they are particularly profitable and challenging. The implication is important when one considers the way the environment professional services sector in the U.S. evolved and what it has to offer to Indian companies. This know-how is crucial to Indian companies. The main issues are whether Indian companies can afford this know-how and whether they can absorb it.

Indian companies that have the necessary professional and technological capability and ICICI will have to conduct a concerted campaign to market India and Indian companies to the U.S. EST sector. This is one reason why the TEST Group must have a presence in the U.S. Credible Indian companies desiring entry into the EST sector in collaboration with U.S. companies are the main means for introducing U.S. technology, and a key to the success of TEST.

The time and cost involved in the negotiations and the use of U.S. technology can also discourage collaborative arrangements. For example, it took over 18 months for a reputed Indian company to strike a deal with Kaiser Corporation for a technical know-how arrangement for a smelter cleansing system. To install this system in one aluminium plant will cost about Rs. 850 million (approximately $30 million) and the fees for Kaiser will come to about $2.25 million. The pre-offer proposal preparation cost for Kaiser will be around $250,000. Local currency costs are additional.

I.5 Trade and Technology Purchase Mechanisms

Company Representation and Distributorship

These include trade and business houses, small and large, who act as representatives or distributors of U.S. company products and equipment. A substantial number of U.S. manufacturers have a presence in India through such arrangements.

Technical know-how licensing arrangements

Another group are manufacturing or service/consulting companies which have licensing and technical know-how arrangements with U.S. companies. Such arrangements in the EST area are rather limited compared with other technological sectors, but the number of Indian companies seeking such arrangements with U.S. companies is growing.

Joint Ventures

Joint ventures with equity participation is the arrangement preferred by many Indian companies, but rather difficult to implement. During the past

few years, Paramount, Sudarshan Chemical, Mysore Kirloskar, Thermax, and Four Eyes Research in India have entered into arrangements with Andersen 2000, Radian, Snyder General Corporation, Kaiser Aluminium & Chemical Corporation and Amclyde Engineered Products in the USA. These are all recent business arrangements. One of these ventures is based on R&D and technology adaptation under the PACT Project. This is seen as a potential area for future Indo-U.S. collaboration. In the case of Snyder General, the company will have 50% equity and in the case of Amclyde, it will hold 51% equity in the Indian company, along with the usual royalty and lump sum payment conditions.

I.6 Constraints to U.S. Technology Purchase by India

The inadequate business and technology information resources needed to promote Indo-U.S. trade and technology transfer in the EST sector was highlighted in Annex H. The cost of U.S. technology is also a factor and has been discussed earlier. The estimated market for the industrial pollution sector in India is around $100 to 150 million per year. It is growing at about 25% per year. Sixty to seventy per cent of this is in the industrial effluent treatment area and the balance in other areas. This is a rather small market for a U.S. company since in many cases the Indian partner will be accessing the relevant services locally. Where imported equipment, instrumentation and technical assistance are involved, the project cost is high and Indian clients are reluctant to make the investments. Paramount, Mysore Kirloskar, Sudarshan Chemical, Thermax and Four Eyes reported that they have to make heavy investments in pre-offer work to service potential clients. If the foreign partner is involved at this stage, the cost is still higher as the local venture has to pay for the time, travel and other expenses of the expatriate technical experts. All this may result in no business if the client awards the business to another offerer or decides to do nothing. The gestation time for the project may be several months and returns are not certain.

In this environment, it is difficult to keep the U.S. partner interested. The Indian companies say their collaborators are aware of the situation and in some cases they have joined the venture with full understanding. However, there are cases where the partners have parted in frustration and this influences the decisions and views of other U.S. companies.

Most of the EST companies in India are medium scale, professionally and technically competent, and are keen to work with U.S. partners.

I.7 The Needs of Indo-US Joint Ventures & The TEST Project Role

The primary means of linking Indian and U.S. companies are existing or new Indo-U.S. joint ventures. It is important that existing or recent joint ventures in the EST area become operationally and commercially successful, and that new joint ventures be promoted. This will raise the confidence level of U.S. companies with joint ventures and those

contemplating one. One effective way to achieve this will be through financing various project components with loans and conditional grants. Initially, the need is for financing pre-offer/feasibility costs and payment of fees and expenses to overseas partners and experts; payment of lump sum know-how and royalty fees; arranging loan financing for clients for total project cost (while the client is responsible for this, the joint venture firm can provide source guidance). Project loans and/or conditional grants can be considered for projects such as Cane Separation Systems (developed under the PACT Project), which will drastically reduce pollution problems in sugar and paper mills. The cost of the Cane Separation Systems project in a sugar mill complex of 2500 tons/day capacity will come to $3.6 million. The royalty payments and fees will be around $1.1 million and the pre-offer expenses will be around $200,000. This is a commercially proven technology and already adapted to local Indian conditions through pilot trials, but has to be commercially installed. If the project is successfully implemented, it has the potential to be replicated in several sugar mills in the country. Another example is that of the proposed smelter cleansing system in an aluminum plant in India with Kaiser know-how. This will involve a financial outlay of about $30 million for the company. The Kaiser technical know-how fees for this project alone are estimated at $2.25 million, and the pre-offer expenses for Kaiser will be around $250,000. The local currency costs are additional. If this project is successfully implemented, another four or five companies may come forward to undertake similar or larger projects. Similar projects are in the pipeline by other Indo-U.S. joint ventures who will benefit from the TEST project financing mechanism.

I.8 Fast Track Commercial Development through Existing Indo-U.S. Joint Ventures

Some existing Indo-US joint ventures are:

1.	Indian Company	Amclyde India Ltd.
	U.S. Company	Amclyde Engineered Products Inc.
	Purpose	To undertake manufacture of up to 2500 TPD cane separators in financial and technical collaboration with the US company. The proposed system will replace the existing sugar cane milling process and reduce pollution significantly. The system has potential application in over 400 sugar mills in India.
2.	Indian Company	Four Eyes Research Pvt. Ltd.
	U.S. Company	ALCOA Corporation.
	Purpose	To undertake development and manufacture of a membrane based system for treatment of distillery effluent in India. The system will be ready for commercial scale trials in 1993.

3.	Indian Company U.S. Company Purpose	ESVIN Advanced Technology Pvt. Ltd MTCI To develop and manufacture a system for treatment of black liquor effluent from straw based paper mills. Treatment of other liquid pollutants and sludge will also be possible. The commercial system is expected to be available in 1993. The project involves purchase of technology from MTCI to ESVIN for a thermo-chemical conversion reactor for adapting to Indian conditions.
4.	Indian Company US Company Purpose	GSFC Ltd. BEND Research Inc. The project involves imports of membranes from BEND for adaptation in certain uses involving pollution abatement in India. GSFC wants to market this system for pollution control and desalination.
5.	Indian Company US Company Purpose	ECOAIR Corporation GLOBE Auto Inc. Development and manufacture of a compressor using CFC substitutes. The project involves development of a compressor and coupling it with a high speed motor (which has already been developed) as a unit. The system will be ready for commercial use in U.S. and India in 1993.
6.	Indian Company US Company Purpose	Paramount Pollution Control Pvt. Ltd. Andersen 2000 Inc. Technical collaboration to offer environment/industrial pollution control equipment, systems and services for air pollution, water/waste water treatment and control.
7.	Indian Company U.S. Company Purpose	The Mysore Kirloskar Ltd. Snyder General Inc. A joint venture with 50:50 equity participation to offer air pollution control equipment, systems and services.
8.	Indian Company U.S. Company Purpose	The Mysore Kirloskar Ltd. Kaiser Aluminium & Chemical Corporation Technical collaboration for aluminium gas cleansing systems.
9.	Indian Company U.S. Company Purpose	Sudarshan Chemicals Radian Inc. Technical collaboration to offer services in air pollution and industrial waste treatment.

I.9 Promotion of New EST Ventures

Several Indian and US companies and consulting firms have expressed interest in collaborative arrangements in EST. These include:

Indian Companies

The Mysore Kirloskar Ltd., Bangalore
Thermax Ltd., Pune
Deepak Nitrite Ltd. and Deepak Fertilizers Ltd., Bombay
Batliboi Ltd., Bombay
Paramount Pollution Control Ltd., Baroda
The Four Eyes (P) Ltd., Pune
PRAJ Counseltech (P) Ltd., Pune
Sudarshan Chemical Industries Ltd., Pune
VIMTA LABS Ltd., Hyderabad
CHEMTECH Foundation and J.S.Group of Companies, Bombay
Envirotech Instruments (P) Ltd., New Delhi
Shriram Foods and Fertilizer Industries, New Delhi

Indian Engineering & Project Development Consulting Groups

M.N.Dastur & Company Ltd., Calcutta
Tata Risk Management Services, Tata Sons Ltd., New Delhi
Tata R&D and Engineering Center, Pune
Consulting Engineering Services(I) Pvt. Ltd., New Delhi
Environmental Engineering Consultants, Bombay
Associated Industrial Consultants (I) Pvt. Ltd., Bombay
Kirloskar Consultants Ltd., Pune
Central Leather Research Institute, Madras
Gujarat Industrial Investment Corporation, Ltd., Ahmedabad
Industrial & Technical Consultancy Organization of Tamilnadu
Gujarat Industrial & Technical Consultancy Organization, Ahmedabad
Technology Development & Investment Corporation of India
CreditCapital Finance Corporation Ltd., New Delhi
Feedback Ventures+Collaborations, New Delhi
Mantec Consultants Pvt. Ltd., New Delhi
GTS Consultants (P) Ltd., New Delhi
Industrial Development Services, New Delhi
Karnataka-Kirloskar Environmental Ltd., Bangalore

US Companies

Roy Weston Inc., West Chester, PA.
CCJM, Grand Rapids and Siver Spring
Envirosystems Inc., Columbia, Md.
Fremont Group Ltd., Chicago, Ill.

The success of the TEST Project will depend on aggressive marketing by the TEST Group to companies in India and the U.S.

I.10 Project/Business Development Support: Role of the TEST Project

Companies of all sizes need assistance in identifying business opportunities, locating technology suppliers, undertaking feasibility studies, negotiations and other commercial activities. Such services are being provided by intermediaries who specialize in venture management, collaboration services, and technology searches/sourcing, and identifying partners. There is a lack of such service providers in the EST sector.

ICICI and the institutional contractor will identify service providers and consultants in India and the U.S. and make available to them the market and business information generated through studies in the U.S. and India. It will also acquaint them with the TEST Project activities and resources.

Service providers include EST consulting and engineering firms in India and the U.S., industrial and technical consultancy organizations in Gujarat, Tamilnadu, and Maharashtra, and Industrial and Investment Corporations in these and other states. The other emerging intermediaries in the technology transfer services area are venture capital and venture management companies such as Credit Capital and its affiliate, British Technology Group; Feedback Ventures+Collaborations which offers a range of services to clients in venture identification, feasibility and implementation; TDICI; Mantec; Four Eyes Research; Praj Counseltech; Kirloskar Consultants; and Industrial Development Services.

Annex J: US and Indian Agencies in Information Networking & Technology Purchase

J.1 U.S.Agencies

An indicative list of the U.S. agencies and programs which will be explored for participation in the EST information network and technical assistance activities in India is given below. Participating agencies would share their EST information and technology data resources with the Indian institutions. These agencies are:

1. U.S.Environmental Training Institute (USETI): This is a joint venture between the private sector and the U.S. government. The objective of the USETI is to share U.S. environmental advances with the international community by providing training courses to qualified public and private sector executives from developing countries. USETI can provide the following: quality training which can be incorporated their local environmental industries; interaction with prominent decision makers in international environmental markets; and exposure to U.S. companies' expertise in environmental technology. USETI proposes to offer courses in existing laboratories, training facilities and factories of major U.S. corporations and government agencies. As a result, the same facilities used for their own employees and customers will become classrooms for USETI participants. In May 1992, USETI offered its inaugural course in Advanced Landfill Management in cooperation with Waste Management Incorporated in Chicago.

2. U.S. Asia Environmental Partnership (USAEP): This new initiative, coordinated by USAID, brings together a coalition of American and Asian businesses, governments and community groups. The program has four components: Environmental Fellowships and Training; Technology Cooperation; Environmental Infrastructure; and Regional Biodiversity Conservation Network. The Technology Cooperation program will foster technology transfer opportunities through trade and investment activities and Asian and U.S. business exchanges. Also planned are: a Technology Innovation Seed Fund, Small Business Demonstration Projects, and US/Asian business-to-business trade related exchanges. The Environmental Infrastructure program will provide cleaner air, water and energy through environmental infrastructure projects such as water supply and wastewater treatment, emission control retrofits, solid and toxic waste management, and production of lead-free fuels.

   USAID will explore the possibility of collaborative and/or complementary activities between TEST and USAEP.

3. The Export-Import Bank of the United States (EXIM): EXIM provides loans (or guarantees) for the client in the recipient country to purchase U.S. goods and services. Under the new rules concessional rates/packages can be used only to fund clearly non-commercially viable development activities. EXIM can and does deal with direct loans for specific large projects, and also provides "bundling" facilities in the form of an agreed upon amount to financial institutions (FIs), including developmental finance institutions (DFIs). The FIs and DFIs bundle smaller loans by on-lending to clients within an agreed upon agenda, usually in the form of a "negative list." The FI appraises individual small projects ($100,000 to several million) and determines the floor and ceiling for the on-lending. EXIM is consciously trying to provide easy credit access for small business/small loans to assure ongoing FX needs. While EXIM is not involved directly in funding environmental technology projects, it has funded packages which include less environmentally damaging technologies. The TEST project through ICICI can access an agreed upon EXIM window. EXIM's interest rate is around 8.2% at present.

4. Office of Technical Assistance (OTA), Massachusetts Executive Office of Environmental Affairs: This state agency assists industry in reducing the use of toxic substances and materials. It offers the following non-regulatory services to business: on-site toxic use reduction opportunity assessments; response to telephone and written requests for information concerning toxic use reduction and compliance with environmental laws; economic analysis to identify benefits of toxic use reduction projects; conferences, workshops, seminars, and trade shows to disseminate information about toxic use reduction practices, technologies, and regulatory requirements; information about existing and emerging manufacturing practices which reduce toxic substance use, hazardous waste generation, toxic air emissions, and waste water discharges. OTA maintains a library containing information on toxic use reduction in many industrial processes and provides free training material and information to help plant managers and executives develop toxic use reduction programs in their own facilities.

   OTA can provide technical assistance to staff from industrial technical and consultancy organizations, company managers and others in organizing such services to assist small and medium enterprises and to share technology information.

5. Environmental & Natural Resources Policy & Training Project (EPAT): A USAID sponsored technical assistance component implemented by WINROCK International Environmental Alliance. This activity includes applied in-country research; support for policy dialogue including analytical work to support global/multilateral policy formulation and reform; sponsoring workshops, conferences and seminars; institutional strengthening; and human resources development.

   The TEST Project can use the resources of EPAT through buy-in arrangements.

6. American Water Foundation: This organization is dedicated to the international transfer of U.S. water resources technology. The organization may be able to attract medium sized U.S. companies to India through country visits, feasibility studies for U.S. companies, orientation, study tours and seminars, etc.

7. Water for People: A non-profit organization formed by the American Water Works Association which, with over 53,000 members, is the largest association of water professionals in the world. WFP was formed to provide volunteer assistance to developing country organizations.

8. United States & Foreign Commercial Service(US&FCS): This service is part of the U.S. Department of Commerce, has offices in India as well as an extensive network in the U.S., and offers a variety of trade facilitating services in three broad areas - market contacts, market assessment and trade promotion. The service is available to U.S. exporters and Indian importers.

   US&FCS is a potential resource for accessing business and company information in the EST area in U.S., promoting and establishing liaison between U.S. and Indian businesses, and arranging company/product catalogs distribution. It also assists in the participation of U.S. business in trade fairs, trade missions and seminars, catalog and video shows and single company promotion.

9. American Consulting Engineers Council: A major agency representing consulting engineers and companies in the U.S. Through its International division and Hazardous Waste Action Coalition, the Council offers advisory services and company contacts.

10. Environmental Pollution Prevention Project (EP3), Bureau for Research and Development, AID/Washington: EP3 is an AID/Washington project to promote pollution prevention and cleaner production primarily through technical assistance; institution creation and strengthening; linking U.S. suppliers with firms in assisted countries; and promoting U.S. agency coordination in pollution prevention through a program called Cleaner Production Worldwide. EP3 plans to coordinate with the Asia Pacific Center for Technology Transfer, Bangalore.

11. U.S.Environmental Protection Agency (USEPA): USEPA offers a range of services and information resources to users. Many of the data bases managed by the USEPA have relevance to the activities under the TEST Project and the agencies involved will benefit from access to these data bases. Some of these are:

    1. The Chemical Assessments and Related Activities (CARA) data base is a catalog of the scientific assessments and projects produced in the Office of Health and Environmental Assessment (OHEA), which is a part of the Office of Research and Development. OHEA includes four organizational groups: The Human Health Assessment Group, The Exposure Assessment Group, The Environmental Criteria and Assessment Office in Research Triangle Park, and The Environmental Criteria and Assessment Office in Cincinnati. The CARA data base also contains reports on the Integrated Risk Information System (IRIS) and reports prepared by the Risk Assessment Forum.

    2. EPA also offers a database called the Pollution Prevention Information Exchange System (PPIES) which provides information on pollution prevention technologies. The EPA Environmental Information Clearing House, which is a part of PPIES, is a database on commercial and technology-related information and provides technology overviews and descriptions, names of vendors, technical information packages, and ways to handle specific problems.

    3. OZONET, a database offered by Industry Cooperation for Ozone Layer Protection, is available through General Electric Information Service Network.

J.2 Information Networking and Technology Transfer: Role of Indian Industry Associations

The role agencies such as Fedreation of Indian Chambers of Commerce and Industries (FICCI), Associated Chambers of Commerce (ASSOCHAM), and Confederation of Indian Industries (CII) play at the national level and also through their state level counterparts will help assure the success of the TEST project. A technically competent organization such as CII can be an important actor in establishing business-to-business contacts, technology expositions, acting as a clearing house for information and promoting dialogue between U.S. and Indian private sector companies. CII has the necessary organizational resources to cooperate with the TEST Project. It may need grant support to strengthen some of its activities and linkages with appropriate U.S. organizations. TEST could provide a grant to CII to publish a periodical newsletter giving information on U.S. environmental technologies, technology and service providers, consulting/engineering firms, new developments, major projects undertaken by U.S. firms, information on manufacturers, information on Indian firms needing technology or consulting services, and trade fairs and conventions in EST in the U.S. and India.

State level agencies, such as the Bombay, Tamil Nadu and Bengal Chambers of Commerce and Industry are closer to the companies in the field. Some of these are quite active in pollution control programs and are providing advisory services to member industries. They are also active in arranging trade and investment tours and promoting technology acquisition activities.

Another group of state level agencies, the industrial and technical consultancy organizations in Gujarat, Tamil Nadu and Maharashtra, play an important role in providing technical assistance and technology purchase and collaboration services to small and medium enterprises and also in organizing buyer-seller meets and technology fairs. ICICI, one of the sponsors for these agencies, states that for strengthening the role of these agencies for delivery of pollution prevention services, it will provide seed funding out of its own resources. These agencies will benefit from technical assistance and training support from U.S. based agencies and consulting groups.

Grants in support of TEST information networking activities will be awarded to agencies by ICICI.

J.3 Type of Projects to be Funded under The TEST Project

The major focus of the TEST project will be to increase environmental protection and enhance the productivity of Indian industry via promoting trade and technology linkages between Indian and U.S. companies. The TEST Project will provide conditional grants and/or loans for the following types of activities:

1. Joint ventures for the manufacture of EST equipment and instruments.

2. Joint ventures for establishing EST consulting and engineering services.

3. Joint ventures for establishing EST analytical and testing facilities.

4. Conduct concept evaluation of pollution control alternatives for specific facilities or industry projects to be undertaken by U.S. consulting firms in collaboration with Indian partners.

5. Loans and/or conditional grants for projects proposed or developed by Indo-U.S. joint ventures and for projects ready for commercialization under the PACT or PACER Projects.

6. Loans and/or conditional grants for ventures importing the U.S. production technologies or equipment that minimize waste and prevent pollution.

ANNEX K: ADMINISTRATIVE ANALYSIS

K.1 Selection of the Developmental Finance Institution

The principal criteria used in the selection of the developmental finance institution (DFI), which will be the main promoter and responsible for overall management and approval of projects undertaken by the TEST Project, are as follows:

1. A national level institution acceptable to the GOI to act as its Agent in receiving and handling monies received on a government-to-government grant basis.

2. A developmental finance institution capable of and accustomed to assessing new technologies, and with a proven record of willingness to assume financial risk in the implementation of those technologies.

3. An institution with the financial capacity to support the local currency requirements of the TEST Project over and above rupee funding provided by TEST.

4. An institution with national respect, a strong belief in the high priority of industrial pollution abatement, and the influence to assume a leadership role in this effort.

5. An institution with the willingness to provide assistance and cooperation to state level financial institutions on pollution control and abatement projects which are originated at the state level.

6. An institution with a satisfactory record of intermediation in previous USAID projects and its acceptability to the Mission.

The Industrial Credit and Investment Corporation of India (ICICI) was selected as best meeting all of the criteria. Its management role in the PACT Project (initiated in 1985) required innovativeness in assessing and implementing joint Indo-American research and development projects. ICICI was also selected to manage USAID's new agribusiness Project (ACE). In PACT and now ACE, ICICI has gained experience in working with U.S. contractors.

A number of private sector financial institutions, and the Industrial Development Bank of India, as well as several of the state development finance companies and industrial development corporations were interviewed.

Without exception, while impressively staffed, the private sector firms were relatively new, small, and possessed neither the human or the financial resources needed to play the central role in carrying out the

TEST Project. The firms are essentially "financial market segment boutiques" specializing in leasing, venture capital, or both. The chosen DFI must have the ability to mobilize large amounts of rupees to finance a number of the potential end user projects from non TEST Project funds. As a major participant in the IBRD pollution project, ICICI is in a position to mobilize some of those monies for TEST. The DFI will preferably agree to take a substantial risk position in the transaction itself to encourage others to participate, if syndication is necessary. The private sector firms interviewed did not have this capacity.

The private financial institutions can, and were encouraged, to play a role as assisting financial institutions (AFIs), or even as intermediaries in identifying and packaging deals for the Project. For this reason, they should be included as recipients of the product of the information network once it has been established. The team was informed that banks are hesitant to lend to pollution control projects. ICICI must use its persuasive powers to involve as many AFIs as possible in TEST, even venture capital firms when appropriate.

IDBI, while certainly a viable candidate for the DFI as it fulfills most of the listed criteria, is, we understand, to shortly reorganize its operation and concentrate on one of its four principal roles, that of a "central bank" for the many state development finance institutions. While IDBI is playing a major role in the disbursement of the World Bank environmental project funds, we felt that in choosing ICICI over IDBI we were eliminating one major uncertainty which could adversely affect TEST Project progress.

K.2 ICICI Mandate and Programs

ICICI was established in 1955 to promote industrial development by providing medium term financial assistance to industrial enterprises. ICICI is incorporated in Bombay under the Indian Companies Act of 1913 as a public limited company. Its shares are listed on the Bombay Stock Exchange, unlike India's other development finance institutions, which are established under special legislation and are wholly owned by the GOI or government agencies.

ICICI's clients are predominantly private firms. Of ICICI's loan, equity, and guarantee approvals in 1989/90, 86 percent of clients were private firms, 11 percent were "joint sector" firms, and 3 percent were cooperatives; only 0.4 percent were public sector corporations.

ICICI places no minimum limits on the size of firms eligible for assistance or on transaction size.

ICICI's development and lending policies reflect the objectives of the GOI's industrialization strategy. During the 1950's, ICICI's lending was directed toward promotion and entrepreneurship, increasing output of "essential" consumer goods, and diversifying domestic production of capital goods. In the 1960's, ICICI lending encouraged import

substitution, and in the 1970's, was directed toward export-producing industries. In the 1980's, lending was oriented toward subsectors offering net foreign exchange earnings, modernization of internationally competitive export industries, including a focus on the electronics and telecommunications sectors.

ICICI is not legally subject to supervision by the GOI or Reserve Bank of India, but in practice ICICI consults with the GOI and the Reserve Bank on operational policies. Because of the GOI's extensive involvement in the operation of the Indian financial system, ICICI's policies are heavily influenced by the GOI.

Through consultation with the Industrial Development Bank of India (IDBI) and the Reserve Bank, ICICI has some limited influence on the GOI's industrial and capital market policies. Because of ICICI's effective working relationship with the GOI, it is likely that selected policy and operational innovations concerning pollution control and abatement and the reduction of environmental degradation through the furtherance of the licensing of foreign technology and the creation of joint ventures from the TEST Project will be introduced to government financial institutions.

K.3 ICICI Ownership and Resources

ICICI's authorized share capital as of March 31, 1991 was Rs 3 billion of which Rs 1.146 billion was issued and paid up. The 1991 statement does not specify ownership, but on 3/31/90, public sector financial institutions owned 81.4 percent, over 10,000 Indian private firms or individuals 9.3 percent, and 40 foreign investors 9.3 percent of the equity.

Financially, ICICI at fiscal year-end on March 31, 1991, showed total resources of $4.5 billion of which capital and reserves were $315.7 million, Rupee borrowings $2 billion, and foreign currency loans $2.2 billion. The overall leverage of net worth to loans borrowed was 13.3:1, a ratio which exceeds U.S. capital adequacy standards of 5 percent at the present time and nearly meets the 8 percent standard to be imposed by the Federal Reserve soon. ICICI makes project loans in both local and foreign currencies in about equal amounts. ICICI is also active in leasing and in making direct investments. Operations for the year ended March 31, 1991 were profitable. ICICI earned after tax profits of $68.6 million and paid a dividend of $ 10.3 million (22%). A newspaper article of May 21, 1992 mentions that dividends have been increased to 24% based on earnings for the year ended March 31, 1992.

K.4 ICICI's Management and Staffing

ICICI's Board of Directors currently has fifteen members including representatives of ICICI management, the private sector, foreign shareholders, the Government of India, and IDBI. The Board determines administrative and operational policies and annual budgets. An

Investment Committee supervises Management of the ICICI securities portfolio, including direct equity investments. A Committee of Directors, including the managing director and two deputy managing directors, has authority to approve loans and investments where ICICI's exposure will exceed Rs 50 million (about $1.67 million).

ICICI has two deputy managing directors reporting to a single managing director. Responsibilities are divided:

Under Deputy Managing Director 1

General Administration
Western Zonal Office
Regional Zonal Offices
Operations
Market Research

Under Deputy Managing Director 2

Financial Services (including investments, leasing, credit lines)
Accounts
Planning
Technology & Development Div.(including PACT, PACER, and ACE)
Special Accounts
Corporate Legal Advisory Services
Economics
Publication, Public Relations, and Library
BIFR Coordination

The group formed to manage TEST will fall within the Technology Division which is also responsible for USAID's PACT, PACER, and ACE projects.

On March 31, 1991, ICCI had a staff of 1,021 of whom 484 were in the professional category.

K.5 ICICI Capability to Manage TEST

TEST will require ICICI to carry out a wide range of activities. Many of these activities will involve the analysis of technical matters which are new to ICICI. However, ICICI will undertake to hire, if they do not have on staff, the technical expertise needed in the TEST Group, and because of their broad range of corporate capabilities and reputation for excellent management, it is fully expected that ICICI will be able to successfully implement the full range of project activities.

ICICI has demonstrated its ability to manage and succeed in non banking activities. It has full merchant banking capabilities including the underwriting of securities and loan syndication, a venture capital subsidiary, and a consulting subsidiary.

TEST will provide both analytical and management challenges to ICICI. Licensing and joint venture arrangements between U.S. technology and the Indian partner may involve the need to adapt the technology to the Indian environment. At a minimum, there will be a need to overcome resistance to the unknown on the part of the end user, many of whom will see mostly cost and little benefit. ICICI thinking and financing must have the flexibility to deal with such situations. The ability to provide a demonstration effect will be important to create demand for many of the technologies analyzed.

The TEST Project will provide funds to assist ICICI in placing a representative to work with the U.S. institutional contractor.

K.6 U.S. Institutional Contractor

Interim assistance (e.g, via a buy-in to a central project) will be arranged to begin implementation in the U.S. while the RFP process to select the institutional contractor is underway.

The U.S. institutional contractor must have skills in international business and marketing. The contractor must also possess, or have access to, knowledge of pollution control. The institutional contractor must become familiar with Indian import regulations, foreign investment and licensing regulations, and foreign exchange regimen in order to be able to assist potential U.S. exporters, licensors, or joint venture partners in the early stages of a possible deal. In addition, the institutional contractor will organize visits by Indian industry groups to U.S. firms which both manufacture and use the technology, and organize the technical assistance which will be supplied to India under the Project. An ICICI presence in the U.S. can enhance both of these functions.

ANNEX L: FINANCIAL ANALYSIS

L.1 INTRODUCTION

Project funds will be used for loans or conditional grants to procure American pollution control technology and equipment, and finance related rupee costs, which will have a positive impact on India's industrial pollution problem. Those funds will also provide conditions that should lead to long term relationships that will encourage the continuing flow of U.S. technology into India after the project terminates.

Twenty million dollars have been used as the basis for constructing three models to project the growth of rupee reflows using various assumptions; growth is based solely on reflows of loan interest and principal repayment, and royalties earned on conditional grants. These payments are deemed tax free to ICICI as these are GOI monies. The rupee reflow account will grow more rapidly than forecasted to the extent that users buy dollars directly with rupees to import U.S. equipment. No estimate of the direct purchase of dollars is included in the models in order to highlight the effect of the other three mechanisms. The calculations are indifferent to whether uses of Project funds are for U.S. or rupee expenditures.

The calculations for payments into the rupee reflow account modeled in the three assumptions of usage shown below, and the timing and modality which constitute the major variables, are shown in U.S. dollars. The relative size and timing of the flows caused by changes in the variables are the subject of the exercise. Devaluations of the rupee may take place during the thirty-year period covered in several of the models, but are not considered in the models.

It should also be noted that the compounding effect to be gained by relending or reinvesting rupees has been omitted from the models; they are designed to estimate the timing of inflows to the rupee reflow account under various scenarios.

L.2 ASSUMPTION 1

The funds are utilized entirely by means of loans, repayable in rupees, at an interest rate of 19 percent per annum on the unpaid balance, the middle of the range of 18 to 20 percent which ICICI indicated as likely to be applicable. Loan conditions, which ICICI also indicated as midrange, are equal, and provide for a two year grace period with payments of interest only followed by repayment of principal and interest over the succeeding six years in equal semiannual installments. As amounts are repaid, they are credited to the rupee reflow account and are permitted to accrue unutilized. The yearly inflow to the account is shown in U.S. dollars.

Loan Utilization ($000's)

YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
$2,000	$4,000	$6,000	$6,000	$2,000

Growth of Reflow Account from Loan Repayments ($000's)

						TOTAL
Year 1	190	-	-	-	-	190
Year 2	380	380	-	-	-	760
Year 3	650	760	570	-	-	1,980
Year 4	586	1,300	1,140	570	-	3,596
Year 5	523	1,172	1,950	1,140	190	4,975
Year 6	461	1,046	1,758	1,950	380	5,595
Year 7	396	922	1,569	1,758	650	5,295
Year 8	364	792	1,383	1,569	586	4,694
Year 9	-	728	1,188	1,383	523	3,822
Year 10	-	-	1,092	1,188	461	2,741
Year 11	-	-	-	1,092	396	1,488
Year 12	-	-	-	-	364	364
TOTAL	3,550	7,100	10,650	10,650	3,550	35,500

The total to the right is an estimate of inflows during any given year. Individual year totals can be added to obtain an estimate of the account total at any desired time. The repayment of principal and interest on the loans made during the LOP -- $35,500,000 without losses -- is given to avoid confusion.

Assuming ICICI's loan losses at their average of about 2.8 percent, the total would be reduced to $34,506,000.

L.3 ASSUMPTION 2

The entire $20 million is utilized on the basis of conditional grants calling for royalty payments of 5 percent on sales which begin in Year 3 and increase so that ICICI achieves its target of recovery of 200 percent of the original grant in ten years from project start up (if projected recovery is much slower than 10 years, ICICI will not approve the proposal). Starting sales in Year 3 are assumed to be 50 percent of the grant made. The pace of utilization is the same as in Assumption 1. The amounts shown are not cumulative.

Conditional Grant Utilization ($000's)

	Year 1	Year 2	Year 3	Year 4	Year 5	
	$2,000	$4,000	$6,000	$6,000	$2,000	TOTAL

Receipt of Royalty Payments on Conditional Grants ($000's)

Year 1	-	-	-	-	-	-
Year 2	-	-	-	-	-	-
Year 3	50	-	-	-	-	50
Year 4	150	100	-	-	-	250
Year 5	200	300	150	-	-	650
Year 6	350	400	450	150	-	1,350
Year 7	500	700	600	450	50	2,300
Year 8	650	1,000	1,050	600	150	3,450
Year 9	700	1,300	1,500	1,050	200	4,750
Year 10	700	1,400	1,950	1,500	350	5,900
Year 11	700	1,400	2,100	1,950	500	6,650
Year 12		1,400	2,100	2,100	650	6,250
Year 13			2,100	2,100	700	4,900
Year 14				2,100	700	2,800
Year 15					700	700
TOTAL	4,000	8,000	12,000	12,000	4,000	40,000

Under the assumptions given, which are ICICI criteria for conditional grants, if all projects were to perform according to their projections, the original $20 million stake would double in 15 years. An 85 percent success rate would result in a rupee pool equivalent to $34 million in 15 years at current values.

L.4 ASSUMPTION 3

Funds are utilized in the same annual increments employed in the first two examples. However, adopting the principle that trade precedes licensing agreements or joint venture investments, early usage of the facility is in the form of loans for the importation of U.S. equipment, followed by the later usage primarily for conditional grants.

Calculations for loan repayments will be amounts received annually on conditions identical to those used in Assumption 1. Assumptions and conditions relating to royalties earned on conditional grant monies are identical to those used in Assumption 2. All figures are in dollars. Over the LOP, Assumption 3 includes $8 million in loans, and $12 million in conditional grants. No failures are calculated into the table.

Project Year	1	2	3	4	5	TOTAL
Loans	2,000	2,000	2,000	2,000		
Cond. Grant		2,000	4,000	4,000	2,000	

Annual Repayments to the Rupee Fund ($000's)

Year 1	190	-	-	-	-	190
Year 2	380	190	-	-	-	570
Year 3	650	380	190	-	-	1,220
Year 4	586	700	380	190	-	1,856
Year 5	523	736	750	380	-	2,389
Year 6	461	723	886	750	-	2,820
Year 7	396	811	923	886	50	3,066
Year 8	364	896	1,161	923	150	3,494
Year 9		1,014	1,396	1,161	200	3,771
Year 10		700	1,664	1,396	350	4,110
Year 11		700	700	1,664	500	3,564
Year 12		700	700	700	650	2,750
Year 13			700	700	700	2,100
Year 14				700	700	1,400
Year 15					700	700
TOTAL	3,550	7,550	9,450	9,450	4,000	34,000

This model equates well with the first all loan model, but shows a total 15 percent lower than the 100 percent conditional grant model (#2) when all projects are successful.

L.5 NET PRESENT VALUE ANALYSIS

The total annual inflows to the rupee reflow account are assumed to be as shown in each model. The annual totals are at 19 percent per annum on the assumption that ICICI relends these funds as received. The annual flows are then discounted to present value at 13 percent per annum. This is the annual inflation rate reported at the present time.

For discussion purposes, we have placed an estimated useful life on the rupee reflow account of twenty-five years.

	MODEL 1	MODEL 2	MODEL 3
Recoverable $ Funds Disbursed ($000's)	$20,000	$20,000	$20,000
Current $ to rupee reflow account (total as shown in model)	$35,550	$40,000	$34,000
Reflows compounded at 19 percent perannum	$39,044	$49,051	$41,769
Net Present Value	$18,030	$13,878	$15,259

L.6 HOST COUNTRY CONTRIBUTION

The Project defines Host-Country Contribution (HCC) as: (1) amounts other than Project funds which are invested in licensing or joint ventures involved in the project either in the form of equity or loans; (2) amounts other than Project funds raised by end-users and used to install technology acquired under the Project; (3) locally-raised funds for the installation of equipment imported under the Project; or (4) local expenses incurred in implementing the Project by members of or participants in the Project. The projected HCC is equal to 35 percent of Project cost.

The Project calls for an HCC equivalent to $10.8 Million. While the timing of the entry of the HCC is uncertain, it is expected that the total will be met and exceeded during the life of project due to the nature of a number of pending joint venture pollution control projects which have been identified, some of which may be approved for execution.

L.7 OTHER POSSIBLE FUNDING SOURCES

ICICI should be aware of making use of assisting financial institution (AFI) financing or venture capital for new manufacturing projects. Indeed, ICICI should promote and encourage their participation. Similarly, U.S. partners may avail themselves of OPIC assistance, including possible financing. EXIM Bank is available to finance U.S. exports so long as the borrower is willing to take the dollar exchange risk.

L.8 FINDINGS AND CONCLUSIONS

A number of difficulties arise in considering the implications of the three models within the context of: (1) the realities of the TEST

Project; and (2) the realities of the Indian economy, which is undergoing a process of liberalization. The Project, and ICICI as its prime mover, are faced with a dilemma.

1. The premise that trade usually precedes the formation of permanent relationships (beyond the level of supplier-distributor) is borne out in business experience. The models adopt this premise.

2. As the Project is demand driven, we have no way to predict in reality the type or mix of transactions that will be presented to ICICI for consideration.

For U.S. and Indian companies willing to join in licensing or joint venture agreements, the conditional grant, even with royalty payments to the full two hundred percent of the original grant, is a very attractive financing vehicle for the U.S. component of the project. Inflation will soften the royalty burden over time, and the possibility of a devaluation of the rupee is attractive from the user's point of view.

Resistance to licensing or joint venturing is thought to be at the U.S. end. Indian industrial candidates must have good records in their principal fields, and a history of high financial integrity. The U.S. manufacturer or engineering firm may be large or small; each has advantages and drawbacks:

1. The large firm may have international experience, a plus, but may find difficulty with India's stance on intellectual property rights and patents. Or, the large firm may have sufficient commitments in other parts of the world at the time.

2. The small firm might not have considered international expansion, let alone a commitment to India. The small firm is apt to lack in house human resources to lend to such a project. However, the small firm may be attracted by the marginal returns of a licensing arrangement, and possibly by the prestige of undertaking an international program under the auspices of a U.S. government program.

ANNEX M: ECONOMIC ANALYSIS

The underlying economic premise of this project is that existing and future U.S. pollution control and abatement technology can assist India in reducing the high social costs and economic inefficiencies created by the externalities of excessive industrial pollution. Decades of industrial growth driven by the need to increase domestic production and create jobs have been achieved behind high protective barriers. However, little or no thought was given throughout the first seven five-year plans to the damage to India's people and environment in the struggle for industrial self sufficiency. As a result, India's industrial centers rank among the world's most polluted.

The economic and social costs caused by externalities in many geographic regions (the Ministry of Environment and Forests has identified fourteen) cannot be measured at this time. The GOI has not applied the resourcess to determine the social cost since the problem is one of staggering proportions. Numerous studies have been conducted or are presently underway. The NEERI 1991 Annual Report lists 136 research projects recently completed, in progress, or contracted. Not a single quantitative reference to the social cost of the pollution problem has been identified. Therefore, the baseline for determining the Project's economic benefit cannot be determined.

Given this lack of baseline data, an economic benefit/cost analysis of the TEST Project cannot be based on data expressed in monetary terms; nor can one construct a meaningful "global" baseline assessment. It would also be difficult, if not impossible, to isolate the "global" benefits of TEST in reducing social and economic costs from the impacts of other projects in this area, the largest of which is a $260 million World Bank project.

However, the direct economic impact of TEST can be captured during and after the completion of the Project through the monitoring and evaluation process. The economic impact of TEST at the level of the firm can be estimated from baseline data submitted to ICICI with a proposal, and can be measured after Project financed technologies have been installed. For example, certain technologies will recapture usable by-products or reduce energy use, both of which are measurable benefits. Where the Project has financed a manufacturing firm, specifications of equipment sold and installed by customers will provide an idealized measure of pollutants which have been taken out of the system, or otherwise neutralized. The assessment process should include an estimate of the cost/benefit relationship to the firm directly, and in the larger context through the actual and projected sale of its products.

An estimate of the overall Project benefit can be derived through tracking the type and number of units of U.S. equipment installed under the Project. The design efficiency of equipment performance (operating specifications), when compared with the original pollution difficulty, will permit an estimation of the reduction of various pollutants over time. If desired, the evaluators can then translate the reduction of pollutants to monetary terms using acceptable methodology and assumptions. The monatized benefits thus calculated can then be compared against Project costs.

The GOI issued its first official Policy Statement for the Abatement of Pollution in February 1992. The policy statement gives official sanction and codification to the efforts of the Ministry of Environment and Forests, which established the Central Pollution Control Board some years ago, and the various state Pollution Control Boards which implement the policies of the Ministry and the Central Board. The objective of official policy is to "integrate environmental considerations into decision making at all levels."

If one of the aims of the Project is achieved through the formation of permanent linkages between U.S. suppliers of technology and Indian users, the project becomes sustainable, and over time the benefits initially supplied by Project funds are multiplied several times over. Current liberalization of the Indian economy, and recent GOI recognition of the industrial pollution problem places the TEST Project in an advantageous timeframe.

USAID commissioned a Market Survey of Proposed Trade and Environmental Services and Technology which was completed in November 1991. The survey verified the problem and stated that, "India is facing an environmental crisis that could have serious implications not only for its own people but also for the rest of the world." It goes on to state that "Industrial pollution is a major cause of environmental problems. American technologies can develop cost effective remedies to pollution." While stating that some subsidization might be necessary to encourage the introduction of new technologies, the survey felt that TEST would be successful at market rates and terms, and encouraged cost sharing through matching or conditional grants. The Indian market for imported pollution control equipment in 1990 was $135 million; the U.S. share of this market was $6 million, or 4.4 percent.

ANNEX N: SOCIAL SOUNDNESS AND GENDER ANALYSIS

N.1. Introduction

The underlying economic premise of TEST is that existing and future U.S. pollution control and abatement technology can assist India in reducing the high social costs and economic inefficiencies due to industrial pollution. Decades of industrial growth driven by the need to increase domestic production and create jobs has been achieved. However, until recently there has been little or no thought about the damage to India's people and environment in the struggle for industrial self sufficiency. As a result, India's industrial centers rank among the world's most polluted.

TEST is designed to respond to India's environmental and development priorities. Providing financing for the procurement of environmental technologies and services (ESTs) and enhancing the flow of relevant information can effectively be supported by the project without major disruption of soicocultural systems.

TEST project outputs include increased use of U.S. sourced environmental services and technologies; improved pollution control equipment and services in project related industries; estbalishment of an information network linking U.S. suppliers and Indian users in a two way flow of information; and reduced pollution emissions from industrial facilities. Of importance to the beneficiaries are the effects of pollution on human health, on employment, on improved plant efficiency and profitablilty, and the effects of improved environmental quality on sustainability of ecosystems and the people they support, regardless of age, gender or race.

The main beneficiaries of TEST will be U.S. and Indian suppliers and consumers, their employees, and the surrounding communities. Industry may benefit economically through improved profit margins and increased gross revenues. The working conditions and the health of plant employees will be improved by reduced pollution. Local communities will benefit from better living conditions and health from improved environment quality management. Additionally, dialogues catalyzed by TEST among the private sector, industry associations, government officials, and NGOs should improve communications - a benefit for future environmental activities in India.

N.2. Industry

Given the diversity of industries, their geographic spread, and lack of reliable studies, the evidence of effective pollution prevention and control programs in India is limited. There is a general consensus among Indian experts that the major obstacles to the purchase and installation of pollution prevention and control equipment in India has been the lack of available and affordable financing, information on appropriate technologies, and access to technology providers. TEST is an effort to overcome these obstacles.

The major technology and processing gaps in India have been identified and ranked based upon a combination of the largest number of sub-sectors and states where they are found. Focusing on these gaps makes it possible for U.S. suppliers of services and technologies, either directly or in collaboration with Indian distributors or joint venture partners, to reach a wide market. The funds available for the TEST project will have the widest impact on India's problem in air and water pollution prevention and hazardous waste management by fostering direct information exchange, the establishment of distributorships and joint ventures, the transfer of technology through licensing arrangements, and by making available the necessary know-how to perform the environmentally related services required to deal with the problems of an industrial society. The intent is to create sustainable cooperation with U.S. suppliers of that equipment and technology.

Another key component is the establishment of a permanent information network with a two way flow, linking Indian needs for technical information and technology imports with the U.S. capability to meet the needs. TEST will provide a number of services that will facilitate the establishment of such a network, a benefit for both U.S. and Indian businesses and trade associations.

N.3. Plant Employees

There is relatively little information about the environmental effects of pollution on plant employees in India. Lax labor laws and poor enforcement have undermined attention to worker health problems resulting from exposure to toxic/hazardous chemicals. It is the plant employees, often a disproportionate number of whom are women, who receive the highest exposures to dangerous materials. Lack of knowledge about proper handling and use of toxic/hazardous materials is common.

TEST, through focusing attention on the introduction of cleaner and more efficient technologies and processing techniques, should lead to increased awareness about safer practices. Further, overall pollution emissions on site will be reduced, diminishing worker exposure.

N.4. Local Communities

Environmental contamination from industry often has a disproportionate affect on the poor, and on women, and children. They are often the first to breath pollutants emitted from industry facilities, as evidenced in the Bhopal tragedy, and for many, their only source of drinking water is contaminated by industrial wastes. These individuals do not have the resources or political power to defend themselves against the polluting industries. Their lack of financial standing means that they are forced to live in less desirable neighborhoods adversely affected by pollution or unable to afford the costs of moving when an undesirable facility is established nearby. In many situations, unlike men who tend to be more mobile, even if only for the short period of a work day, women and children are less able to escape the contaminated environment.

Activities under TEST will bring to the community new information and improved environmental practices. As well, the introduction of environmental technologies and processing methods will lead to a reduction in pollutants produced and emitted from industrial facilities, resulting in significant benefit to the surrounding communities.

Rec'd 7/13/92
Tagged

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2 July 1992

ACTION MEMORANDUM FOR THE ASIA ENVIRONMENTAL OFFICER

THROUGH: Steven P. Mintz - Director (A), USAID/India

FROM: John A. Grayzel - Environmental Officer, USAID/New Delhi

ACTION: To approve a Categorical Exclusion from Environmental Procedures for USAID/India's Trade in Environmental Services and Technology Project (386-0530).

BACKGROUND: The goal of the Trade in Environmental Services and Technology Project (TEST, 386-0530) is to increase environmental protection while enhancing industrial productivity on a sustainable basis. The project purpose is to assist industry to adopt environmentally sound practices while promoting sustainable linkages between U.S. and Indian firms. The project will be implemented through the Industrial Credit and Investment Corporation of India (ICICI). ICICI is an intermediary credit institution and will have complete review and approval authority for TEST funded loans, conditional grants, and technical assistance. TEST is therefore eligible for a Categorical Exclusion from Environmental Procedures under 22 CFR Part 216,2(c)(2)(x).

It is expected that TEST Project activities will increase production efficiencies and introduce new technologies which will have a significant positive impact on the environment. The TEST Group will consider pollution reduction potential when reviewing proposals, assess the feasibility of monitoring actual pollution reduction in specific project-funded activities, and incorporate this activity-specific monitoring as appropriate. Development of the monitoring requirements (satisfactory to USAID) will be included in the Conditions Precedent of the Project Agreement. Further, since ICICI does already include requirements regarding environmental considerations in their standard loan review process; requirements for TEST-funded activities will strengthen existing environmental protection procedures.

RECOMMENDATION: That you sign below indicating your approval of the attached Initial Environmental Examination, which states that the Project is Categorically Excluded from further Environmental Procedures.

Approved/Disapproved

M Kux, ASIA/DR, 8-31-92.
ASIA Environmental Officer

ANNEX O: ENVIRONMENTAL ANALYSIS (INITIAL ENVIRONMENTAL EXAMINATION)

The Environmental Analysis includes the Action Memorandum signed by the ASIA Environmental Officer and the Initial Environmental Examination which was attached to that Memorandum.

INITIAL ENVIRONMENTAL EXAMINATION

PROJECT OVERVIEW

The TEST project is a direct response to India's environmental degradation and health problems caused by air and water pollution, and the inability to safely dispose of hazardous waste. The goal of the project is to increase environmental protection while enhancing industrial productivity on a sustainable basis. Its purpose is to assist industry to adopt environmentally sound practices while promoting sustainable linkages between U.S. and Indian firms. TEST will emphasize technology and processing gaps that were determined during project design.

The major technology and processing needs identified to deal with India's pollution problems can be summarized as follows:

1. Removal/reduction of dissolved solids from waste-water streams.

2. Recovery and reuse of chemical resources from waste-water, atmospheric emissions, and solid wastes.

3. Systems for removing special pollutants from waste water, atmospheric emissions, and manufactures products.

4. Handling and management of hazardous wastes.

5. Reduction of color, odor, and biological/chemical oxygen demands loads in waste water.

6. Reduction of particulate (suspended particles), sulfur dioxide and oxides of nitrogen emitted to the atmosphere from industrial processes.

7. Availability of adequate instrumentation for monitoring and analysis in control of both water and air pollution.

Assistance is also needed in the services sector, e.g., performing environmental audits, environmental impact analyses, and risk assessment analyses for hazardous processes.

The cost of five-year TEST Project is $35.8 million. USAID will provide $25 million: $20 million for procurement of U.S. hardware, technology and services, and to finance associated rupee costs; and $5 million for technical assistance, trade and investment tours, studies, promotion and administration, and monitoring and evaluation. The remaining $10.8 million will come from private sector host country TEST clients.

The project will be implemented by the Industrial Credit and Investment Corporation of India (ICICI), one of India's major development financial institutions. ICICI was chosen because of its overall capabilities and

track record in implementing other USAID projects, and its proven track record in expanding technology acquisition financing. A U.S. institutional contractor in partnership with an ICICI local representative will undertake the U.S. portion of the work. The USAID/India Office of Technology Development and Enterprise (TDE) will appoint a project officer who will monitor the project.

PROJECT ELEMENTS

Major obstacles to the purchase and installation of pollution prevention and control equipment and the introduction of professional environmental engineering and consulting services have been the lack of available and affordable financing, information on appropriate technologies, and access to technology providers. While providing access to financing is a major component of TEST, specific efforts will be undertaken to link U.S. and Indian companies, especially those not now engaged in trade with India.

1. Available and Affordable Financing

ICICI has been recommended as the financial institution best suited to implement the project. The financial components to be managed by ICICI include $20 million for dollar and rupee loans, conditional grants, and a rupee fund set aside for pollution control program only.

A Dollar Fund will provide loans for the acquisition of U.S. environmental technology, and for the production of pollution prevention or control equipment. These acquisitions will take place via standard commercial transactions.

Conditional Grants will also be disbursed from the Dollar Fund to a recipient under agreement. The agreement will stipulate that upon the completion of the activity, and the commencement of its operations, a percentage of its profits will be returned to ICICI. The percentage of sales and periods of repayments will be negotiated between ICICI and the recipient.

A Rupee Fund is to be created from reflows of principal, interest, and royalties on conditional grants from the Dollar Fund usage. This Fund will facilitate the procurement of local environmental technology, equipment and services and is envisioned to continue after termination of the TEST project.

Until such time as the Rupee Fund is capitalized via reflows from Dollar Fund loans and conditional grants, rupee costs associated with purchase of U.S. hardware, technology and services will be funded from the Dollar Fund.

2. Information Exchange and Marketing

Outside the input of capital funds, the TEST project implementation will be divided into two interrelated components:

1) Setting up a permanent information network with a two-way flow matching Indian needs for technical information and technology imports with the U.S. capability to meet those needs.

2) Promoting a network of specific Indian and U.S. firms and organizations which match importers with suppliers and promote the technology transfer arrangements described above.

RECOMMENDATION AND FOLLOW-UP ACTIONS

It is expected that TEST project activities will increase production efficiencies and introduce new technologies and processing techniques which will have a significant positive impact on the environment. Designing and implementing pro-active environmental projects which are focused almost entirely on environmental preservation and improvement is relatively new at A.I.D. Consequently, the current A.I.D. Environmental procedures do not provide adequate guidance on how to conduct an Environmental Analysis for projects like TEST.

The TEST Project will be implemented by an intermediate credit institution, the Industrial Credit and Investment Corporation of India (ICICI). Per 22 CFR Part 2.16(c)(2) of A.I.D.'s Environmental Procedures, ACE is categorically excluded from an Initial Environmental Assessment, or Environmental Impact Statement under Section (x): "Support for intermediate Credit institutions when the objective is to assist in the capitablization of the institution or part thereof and when such support does not involve reservation of the right to review and approve individual loans made by the institution."

ICICI will have complete review and approval authority for TEST funded loans (as well as TA). However, ICICI routinely includes environmental criteria in its appraisal process. In the ICICI publication for borrowers, "Explanatory Notes for Filling Up the Application Form for Financial Assistance from All-India Financial Institutions," effluents are specifically addressed:

> "Some of the units have run into difficulties for not having taken adequate and timely measures for proper disposal of solid, liquid and/or gaseous effluents. The purpose of this question is to ensure that the comparing has made adquate arrangements for treating all the effluents."
>
> "Explain in detail the special characteristics, such as alkaline, acidic, toxic/poisonous etc. of the effluents which are harmful to any living organism or vegetation and the arrangements proposed for their treatment and disposal."

The TEST Project will complement and enhance ICICI's appraisal requirements regarding pollution abatement and cleaner technologies. Additionally, as part of the proposal screening process, ICICI will develop criteria for evaluating and assessing alternative technologies. These criteria will be refined with assistance from the institutional contractor.

The prospective clients for loans or conditional grants will submit proposals to ICICI's TEST Group pursuant to guidance furnished by the Group. There will be situations in which prospective clients will have estimates of the polluted reduction potential due to the introduction of the proposed hardware or process. The TEST Group will consider pollution reduction potential when reviewing proposals, assess the feasibility of monitoring actual pollution reduction in specific Project-funded activities, and incorporate this activity-specific monitoring as appropriate. In the cases of manufacturing licenses or joint venture arrangements, the estimated pollution reduction would be the product of a pollution reduction estimate per facility or processing unit times the potential number of facilities which will purchase the environmental technology. Ultimately it may be possible to estimate the total pollution abatement on a national level due to the introduction of the technologies and processing methods funded by TEST.

The TEST Group will include at least one environmental scientist who will be responsible for verifying the accuracy of the proposal's pollution reduction estimates and proposed monitoring and evaluation plans.

In order to provide overall guidance and advice to the Project, a TEST Advisory Council will be formed at the project's inception. This Council will include a senior level representative from the Ministry of Environment and Forests and a highly reputed environmental scientist from either the private sector or academia. There will be senior level U.S. participation on the Council. Such participation could include an individual who is a senior level advisor to the U.S.-Asia Environmental Partnership (USAEP).

ANNEX P: INTELLECTUAL PROPERTY RIGHTS

P.1 Introduction

The TEST Project purpose is to assist Indian industries to adopt environmentally sound practices while promoting sustainable linkages between U.S. and Indian firms. The Project focusses on providing loans, conditional grants, and technical assistance to private firms, and to enhancing information flow between U.S. suppliers and Indian consumers of environmental technologies and services (ESTs). Although critical specific technology gaps, industrial subsectors and geographical foci have been preliminarily identified, the Project will be market-demand-driven. In this way it will be responsive to emerging commercial opportunities for matching Indian needs to U.S. comparative advantages.

The source of equipment and technologies to be purchased under TEST is the U.S. The purchaser is the Indian commercial sector.

It is not intended that TEST will generate new intellectual property, since the Project is designed to encourage and assist Indian industry and the Indian environmental services and technology (EST) subsector to access, adopt and adapt U.S. technology to assist Indian industry in improving productivity and in meeting environmental standards. However, it is possible that there may be some potential generation of new intellectual property during the adaptation of U.S. equipment and technologies. In either case, the project has been designed to have the capacity to support, both financially and operationally, the negotiation of and specific payment for intellectual property rights (IPR) as a condition precedent to any final agreement between buyer and seller.

P.2. Management of IPR in the TEST Project

TEST is designed to operate in a commercial fashion. In cases which do involve proprietary technology or information, the necessary commercial arrangements will be made before a loan is approved. The U.S. company will be apprised of the IPR situation in India and the attendant IPR concerns. The TEST Group within the implementing developmental finance institution, the Industrial Credit and Investment Corporation of India (ICICI), and the institutional contractor responsible for TA and T&I Tours, will be informed of this approach and will be responsible for identifying IPR as an essential point for consideration in any proceedings. ICICI, through its experience with other USAID projects, especially PACT (Project for the Advancement of Commercial Technology), is well acquainted with and sensitive to U.S. concerns in this regard. Most importantly, funds will be available under TEST for specific purchase, when appropriate, of IPR under terms and conditions acceptable to the sellers. This will include TEST supporting the purchase of licences, franchises, and know-how in addition to specific goods and services.

In addition, TEST will include support to various Indian organizations to provide information, consulting and support services to users and producers of ESTs. IPR is a potential topic for study by these organizations.

P.3. Impact

The final decision of whether to participate in a commercial technology activity in India will rest with the U.S. company involved. It is the U.S. company which will decide as to the value of its IPR, if any, and under what conditions and at what price, if any, it is willing to participate. It is the Indian company which will decide if it is willing to pay the price required. The major interest of the Indian environmental companies who will acquire ESTs under TEST is to engage in ongoing business: they must have a strong vested interest in obtaining IPR, and in using TEST deals as the basis for establishing long-term joint ventures with U.S. providers.

Increasing the number of Indian firms that experience the benefits of IPR, as well as exposure to the investment required to obtain them, will directly increase the number of Indian firms with vested interests in IPR recognition and enforcement. Precisely because TEST will support full and necessary purchase of U.S. IPR by Indian companies, it is anticipated that TEST will be a pro-active contributor to the growth and strengthening of the Indian private sector constituency for protection of IPR.

P.4. AID/W Review

In a memo dated July 31, 1991 signed by the Deputy Assistant Administrator of the then APRE Bureau, it was decided that USAID/India's current and future private sector projects will not be submitted to the Interagency IPR Working Group. The rationale for that decision was based on the fact that all Mission private sector to private sector projects will be designed to be implemented through a U.S. private sector to Indian private sector focus, and in all these projects, the IPR issue will be negotiated directly by the involved private sector parties. These negotiations will only take place after the parties have been apprised by the TEST Group and the institutional contractor of USG concerns with respect to the IPR issue and the legal status of IPR in India.

ANNEX Q: KEY CONTACTS

INDIVIDUAL/INDUSTRY	CONTACT PERSONS	DESIGNATION
DELHI		
U S A I D	John Grayzel	Director, Technology Development & Enterprise (TDE)
	Andrea Yates	Deputy Director (TDE)
	Amitabha Ray	Project Officer, TEST
U S Embassy, Foreign Commerical Section (FCS)	Tapan Banerjee	Commerical Attache
Indian Sugar Mills Association	D K Goel	Chief Engineer Sugar
Anand Prabat Industrial Association	S K Tandon	Secretary
Federation of Indian Chambers of Commerce & Industries	D H Pai Panandiker	Secretary General
Confederation of Indian Industries	Rajat Nandi	Director
Credit Capital Venture Fund	Adit Jain	Manager Consulting Services
Associated Chamber of Commerce & Industry	R Parthasarthy	Dy. Secretary
Punjab Haryana Delhi Chamber of Commerce & Industry	Amit Sen	Secretary
Min. of Env. & Forests	N Bagchi	Director

M N Dastur & Co	Chuni L Sengupta	Resident Director
MANTEC Consultants Ltd.	A Brara	Director
Envirotech Instruments Pvt Ltd	S K Gupta	Director
Dupont Far East Inc	Deepak Mukherjee	Communications Manager
Consulting Engineering Services Pvt Ltd	B Datta	Associate
Holtec Engineers Pvt Ltd	M J Sane	Technical Director
Water & Power - Consultancy Services (I) Ltd	R Rajappa	Managing Director
Bharat Heavy Electricals Ltd	Arun Kumar	Senior Manager PCRI
Central Ground - Water Board	Mr M L Lath	Chairman
National Federation Coop. Sugar Factories Ltd	Mr V Singh	Technical Adviser
Nuchem Ltd	Mr Romesh C Barar	Managing Director
Tata Risk Management Services	Mr Subir Gupta	Deputy Manager (Eng)
The Atlas Cycle - Industries Ltd	Mr Bishamber - Daskapur	President
Shriram Foods & Fertilizer Industries	Mr Surendra Kumar	Sr Manager (Env & safety)
Feedback Ventures + Collaborations Services Ltd	Abhijit Bhaumik	General Manager
BANGALORE		
Technology Development & Investment Corporation of India	K S Nadkarni	President

Karnataka State Industrial Investment & Developemnt Corporation	S R Vijay	Chairman & Managing Director
Asia & Pacific Center for Transfer of Technology	Ove Chr Bugge	Director
Mysore Kirlosker Ltd	V T Jairaj	Divisional Manager

BARODA

Paramount Pollution Control Ltd	Kewal Tuli	Managing Director
Nandesari Industries	Ramesh Surti	Vice President
Gujarat Industrial-Development Corpn		Superintending-Engineer
Gujarat Industrial- & Technical Consultancy Organization Ltd	B H Shah	Chief Executive
Deepak Nitrite Ltd Vadodara	A K Dasgupta	Executive Director
Socleen Society	Dr Vinod Modi	

BOMBAY

Hindustan D Oliver	V J Yennemadi	Director
CHEMTECH	J Shah	President
NOCIL	K V Venkatesh	Managing Director
RCF	K Mohan	Chief Engineer Environment
Batliboi & Co	P S Shastree	Dep General Manager, Air Pollution Control
Voltas Ltd	D K Kelapure	Manager Operations

Toshniwal Instrument		
Mahrashtra Pollution Control Board	D R Rasal	Member Secretary
Vapi Industries Association	Manoj G Oza	President
Industrial Boilers Pvt Ltd	Mrs H R Engineer	Director
Associated Industries Consultants Pvt Ltd	Soli Arceivala	Managing Director
Belgundi Group	Hary Dhaul	Managing Director
Rashtriya Chemicals & Fertilizers Ltd	K Mohan	Chief Engineer (Environment)
Ing-Tech Engineering Co	A M Agnihotri	General Manager
J S Group of Companies	Maulick Shah	Director
Hydraulic & General Engineers Ltd (subsidiary of Batliboi)	V N Subramanian	Chief Executive
Private Consultant	T R Krishna Rao	Retired Chairman Dorr - Oliver
Bombay Chamber of Commerce & Industry	Vivek Date	Secretary
Tata Consultancy Services	Prakash N Kirpalani	Manager
20th Century Finance Corporation	Sanjaya Kulkarni	Director
Industrial Credit & Investment Corp	N. Vaghul A J Advani	Chairman/Managing Director Deputy General Manager
Infrastructure Leasing & Financial Services	N K Prasad	Managing Director

Industrial Development Bank of India	S Gopalan	Executive Director
Maharashtra State Finance Corporation	Y Bhave	Managing Director
PACT, ICICI	K D Shedde	Project Manager

HYDERABAD

Adm Staff College of India	S S Arvind	Member, Centre for India Energy, Environment & Technology
Andhra Pradesh Pollution Control Board	Dr S V Rao	Member Secretary
Vimta Labs Ltd	S P Vasireddi	Managing Director
Jeedimetla Effluent Treatment Plant Ltd	M Raina Kumar	Technical Director

MADRAS

Central Leather Research Institute	Dr K V Raghavan	Director
Tamil Nadu Thermal Treators	P A Balakrishna	Proprietor
Tamil Nadu Pollution Control Board	Member Secretary	
Techmat Enterprises	B K Venkatesh	Partner
Endo Therm Fluids (India) Pvt Ltd	Dr N Sridhar	Director
E I D Parry (I) Ltd	M V Subbiah	Managing Director
Annamalai University	Dr M Ananda-Krishnan	Vice Chancellor
Dharmsee Parpic (Mayper Leather manufacturing Pvt Ltd)	A Abdul Haq	Manager Development

Natural Chemical Products Pvt Ltd	Dr C V N Rao	Managing Director
Tamil Nadu Industrial Investment Corp	P S Pandiyan	CMD
Tamil Nadu Corp for Industrial Infrastructre Development	P Shankar	Managing Director
Industrial and Technical Consultancy Organization of Tamilnadu	C E Karunakaran	Managing Director
Madras Chamber of Commerce & Industry	N Kannan	Secretary

NAGPUR

National Environmental Engg Research Institute	P P Khanna	Director
Environmental - Engineers	V P Thereponkar	Partner

AHMEDABAD

Gujarat Industrial & Investment Corp	Amarjit Singh	Jt Managing Director
Gujarat State Finance Corporation	Lalit Sud	Managing Director
Gujarat Industrial Extension Bureau	N M Bijlani	Vice Chairman & Managing Director
Gujarat Ambuja Cement Ltd	B K Jagetya	Sr Manager
Vikas Center for Development	Rajesh Shah	Executive Secretary

PUNE

Tata Research Development & Design Center	R D Deshpande	Consulting Advisor
Water & Waste Water Treatment	General Manager	
Chemical Plant & Process Division Thermax Ltd	R Ramdas	General Manager
Four Eyes Research (P) Ltd	T P Vartak	Chairman
Sudarshan Chemical-Industries Ltd	Kishor Rathi	Vice President (Operations)
PRAJ Counseltech - P. Ltd.	Pramod Chaudhari	Chairman & Managing Director
Kirloskar Consul-tans Ltd	D V Tikekar	Managing Director

U. S. A

Massachusetts Environmental Affairs, OTA	Rick Reibstein	
Office of Health & Environmental Assessment	Dr Baba Saheb Sonawane	Chief, Reproductive & Developmental Toxicology Branch
Office of Inter-national activities USEPA	Ted MacDonald	
Office of Research and Development USEPA	Fred Lindsey	Director
Industry, Trade & Finance Division Asia Technical Dept IBRD	Walter Vergara	Sr Chemical Engineer

Weston Intl	Dr Arun K Deb	Vice President/Water
Weston Intl	Dr Manmohan (Bart) Bhatla	Vice President/Industry
C.C. Johnson & Malhotra	Dr Kumar Malhotra	President
Envirosystems	President	
Water for People Am. Water Works Assn	Dr Gary D Thorud	Ex. Director
OPIC	F Van Bodengraven	Asia Desk
IBRD	Thomas Blinkhorn	India Desk
AID/ASIA Bureau	Molly Kux	Environmental Officer

<u>DONOR AGENCIES</u>

DEG - German Investment & Development Company	Wolfgang Hofmann	Regioanl Manager
E E C	Marc Thill	Consultant Fianancial & Technical Coop
UNDP	Ove Bjerregaard	Deputy Resident Representative
NORAD	A Tunold	Programme Officer

ANNEX R: STATUTORY CHECK LIST

5C(2) - ASSISTANCE CHECKLIST

Listed below are statutory criteria applicable to the assistance resources themselves, rather than to the eligibility of a country to receive assistance. This section is divided into three parts. Part A includes criteria applicable to both Development Assistance and Economic Support Fund resources. Part B includes criteria applicable only to Development Assistance resources. Part C includes criteria applicable only to Economic Support Funds.

CROSS REFERENCE: IS COUNTRY CHECKLIST UP TO DATE?

A. CRITERIA APPLICABLE TO BOTH DEVELOPMENT ASSISTANCE AND ECONOMIC SUPPORT FUNDS

1. Host Country Development Efforts (FAA Sec. 601(a)): Information and conclusions on whether assistance will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture, and commerce; and (f) strengthen free labor unions.

(a) The Project will stimulate Indian procurement of U.S. environmental services and technologies and help Indian enterprises become more productive and therefore more competitive.
(b) It will encourage Indian firms to improve manufacturing systems and products and thereby become more competitive.
(c) It is unlikely to have such effect.
(d) The Project will foster greater competition among Indian firms and between Indian and foreign firms.
(e) Efficiency of industry will be enhanced by the Project.
(f) Will likely have no effect.

2. U.S. Private Trade and Investment (FAA Sec. 601(b)): Information and conclusions on how assistance will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).

U.S. sales of environmental services and technologies will be financed under the Project. It is likely that U.S. - Indian joint ventures will result from trade relationships.

3. Congressional Notification

a. **General requirement** (FY 1991 Appropriations Act Secs. 523 and 591; FAA Sec. 634A): If money is to be obligated for an activity not previously justified to Congress, or for an amount in excess of amount previously justified to Congress, has Congress been properly notified (unless the notification requirement has been waived because of substantial risk to human health or welfare)? — Yes.

b. **Notice of new account obligation** (FY 1991 Appropriations Act Sec. 514): If funds are being obligated under an appropriation account to which they were not appropriated, has the President consulted with and provided a written justification to the House and Senate Appropriations Committees and has such obligation been subject to regular notification procedures? — N/A

c. **Cash transfers and nonproject sector assistance** (FY 1991 Appropriations Act Sec. 575(b)(3)): If funds are to be made available in the form of cash transfer or nonproject sector assistance, has the Congressional notice included a detailed description of how the funds will be used, with a discussion of U.S. interests to be served and a description of any economic poolicy reforms to be promoted? — N/A

4. **Engineering and Financial Plans** (FAA Sec. 611(a)): Prior to an obligation in excess of $500,000, will there be: (a) engineering, financial or other plans necessary to carry out the assistance; and (b) a reasonably firm estimate of the cost to the U.S. of the assistance? — Yes.

5. **Legislative Action** (FAA Sec. 611(a)(2)): If legislative action is required within recipient country with respect to an obligation in excess of $500,000, what is the basis for a reasonable expectation that such action — Legislative action is not required.

will be completed in time to permit orderly accomplishment of the purpose of the assistance?

6. **Water Resources** (FAA Sec. 611(b); FY 1991 Appropriations Act Sec. 501): If project is for water or water-related land resource construction, have benefits and costs been computed to the extent practicable in accordance with the principles, standards, and procedures established pursuant to the Water Resources Planning Act (42 U.S.C. 1962, et seq.)? (See A.I.D. Handbook 3 for guidelines.)

N/A

7. **Cash Transfer and Sector Assistance** (FY 1991 Appropriations Act Sec. 575(b)): Will cash transfer or nonproject sector assistance be maintained in a separate account and not commingled with other funds (unless such requirements are waived by Congressional notice for nonproject sector assistance)?

N/A

8. **Capital Assistance** (FAA Sec. 611(e)): If project is capital assistance (e.g., construction), and total U.S. assistance for it will exceed $1 million, has Mission Director certified and Regional Assistant Administrator taken into consideration the country's capability to maintain and utilize the project effectively?

N/A

9. **Multiple Country Objectives** (FAA Sec. 601(a)): Information and conclusions on whether projects will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.

See response to Para. one above.

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10. **U.S. Private Trade** (FAA Sec. 601(b)): Information and conclusions on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).

See Para. two above.

11. **Local Currencies**

a. **Recipient Contributions** (FAA Secs. 612(b), 636(h)): Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized in lieu of dollars.

a. Indian enterprises availing themselves of Project funds f import of U.S. environmental services or technologies will the case of financing on a lo basis, repay the dollar value in local currency. In the case of conditional grants, the Indian importer will repay in local currency for the goods or services if the resulting undertaking is profitable.

b. **U.S.-Owned Currency** (FAA Sec. 612(d)): Does the U.S. own excess foreign currency of the country and, if so, what arrangements have been made for its release?

b. No.

c. **Separate Account** (FY 1991 Appropriations Act Sec. 575). If assistance is furnished to a foreign government under arrangements which result in the generation of local currencies:

(1) Has A.I.D. (a) required that local currencies be deposited in a separate account established by the recipient government, (b) entered into an agreement with that government providing the amount of local currencies to be generated and the terms and conditions under which the currencies so deposited may be utilized, and (c) established by agreement the responsibilities of A.I.D. and that government to monitor and account for deposits into and disbursements from the separate account?

(1) (a) Yes.

(b) Yes.

(c) Yes.

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(2) Will such local currencies, or an equivalent amount of local currencies, be used only to carry out the purposes of the DA or ESF chapters of the FAA (depending on which chapter is the source of the assistance) or for the administrative requirements of the United States Government?

(2) Yes.

(3) Has A.I.D. taken all appropriate steps to ensure that the equivalent of local currencies disbursed from the separate account are used for the agreed purposes?

(3) Yes.

(4) If assistance is terminated to a country, will any unencumbered balances of funds remaining in a separate account be disposed of for purposes agreed to by the recipient government and the United States Government?

(4) Yes.

12. Trade Restrictions

a. Surplus Commodities (FY 1991 Appropriations Act Sec. 521(a)): If assistance is for the production of any commodity for export, is the commodity likely to be in surplus on world markets at the time the resulting productive capacity becomes operative, and is such assistance likely to cause substantial injury to U.S. producers of the same, similar or competing commodity?

The assistance will enhance the efficiency of Indian industry and the quality of products it produces, thereby increasing possibilities for export. It is unlikely, however, that any Indian exports which ultimately result will cause substantial injury to U.S. producers.

b. Textiles (Lautenberg Amendment) (FY 1991 Appropriations Act Sec. 521(c)): Will the assistance (except for programs in Caribbean Basin Initiative countries under U.S. Tariff Schedule "Section 807," which allows reduced tariffs on articles assembled abroad from U.S.-made components) be used directly to procure feasibility studies, prefeasibility studies, or project profiles of potential investment in, or to [illegible] specifically designed for, the manufacture for export to the United States or to third country markets in direct competition with U.S. exports, of

No.

textiles, apparel, footwear, handbags, flat goods (such as wallets or coin purses worn on the person), work gloves or leather wearing apparel?

13. **Tropical Forests** (FY 1991 Appropriations Act Sec. 533(c)(3)): Will funds be used for any program, project or activity which would (a) result in any significant loss of tropical forests, or (b) involve industrial timber extraction in primary tropical forest areas?

The Project will be monitored to assure that tropical forests are not significantly affected by activities related to the Project.

14. **PVO Assistance**

a. **Auditing and registration** (FY 1991 Appropriations Act Sec. 537): If assistance is being made available to a PVO, has that organization provided upon timely request any document, file, or record necessary to the auditing requirements of A.I.D., and is the PVO registered with A.I.D.?

N/A

b. **Funding sources** (FY 1991 Appropriations Act, Title II, under heading "Private and Voluntary Organizations"): If assistance is to be made to a United States PVO (other than a cooperative development organization), does it obtain at least 20 percent of its total annual funding for international activities from sources other than the United States Government?

N/A

15. **Project Agreement Documentation** (State Authorization Sec. 139 (as interpreted by conference report)): Has confirmation of the date of signing of the project agreement, including the amount involved, been cabled to State L/T and A.I.D. LEG within 60 days of the agreement's entry into force with respect to the United States, and has the full text of the agreement been pouched to those same offices? (See Handbook 3, Appendix 6G for agreements covered by this provision).

The agreement will be for less than $25 million, the amount specified in the Handbook.

16. **Metric System** (Omnibus Trade and Competitiveness Act of 1988 Sec. 5164, as interpreted by conference report, amending Metric Conversion Act of 1975 Sec. 2, and as implemented through A.I.D. policy): Does the assistance activity use the metric system of measurement in its procurements, grants, and other business-related activities, except to the extent that such use is impractical or is likely to cause significant inefficiencies or loss of markets to United States firms? Are bulk purchases usually to be made in metric, and are components, subassemblies, and semi-fabricated materials to be specified in metric units when economically available and technically adequate? Will A.I.D. specifications use metric units of measure from the earliest programmatic stages, and from the earliest documentation of the assistance processes (for example, project papers) involving quantifiable measurements (length, area, volume, capacity, mass and weight), through the implementation stage?	To the extent practicable, metric measurements will be used in procurements, grants and other activities under the project.
17. **Women in Development** (FY 1991 Appropriations Act, Title II, under heading "Women in Development"): Will assistance be designed so that the percentage of women participants will be demonstrably increased?	Yes.
18. **Regional and Multilateral Assistance** (FAA Sec. 209): Is assistance more efficiently and effectively provided through regional or multilateral organizations? If so, why is assistance not so provided? Information and conclusions on whether assistance will encourage developing countries to cooperate in regional development programs.	(1) The goods and services to be financed will primarily be of U.S. source and origin. The U.S. is the world leader in environmental services and technologies. (2) By increasing Indian industry's awareness of environmental concerns, the Project may lead to greater Indian involvement in regional development issues and programs.

19. **Abortions** (FY 1991 Appropriations Act, Title II, under heading "Population, DA," and Sec. 525): N/A

a. Will assistance be made available to any organization or program which, as determined by the President, supports or participates in the management of a program of coercive abortion or involuntary sterilization?

b. Will any funds be used to lobby for abortion?

20. **Cooperatives** (FAA Sec. 111): Will assistance help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward a better life?

21. **U.S.-Owned Foreign Currencies**

a. **Use of currencies** (FAA Secs. 612(b), 636(h); FY 1991 Appropriations Act Secs. 507, 509): Describe steps taken to assure that, to the maximum extent possible, foreign currencies owned by the U.S. are utilized in lieu of dollars to meet the cost of contractual and other services. a. See Para. IIa. above.

b. **Release of currencies** (FAA Sec. 612(d)): Does the U.S. own excess foreign currency of the country and, if so, what arrangements have been made for its release? b. No.

22. **Procurement**

a. **Small business** (FAA Sec. 602(a)): Are there arrangements to permit U.S. small business to participate equitably in the furnishing of commodities and services financed? a. Procurements under the Project will be advertised in A.I.D. publications aimed at small businesses.

b. **U.S. procurement** (FAA Sec. 604(a)): Will all procurement be from the U.S. except as otherwise determined by the President or determined under delegation from him? b. Yes.

c. **Marine insurance** (FAA Sec. 604(d)): If the cooperating country discriminates against marine insurance companies authorized to do business in the U.S., will commodities be insured in the United States against marine risk with such a company? N/A

d. **Non-U.S. agricultural procurement** (FAA Sec. 604(e)): If non-U.S. procurement of agricultural commodity or product thereof is to be financed, is there provision against such procurement when the domestic price of such commodity is less than parity? (Exception where commodity financed could not reasonably be procured in U.S.) N/A

e. **Construction or engineering services** (FAA Sec. 604(g)): Will construction or engineering services be procured from firms of advanced developing countries which are otherwise eligible under Code 941 and which have attained a competitive capability in international markets in one of these areas? (Exception for those countries which receive direct economic assistance under the FAA and permit United States firms to compete for construction or engineering services financed from assistance programs of these countries.) No.

f. **Cargo preference shipping** (FAA Sec. 603)): Is the shipping excluded from compliance with the requirement in section 901(b) of the Merchant Marine Act of 1936, as amended, that at least 50 percent of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners, and tankers) financed shall be transported on privately owned U.S. flag commercial vessels to the extent such vessels are available at fair and reasonable rates? No.

g. **Technical assistance** (FAA Sec. 621(a)): If technical assistance is financed, will such assistance be furnished by private enterprise on a contract basis to the fullest extent practicable? Will the Yes.

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facilities and resources of other Federal agencies be utilized, when they are particularly suitable, not competitive with private enterprise, and made available without undue interference with domestic programs? Yes.

h. **U.S. air carriers** (International Air Transportation Fair Competitive Practices Act, 1974): If air transportation of persons or property is financed on grant basis, will U.S. carriers be used to the extent such service is available? Yes.

i. **Termination for convenience of U.S. Government** (FY 1991 Appropriations Act Sec. 504): If the U.S. Government is a party to a contract for procurement, does the contract contain a provision authorizing termination of such contract for the convenience of the United States?

j. **Consulting services** (FY 1991 Appropriations Act Sec. 524): If assistance is for consulting service through procurement contract pursuant to 5 U.S.C. 3109, are contract expenditures a matter of public record and available for public inspection (unless otherwise provided by law or Executive order)? Yes.

k. **Metric conversion** (Omnibus Trade and Competitiveness Act of 1988, as interpreted by conference report, amending Metric Conversion Act of 1975 Sec. 2, and as implemented through A.I.D. policy): Does the assistance program use the metric system of measurement in its procurements, grants, and other business-related activities, except to the extent that such use is impractical or is likely to cause significant inefficiencies or loss of markets to United States firms? Are bulk purchases usually to be made in metric, and are components, subassemblies, and semi-fabricated materials to be specified in metric units when economically available and technically adequate? Will A.I.D. specifications use metric units of measure from the earliest programmatic stages, and from the earliest

Metric measurements are used to the maximum practicable extent in the USAID/India assistance program.

No bulk purchases are contemplated under the Project.

Where measurements are included in Project documentation, metric measurements are used to the extent practicable.

documentation of the assistance processes (for example, project papers) involving quantifiable measurements (length, area, volume, capacity, mass and weight), through the implementation stage?

1. **Competitive Selection Procedures** (FAA Sec. 601(e)): Will the assistance utilize competitive selection procedures for the awarding of contracts, except where applicable procurement rules allow otherwise? Yes.

23. Construction N/A

a. **Capital project** (FAA Sec. 601(d)): If capital (e.g., construction) project, will U.S. engineering and professional services be used?

b. **Construction contract** (FAA Sec. 611(c)): If contracts for construction are to be financed, will they be let on a competitive basis to maximum extent practicable?

c. **Large projects, Congressional approval** (FAA Sec. 620(k)): If for construction of productive enterprise, will aggregate value of assistance to be furnished by the U.S. not exceed $100 million (except for productive enterprises in Egypt that were described in the Congressional Presentation), or does assistance have the express approval of Congress?

24. **U.S. Audit Rights** (FAA Sec. 301(d)): If fund is established solely by U.S. contributions and administered by an international organization, does Comptroller General have audit rights? N/A

25. **Communist Assistance** (FAA Sec. 620(h). Do arrangements exist to insure that United States foreign aid is not used in a manner which, contrary to the best interests of the United States, promotes or assists the foreign aid projects or activities of the Communist-bloc countries? Yes.

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26. **Narcotics**

a. **Cash reimbursements** (FAA Sec. 483): Will arrangements preclude use of financing to make reimbursements, in the form of cash payments, to persons whose illicit drug crops are eradicated? Yes.

b. **Assistance to narcotics traffickers** (FAA Sec. 487): Will arrangements take "all reasonable steps" to preclude use of financing to or through individuals or entities which we know or have reason to believe have either: (1) been convicted of a violation of any law or regulation of the United States or a foreign country relating to narcotics (or other controlled substances); or (2) been an illicit trafficker in, or otherwise involved in the illicit trafficking of, any such controlled substance? Yes.

27. **Expropriation and Land Reform** (FAA Sec. 620(g)): Will assistance preclude use of financing to compensate owners for expropriated or nationalized property, except to compensate foreign nationals in accordance with a land reform program certified by the President? Yes.

28. **Police and Prisons** (FAA Sec. 660): Will assistance preclude use of financing to provide training, advice, or any financial support for police, prisons, or other law enforcement forces, except for narcotics programs? Yes.

29. **CIA Activities** (FAA Sec. 662): Will assistance preclude use of financing for CIA activities? Yes.

30. **Motor Vehicles** (FAA Sec. 636(i)): Will assistance preclude use of financing for purchase, sale, long-term lease, exchange or guaranty of the sale of motor vehicles manufactured outside U.S., unless a waiver is obtained? Yes.

31. **Military Personnel** (FY 1991 Appropriations Act Sec. 503): Will assistance preclude use of financing to pay pensions, annuities, retirement pay, or adjusted service compensation for prior or current military personnel? Yes.

32. **Payment of U.N. Assessments** (FY 1991 Appropriations Act Sec. 505): Will assistance preclude use of financing to pay U.N. assessments, arrearages or dues? Yes.

33. **Multilateral Organization Lending** (FY 1991 Appropriations Act Sec. 506): Will assistance preclude use of financing to carry out provisions of FAA section 209(d) (transfer of FAA funds to multilateral organizations for lending)?

34. **Export of Nuclear Resources** (FY 1991 Appropriations Act Sec. 510): Will assistance preclude use of financing to finance the export of nuclear equipment, fuel, or technology?

35. **Repression of Population** (FY 1991 Appropriations Act Sec. 511): Will assistance preclude use of financing for the purpose of aiding the efforts of the government of such country to repress the legitimate rights of the population of such country contrary to the Universal Declaration of Human Rights?

36. **Publicity or Propoganda** (FY 1991 Appropriations Act Sec. 516): Will assistance be used for publicity or propaganda purposes designed to support or defeat legislation pending before Congress, to influence in any way the outcome of a political election in the United States, or for any publicity or propaganda purposes not authorized by Congress?

37. **Marine Insurance** (FY 1991 Appropriations Act Sec. 563): Will any A.I.D. contract and solicitation, and subcontract entered into under such contract, include a clause requiring that U.S. marine insurance companies have a fair opportunity to bid for marine insurance when such insurance is necessary or appropriate? Yes.

38. **Exchange for Prohibited Act** (FY 1991 Appropriations Act Sec. 569): Will any assistance be provided to any foreign government (including any instrumentality or agency thereof), foreign person, or United States person in exchange for that foreign government or person undertaking any action which is, if carried out by the United States Government, a United States official or employee, expressly prohibited by a provision of United States law? No.

B. CRITERIA APPLICABLE TO DEVELOPMENT ASSISTANCE ONLY

1. **Agricultural Exports (Bumpers Amendment)** (FY 1991 Appropriations Act Sec. 521(b), as interpreted by conference report for original enactment): If assistance is for agricultural development activities (specifically, any testing or breeding feasibility study, variety improvement or introduction, consultancy, publication, conference, or training), are such activities: (1) specifically and principally designed to increase agricultural exports by the host country to a country other than the United States, where the export would lead to direct competition in that third country with exports of a similar commodity grown or produced in the United States, and can the activities reasonably be expected to cause substantial injury to U.S. exporters of a similar agricultural commodity; or (2) in support of research that is intended primarily to benefit U.S. producers? N/A

2. **Tied Aid Credits** (FY 1991 Appropriations Act, Title II, under heading "Economic Support Fund"): Will DA funds be used for tied aid credits?	No.
3. **Appropriate Technology** (FAA Sec. 107): Is special emphasis placed on use of appropriate technology (defined as relatively smaller, cost-saving, labor-using technologies that are generally most appropriate for the small farms, small businesses, and small incomes of the poor)?	Yes.
4. **Indigenous Needs and Resources** (FAA Sec. 281(b)): Describe extent to which the activity recognizes the [illegible] of the people of the country; utilizes the country's intellectual resources to encourage institutional development; and supports civic education and training in skills required for effective participation in governmental and political processes essential to self-government.	The project will help reduce industrial pollution, enhancing both health conditions and the marketability of Indian goods. Indian firms will become more aware of the importance of attention to environmental concerns. It is unlikely that the Project will have an effect on political participation.
5. **Economic Development** (FAA Sec. 101(a)): Does the activity give reasonable promise of contributing to the development of economic resources, or to the increase of productive capacities and self-sustaining economic growth?	Yes. The industrial firms availing themselves of Project funds should become more efficient.
6. **Special Development Emphases** (FAA Secs. 102(b), 113, 281(a)): Describe extent to which activity will: (a) effectively involve the poor in development by extending access to economy at local level, increasing labor-intensive production and the use of appropriate technology, dispersing investment from cities to small towns and rural areas, and insuring wide participation of the poor in the benefits of development on a sustained basis, using appropriate U.S. institutions; (b) encourage democratic private and local governmental institutions; (c) support the self-help efforts of developing countries; (d) promote the participation of women in the national economies of developing countries	(a) The Project will not directly involve the poor in the development process. However, the poor will benefit from a more healthy physical environment. (b) It will enable private firms to be more productive and efficient. (c) It responds to India's desire to be more industrially competitive. (d) It will improve the physical environment in which women live.

and the improvement of women's status; and (e) utilize and encourage regional cooperation by developing countries.

(e) It will increase Indian awareness of environmental concerns which extends beyond national borders.

7. Recipient Country Contribution (FAA Secs. 110, 124(d)): Will the recipient country provide at least 25 percent of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or is the latter cost-sharing requirement being waived for a "relatively least developed" country)?

Yes

8. Benefit to Poor Majority (FAA Sec. 128(b)): If the activity attempts to increase the institutional capabilities of private organizations or the government of the country, or if it attempts to stimulate scientific and technological research, has it been designed and will it be monitored to ensure that the ultimate beneficiaries are the poor majority?

The Project has not been designed, nor will it be monitored, to assure that its benefits will target the poor majority. However, the poor will benefit, however, from the improvement in the quality of the environment which the Project will engender.

9. Abortions (FAA Sec. 104(f); FY 1981 Appropriations Act, Title II, under heading "Population, DA," and Sec. 535):

N/A

a. Are any of the funds to be used for the performance of abortions as a method of family planning or to motivate or coerce any person to practice abortions?

b. Are any of the funds to be used to pay for the performance of involuntary sterilization as a method of family planning or to coerce or provide any financial incentive to any person to undergo sterilizations?

c. Are any of the funds to be made available to any organization or program which, as determined by the President, supports or participates in the management of a program of coercive abortion or involuntary sterilization?

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d. Will funds be made available only to voluntary family planning projects which offer, either directly or through referral to, or information about access to, a broad range of family planning methods and services?

e. In awarding grants for natural family planning, will any applicant be discriminated against because of such applicant's religious or conscientious commitment to offer only natural family planning?

f. Are any of the funds to be used to pay for any biomedical research which relates, in whole or in part, to methods of, or the performance of, abortions or involuntary sterilization as a means of family planning?

g. Are any of the funds to be made available to any organization if the President certifies that the use of these funds by such organization would violate any of the above provisions related to abortions and involuntary sterilization?

10. **Contract Awards** (FAA Sec. 601(e)): Will the project utilize competitive selection procedures for the awarding of contracts, except where applicable procurement rules allow otherwise?

Yes

11. **Disadvantaged Enterprises** (FY 1991 Appropriations Act Sec. 567): What portion of the funds will be available only for activities of economically and socially disadvantaged enterprises, historically black colleges and universities, colleges and universities having a student body in which more than 40 percent of the students are Hispanic Americans, and private and voluntary organizations which are controlled by individuals who are black Americans, Hispanic Americans, or Native Americans, or who are economically or socially disadvantaged (including women)?

A specific portion of Project funds has not been set aside for disadvantaged enterprises. However, the Mission will ensure that any contract in excess of $500,000 which is financed under the Project includes a requirement for 10 of the value of the contract to be subcontracted to disadvantaged enterprises unless AID regulations provide otherwise.

12. **Biological Diversity** (FAA Sec. 119(g): Will the assistance: (a) support training and education efforts which improve the capacity of recipient countries to prevent loss of biological diversity; (b) be provided under a long-term agreement in which the recipient country agrees to protect ecosystems or other wildlife habitats; (c) support efforts to identify and survey ecosystems in recipient countries worthy of protection; or (d) by any direct or indirect means significantly degrade national parks or similar protected areas or introduce exotic plants or animals into such areas?

(a) No.

(b) No.

(c) No.

(d) No.

13. **Tropical Forests** (FAA Sec. 118; FY 1991 Appropriations Act Sec. 533(c)-(e) & (g)):

a. **A.I.D. Regulation 16:** Does the assistance comply with the environmental procedures set forth in A.I.D. Regulation 16?

a. Yes.

b. **Conservation:** Does the assistance place a high priority on conservation and sustainable management of tropical forests? Specifically, does the assistance, to the fullest extent feasible: (1) stress the importance of conserving and sustainably managing forest resources; (2) support activities which offer employment and income alternatives to those who otherwise would cause destruction and loss of forests, and help countries identify and implement alternatives to colonizing forested areas; (3) support training programs, educational efforts, and the establishment or strengthening of institutions to improve forest management; (4) help end destructive slash-and-burn agriculture by supporting stable and productive farming practices; (5) help conserve forests which have not yet been degraded by helping to increase production on lands already cleared or degraded; (6) conserve forested watersheds and rehabilitate those which have been deforested; (7) support training, research, and other actions

b. N/A

which lead to sustainable and more environmentally sound practices for timber harvesting, removal, and processing; (8) support research to expand knowledge of tropical forests and identify alternatives which will prevent forest destruction, loss, or degradation; (9) conserve biological diversity in forest areas by supporting efforts to identify, establish, and maintain a representative network of protected tropical forest ecosystems on a worldwide basis, by making the establishment of protected areas a condition of support for activities involving forest clearance or degradation, and by helping to identify tropical forest ecosystems and species in need of protection and establish and maintain appropriate protected areas; (10) seek to increase the awareness of U.S. Government agencies and other donors of the immediate and long-term value of tropical forests; (11) utilize the resources and abilities of all relevant U.S. government agencies; (12) be based upon careful analysis of the alternatives available to achieve the best sustainable use of the land; and (13) take full account of the environmental impacts of the proposed activities on biological diversity?

c. **Forest degradation:** Will assistance be used for: (1) the procurement or use of logging equipment, unless an environmental assessment indicates that all timber harvesting operations involved will be conducted in an environmentally sound manner and that the proposed activity will produce positive economic benefits and sustainable forest management systems; (2) actions which will significantly degrade national parks or similar protected areas which contain tropical forests, or introduce exotic plants or animals into such areas; (3) activities which would result in the conversion of forest lands to the rearing of livestock; (4) the construction, upgrading, or maintenance of roads (including temporary haul roads for logging or other extractive industries) which pass through relatively undergraded

(1) No.

(2) No.

(3) No.

(4) No.

forest lands; (5) the colonization of forest lands; or (6) the construction of dams or other water control structures which flood relatively undergraded forest lands, unless with respect to each such activity an environmental assessment indicates that the activity will contribute significantly and directly to improving the livelihood of the rural poor and will be conducted in an environmentally sound manner which supports sustainable development?	(5) No (6) No
d. **Sustainable forestry:** If assistance relates to tropical forests, will project assist countries in developing a systematic analysis of the appropriate use of their total tropical forest resources, with the goal of developing a national program for sustainable forestry?	N/A
e. **Environmental impact statements:** Will funds be made available in accordance with provisions of FAA Section 117(c) and applicable A.I.D. regulations requiring an environmental impact statement for activities significantly affecting the environment?	Yes
14. **Energy** (FY 1991 Appropriations Act Sec. 533(c)): If assistance relates to energy, will such assistance focus on: (a) end-use energy efficiency, least-cost energy planning, and renewable energy resources, and (b) the key countries where assistance would have the greatest impact on reducing emissions from greenhouse gases?	(a) Inefficient use of energy is a major cause of environmental degradation. The Project will focus on environmental improvements in industrial processes. (b) India has a major air pollution problem, to a large extent the result of industrial emissions. The Project will help to reduce such emissions.
15. **Sub-Saharan Africa Assistance** (FY 1991 Appropriations Act Sec. 562, adding a new FAA chapter 10 (FAA Sec. 496)): If assistance will come from the Sub-Saharan Africa DA account, is it: (a) to be used to help the poor majority in Sub-Saharan Africa through a process of long-term development and economic growth that is equitable, participatory, environmentally sustainable, and self-reliant; (b) to be used to promote sustained economic growth, encourage	N/A

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private sector development, promote individual initiatives, and help to reduce the role of central governments in areas more appropriate for the private sector; (c) to be provided in a manner that takes into account, during the planning process, the local-level perspectives of the rural and urban poor, including women, through close consultation with African, United States and other PVOs that have demonstrated effectiveness in the promotion of local grassroots activities on behalf of long-term development in Sub-Saharan Africa; (d) to be implemented in a manner that requires local people, including women, to be closely consulted and involved, if the assistance has a local focus; (e) being used primarily to promote reform of critical sectoral economic policies, or to support the critical sector priorities of agricultural production and natural resources, health, voluntary family planning services, education, and income generating opportunities; and (f) to be provided in a manner that, if policy reforms are to be effected, contains provisions to protect vulnerable groups and the environment from possible negative consequences of the reforms?

16. **Debt-for-Nature Exchange** (FAA Sec. 463): If project will finance a debt-for-nature exchange, describe how the exchange will support protection of: (a) the world's oceans and atmosphere, (b) animal and plant species, and (c) parks and reserves; or describe how the exchange will promote: (d) natural resource management, (e) local conservation programs, (f) conservation training programs, (g) public commitment to conservation, (h) land and ecosystem management, and (i) regenerative approaches in farming, forestry, fishing, and watershed management. N/A

17. **Deobligation/Reobligation** (FY 1991 Appropriations Act Sec. 515): If deob/reob authority is sought to be exercised in the provision of DA assistance, are the funds being obligated for the same general purpose, and for countries within the same region as originally obligated, and have the House and Senate Appropriations Committees been properly notified? Yes.

18. **Loans** N/A

a. **Repayment capacity** (FAA Sec. 122(b)): Information and conclusion on capacity of the country to repay the loan at a reasonable rate of interest.

b. **Long-range plans** (FAA Sec. 122(b)): Does the activity give reasonable promise of assisting long-range plans and programs designed to develop economic resources and increase productive capacities?

c. **Interest rate** (FAA Sec. 122(b)): If development loan is repayable in dollars, is interest rate at least 2 percent per annum during a grace period which is not to exceed ten years, and at least 3 percent per annum thereafter?

d. **Exports to United States** (FAA Sec. 620(d)): If assistance is for any productive enterprise which will compete with U.S. enterprises, is there an agreement by the recipient country to prevent export to the U.S. of more than 20 percent of the enterprise's annual production during the life of the loan, or has the requirement to enter into such an agreement been waived by the President because of a national security interest?

19. **Development Objectives** (FAA Secs. 102(a), 111, 113, 281(a)): Extent to which activity will: (1) effectively involve the poor in development, by expanding access to economy at local level, increasing labor-intensive production and the use of appropriate technology, spreading investment out from (1) Little effect.

cities to small towns and rural areas, and insuring wide participation of the poor in the benefits of development on a sustained basis, using the appropriate U.S. institutions; (2) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and otherwise encourage democratic private and local governmental institutions; (3) support the self-help efforts of developing countries; (4) promote the participation of women in the national economies of developing countries and the improvement of women's status; and (5) utilize and encourage regional cooperation by developing countries?

(2) No effect.

(3) It will help India become more competitive industrially.
(4) Other than contributing to better health for women as a consequence of environmental enhancement, it will have little effect.
(5) See para. 6.e. above.

20. Agriculture, Rural Development and Nutrition, and Agricultural Research (FAA Secs. 103 and 103A):

N/A

a. Rural poor and small farmers: If assistance is being made available for agriculture, rural development or nutrition, describe extent to which activity is specifically designed to increase productivity and income of rural poor; or if assistance is being made available for agricultural research, has account been taken of the needs of small farmers, and extensive use of field testing to adapt basic research to local conditions shall be made.

b. Nutrition: Describe extent to which assistance is used in coordination with efforts carried out under FAA Section 104 (Population and Health) to help improve nutrition of the people of developing countries through encouragement of increased production of crops with greater nutritional value; improvement of planning, research, and education with respect to nutrition, particularly with reference to improvement and expanded use of indigenously produced foodstuffs; and the undertaking of pilot or demonstration programs explicitly addressing the problem of malnutrition of poor and vulnerable people.

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c. **Food security:** Describe extent to which activity increases national food security by improving food policies and management and by strengthening national food reserves, with particular concern for the needs of the poor, through measures encouraging domestic production, building national food reserves, expanding available storage facilities, reducing post harvest food losses, and improving food distribution.

21. **Population and Health** (FAA Secs. 104(b) and (c)): If assistance is being made available for population or health activities, describe extent to which activity emphasizes low-cost, integrated delivery systems for health, nutrition and family planning for the poorest people, with particular attention to the needs of mothers and young children, using paramedical and auxiliary medical personnel, clinics and health posts, commercial distribution systems, and other modes of community outreach. N/A

22. **Education and Human Resources Development** (FAA Sec. 105): If assistance is being made available for education, public administration, or human resource development, describe (a) extent to which activity strengthens nonformal education, makes formal education more relevant, especially for rural families and urban poor, and strengthens management capability of institutions enabling the poor to participate in development; and (b) extent to which assistance provides advanced education and training of people of developing countries in such disciplines as are required for planning and implementation of public and private development activities. N/A

23. **Energy, Private Voluntary Organizations, and Selected Development Activities** (FAA Sec. 106): If assistance is being made available for energy, private voluntary organizations, and selected development problems, describe extent to which activity is:

a. concerned with data collection and analysis, the training of skilled personnel, research on and development of suitable energy sources, and pilot projects to test new methods of energy production; and facilitative of research on and development and use of small-scale, decentralized, renewable energy sources for rural areas, emphasizing development of energy resources which are environmentally acceptable and require minimum capital investment;	a. The Project will focus on industrial environmental problems including efficiency of energy use. Data collection and analysis, training of skilled personnel and R and D activities will be involved to some degree.
b. concerned with technical cooperation and development, especially with U.S. private and voluntary, or regional and international development, organizations;	b. The Project will likely lead to joint ventures of U. S. and Indian firms.
c. research into, and evaluation of, economic development processes and techniques;	c. N/A
d. reconstruction after natural or manmade disaster and programs of disaster preparedness;	d. N/A
e. for special development problems, and to enable proper utilization of infrastructure and related projects funded with earlier U.S. assistance;	e. The Project addresses environmental problems directly. Indian industry will operate with greater environmental safety and efficiency.
f. for urban development, especially small, labor-intensive enterprises, marketing systems for small producers, and financial or other institutions to help urban poor participate in economic and social development.	f. N/A

C. CRITERIA APPLICABLE TO ECONOMIC SUPPORT FUNDS ONLY N/A

1. **Economic and Political Stability** (FAA Sec. 531(a)): Will this assistance promote economic and political stability? To the maximum extent feasible, is this assistance consistent with the policy directions, purposes, and programs of Part I of the FAA?

2. **Military Purposes** (FAA Sec. 531(c)): Will this assistance be used for military or paramilitary purposes?

3. **Commodity Grants/Separate Accounts** (FAA Sec. 609): If commodities are to be granted so that sale proceeds will accrue to the recipient country, have Special Account (counterpart) arrangements been made? (For FY 1991, this provision is superseded by the separate account requirements of FY 1991 Appropriations Act Sec. 575(a), see Sec. 575(a)(5).)

4. **Generation and Use of Local Currencies** (FAA Sec. 531(d)): Will ESF funds made available for commodity import programs or other program assistance be used to generate local currencies? If so, will at least 50 percent of such local currencies be available to support activities consistent with the objectives of FAA sections 103 through 106? (For FY 1991, this provision is superseded by the separate account requirements of FY 1991 Appropriations Act Sec. 575(a), see Sec. 575(a)(5).)

5. **Cash Transfer Requirements** (FY 1991 Appropriations Act, Title II, under heading "Economic Support Fund," and Sec. 575(b)). If assistance is in the form of a cash transfer:

a. **Separate account:** Are all such cash payments to be maintained by the country in a separate account and not to be commingled with any other funds?

b. **Local currencies:** Will all local currencies that may be generated with funds provided as a cash transfer to such a country also be deposited in a special account, and has A.I.D. entered into an agreement with that government setting forth the amount of the local currencies to be generated, the terms and conditions under which they are to be used, and the responsibilities of A.I.D. and that government to monitor and account for deposits and disbursements?

c. **U.S. Government use of local currencies:** Will all such local currencies also be used in accordance with FAA Section 609, which requires such local currencies to be made available to the U.S. government as the U.S. determines necessary for the requirements of the U.S. Government, and which requires the remainder to be used for programs agreed to by the U.S. Government to carry out the purposes for which new funds authorized by the FAA would themselves be available?

d. **Congressional notice:** Has Congress received prior notification providing in detail how the funds will be used, including the U.S. interests that will be served by the assistance, and, as appropriate, the economic policy reforms that will be promoted by the cash transfer assistance?

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