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ECEP/EP3-EGYPT MAINSTREAM ACTIVITY

Final Report



Prepared for

U S Agency for International Development/Washington (R&D/ENR)
U S Agency for International Development/Egypt (DR/ENV)
Development Research and Technological Planning Center
Tabbin Institute for Metallurgical Studies
Federation for Egyptian Industry

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EXECUTIVE SUMMARY

BACKGROUND

On June 13, 1988, the Energy Conservation and Efficiency Project (ECEP) was authorized by the U S Agency for International Development mission in Egypt (USAID/Egypt) to implement energy conservation/efficiency measures through technical assistance, training, project promotion and information dissemination support to both the private and public sectors. Since that time, concern for environmental issues has steadily grown within USAID and within Egypt. In May 1992, the Government of Egypt (GOE) developed an Egyptian National Environmental Action Plan and in March 1994 passed Environmental Law #4. In 1993, USAID/Egypt established an Environment Office (DR/ENV) to take the lead role in implementing the Agency's evolving strategic objective for the environment in Egypt. On November 4, 1993, USAID/Egypt approved a project amendment for a redesigned ECEP to more directly address environmental issues. The redesigned project was re-named the Energy Conservation and Environment Project and retained the same acronym, i.e., ECEP.

The management and technical assistance for the environmental services of the amended project were provided through a buy-in to an existing USAID/Washington project, the Environmental Pollution Prevention Project (EP3). On August 15, 1994, a contract was signed with the EP3 contractor, RCG/Hagler-Bailly Consulting, Inc., to initiate an Industrial Environmental Management Program in Egypt. This US\$2.7 million, 3-year project is the ECEP's Pollution Prevention Component (ECEP/EP3) comprised of three ongoing activities: (1) Mainstream Activity, (2) 10th of Ramadan Environmental Management Program, and (3) the Alexandria Initiative. On September 6, 1995, the redesigned ECEP project was extended for two additional years through September 30, 1998 and US\$18 million in additional funds was approved to (1) accelerate the continued adoption of improved technologies and practices to save energy and protect the environment, and (2) ensure that the project has a greater impact towards achieving environmental goals set for Egypt. Table ES-1 is a summary of the goals, purpose and time-frame for these projects. Direct project environmental outputs are identified in Table ES-2. This document is the Final Report for the Mainstream Activity (Delivery Order #4), which was in effect from August 1, 1994 through August 1, 1997.

ECEP/EP3 is focused on (1) environmental assessment of production facilities, (2) the procurement of selected equipment to facilitate assessments, (3) assistance to facilities' environmental efforts, and (4) analyses of environmental issues for policy improvements. An office in Cairo works with three Egyptian agencies for industrial technology demonstrations, incorporation of environmental management, and training programs. (1) the Development Research and Technological Planning Center (DRTPC) - *for private sector plants*, the Tabbin Institute for Metallurgical Studies (TIMS) - *for public sector plants*, and the Federation of Egyptian Industries (FEI) - *for awareness and training programs for both the public and private sectors*. The Egyptian Environmental Affairs Agency (EEAA) was expected to gain importance within the environmental community as a need for compliance with

Environmental Law #4 approached. Therefore, the EEAA became part of the redesigned project

Table ES-1. Summary of Energy Conservation/Efficiency and Environmental Activity in Egypt

Project/Activity	Goal	Purpose	Life of Project
Energy Conservation and Efficiency Project (ECEP) [US\$49.5 million]	To improve the productivity and competitiveness of the economy by improving the energy efficiency of its industrial and commercial processes and practices	To promote and accelerate the adoption of improved commercial technologies, processes and practices to save energy and incr energy eff, and improve instit cap	Signed 6/13/88 LOP 6/13/88 - 9/30/96
Egyptian Environmental Action Plan passed in May 1992; Egyptian Environmental Law #4 passed in March 1994			
Energy Conservation and Environment Project (ECEP) [Amend No 1][No add funding]	To improve energy efficiency and environmental protection in Egypt	To accelerate the adoption of improved technologies and practices to save energy and protect the environment	Signed 11/04/93 LOP 9/30/93 - 9/30/96
ECEP/EP3 Mainstream Activity [DO #4] [US\$2.7 million]	To establish a sustainable pollution prevention program to reduce environmental pollution associated with urbanization and industrialization in Egypt To share and transfer the advances made in the US in pollution prevention, waste minimization and clean production technologies with industry through technical assistance, training, promotion/outreach, info dissemination, and audits, assessments and demonstration projects		Signed 8/15/94 LOP 8/1/94 - 8/1/97
Energy Conservation and Environment Project (ECEP) [Supp No 2] [US\$18M funding]	To have a greater impact to improve energy efficiency and environmental protection in Egypt	To accelerate the continued adoption of improved technologies and practices to save energy/protect the environment	Signed 9/6/95 Extended PACD to 9/30/98
ECEP/EP3 10th of Ramadan Activity [DO #10] [US\$1.8 million]	To establish a sustainable pollution prevention program in 10th of Ramadan City To initiate an Environmental Management Program, coordinate an Industrial Pollution Prevention Program, and institute a Training and Information Program		Signed 1/08/96 LOP 1/08/96 - 1/31/98
ECEP/EP3 Alexandria Initiative [Task #800] [US\$2.8 Million]	To support the Alexandria General Organization for Sanitation and Drainage (AGOSD) activities by lowering the quantity and improving the quality of industrial effluent discharges, expanding industrial pollution prevention activities, and lowering pretreatment requirements To provide institutional and technical assistance and promotion/training in Alex and Cairo		Signed 1/30/97 LOP 1/01/97 - 7/06/98

**Table ES.2. Energy Conservation and Environment :
Project Pollution Prevention Component
ECEP/EP3 Direct Project Outputs for Environmental Activities**

Pilot Demonstrations	Policy Development Studies
<p><u>Conduct Six Pilot Demonstrations in the Industrial Sectors</u></p> <p>References <i>Industrial Environmental Management in Egypt Statement of Work</i> (Reference 4) for specific details</p> <p>Project Paper Supplement No. 2 states: at least ten industrial plants will have implemented pollution prevention technologies as demonstration sites and another 40 plants will have implemented low-cost/no-cost methodologies.</p>	<p><u>Conduct Four Policy Studies</u></p> <p>Conduct policy studies in a range of environmental management issues such as</p> <ul style="list-style-type: none"> • Study of the conversion of transportation fleets to compressed natural gas, • Investigation of methods for quantifying benefits of pollution prevention measures, • Cross-sectoral fuels optimization assessment, • Establishment of a pollution abatement policy support program for the 10th of Ramadan City, • Assessment of storage tank management <p>Project Paper Supplement No. 2 states: at least 10 ECEP-funded policy analyses will provide the technical analyses for GOE action on reform in industrial energy use policy.</p>
Training	Promotion
<p><u>Conduct Twenty Courses in Ten Topics for Five Hundred Persons</u></p> <ul style="list-style-type: none"> • Provide training in conducting environmental surveys and preparing feasibility studies and procedures for evaluation and selection of environmental technologies • Provide classroom and in-plant training for plant personnel and other professionals for environmental system operation, procurement, installation and operations and maintenance • Conduct a Training Effectiveness Assessment of training programs conducted to date <p>Project Paper Supplement No. 2 states: the Cairo and Alexandria General Organizations for Sanitary Drainage will be capable of implementing pollution prevention technologies.</p>	<p><u>Develop Five Technology-Specific Manuals and Fifteen Technical Briefs</u></p> <ul style="list-style-type: none"> • Promote environmental management to Egyptian industrial manufacturing plants, consulting firms, government agencies and the general public by providing information on environmental service firms, pollution reduction/control technologies, eligibility criteria and application procedures • Develop directories of Egyptian consultants and equipment suppliers and other directories and databases to support industry <p>Project Paper Supplement No. 2 states: a pollution prevention information clearinghouse will be made available to any interested Egyptian user.</p>

ACCOMPLISHMENTS

The ECEP/EP3 office has trained a skilled cadre of environmental engineers, and expanded the institutional capacity of TIMS and DRTPC, to provide environmental assessments and management services; to demonstrate pollution prevention and control technologies, and to design, develop and implement environmental training seminars and workshops with FEI.

Egypt now has the foundation for a national program to help its industry comply with Environmental Law #4. The technical and managerial capacity is being developed at TIMS and DRTPC for public and private sector collaboration with EEAA in programs to educate industrialists about pollution prevention, identify and quantify effluent and emissions, assess mitigation measures, implement the best pollution prevention and control options, and monitor and evaluate compliance with environmental regulations and standards.

The Pollution Prevention Diagnostic Assessment (PPDA) reports are the major tangible output of the assessment activities. The process started with reviewing a large number of facilities and ended with 32 assessments reasonably evenly distributed among the industrial sectors and private/public facilities.. The Screening/Pre-assessment breakdown is shown below.

Number of Facility Profiles Reviewed.	637
Number of Facilities selected after Screening.	96
Number of Facilities selected after Pre-Assessment:	34
Number of Assessments (PPDA) Reports Completed.	32

Some 36 US consultants/experts have participated in the ECEP/EP3 program to date. As many as 24 different US consultants/experts delivered technical assistance during the first year of the Mainstream Activity. These interventions contributed to a number of success stories.

Textile Sector

- A facility started implementing some of the no cost and low cost options immediately after the on-site assessment was completed. This resulted in an annual savings of L.E. 73,000 and an 84% reduction in water use.

Metal Finishing

- A galvanizing plant invested L.E. 151,000 in implementing most of the pollution prevention options and showed an estimated annual savings of L.E. 273,000.
- A metal finishing plant began the procurement process, utilizing internal funds, to acquire a new electroplating line. This is an application of a capital intensive option.

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Chemical

- A facility manager in Alexandra substituted an oil-based cleaner by a more environmentally friendly detergent using the concepts and approaches presented at an ECEP/EP3-Egypt workshop

Food

- A sugar refinery plant implemented some of the low cost pollution prevention options for a total cost of L.E 72,100 Total estimated annual savings is L E 273,000.

Other

- An auto assembly plant included a \$500,000 investment in its 1995-1996 annual budget to implement three medium cost pollution prevention options.

The project conducted 42 training courses/workshops, as well as promotional seminars and conferences. The project trained 1987 participants received 4614 days of training. More than 50 companies were reached which has reflected in increase of awareness of pollution prevention concepts and applications. The project produced numerous publications dealing with pollution prevention 7 case studies, 12 manuals, 5 technical booklets, 5 technical briefings and 6 news publications. The evaluation sheets of participants to training reflected more awareness of industrial pollution prevention problems as the number who expressed willingness to interact with the project activities has increases

An electronic catalogue containing all technical reports, data, and documents related to the Mainstream Activity was developed and distributed to the Implementing Agencies. This product is the initial step of an ECEP/EP3-Egypt pollution prevention "knowledge base" for the total project

COMPLIANCE WITH DELIVERY ORDER #4

All contract requirements were satisfied for the two tasks of the Mainstream Activity - Strategy for Program Implementation and Demonstrations and Information Dissemination. A pollution prevention office was established in Cairo and staffed with appropriate professionals. Three workplans were written to define and schedule annual activity. A "Pollution Prevention Roundtable" was held as a "kick-off" meeting for the project in October 1994. Over the project's 3-year life, many "leadership conferences" were held in various forms, e.g., as industrial roundtables, seminars and workshops. The institutional capacity was expanded at TIMS and DRTPC to address all aspects of pollution prevention awareness, training and interventions, and at FEI for information dissemination of

environmental materials. Pollution Prevention Diagnostic Assessments (PPDAs) were written for 32 plants reasonably even distributed among industrial sectors and private/public facilities. As new activities were added to the ECEP/EP3 program, the PPDA process was streamlined using a "Rapid Assessment Methodology" with attention given to technical assistance with Compliance Action Plans. An electronic catalogue containing all the technical reports, data and documents from the Mainstream Activity was developed and distributed to Implementing Agencies. This product is structured to expand into a more comprehensive "knowledge base" by the end of the ECEP/EP3 -Egypt program.

On an "as needed" basis under the Mainstream Activity, ECEP/EP3-Egypt supported other USAID/Egypt programs by providing technical assistance to assess pollution prevention opportunities. For example, ECEP/EP3-Egypt was asked to support Winrock International's ecotourism initiative. A team of pollution prevention experts participated in two 2-day workshops and other meetings as part of the USAID/Egypt's Promotion of Environmentally Sustainable Tourism (EST) project.

LESSONS LEARNED

Technical Assistance- The 18 public sector and 14 private sector Pollution Prevention Diagnostic Analyses (PPDAs) are of good quality with a comprehensive description of the processes and pollution prevention options. However, the analytic element is generally weak due to a lack of a clear methodology, actual measurements, and a systematic monitoring program. The PPDAs do not clearly recommend how the plant might continue the pollution prevention efforts and how they might prioritize the medium-cost options for systematic future implementation. The PPDAs form a basis for a longer-term relationship with a plant, but do not outline how a "follow-up" relationship might continue. The assessments, each with 6-7 persons and a U.S. expert (s), appeared to be expensive. Therefore, a market to sustain the activity is doubtful. Finally, the layers of communication seemed to be a barrier and to slow the process.

The required technical assistance varied over a wide range depending on the capability of the plant operating staff. The technical assistance plan should have addressed this issue early in the project and assigned the appropriate level of U.S. expertise.

A very broad range of pollution prevention options was identified in the assessments. Valuable technical assistance with low-cost/no-cost options (the ones that industry is most interested in at the current time) is valuable at the pre-assessment level without the expense of a detailed analysis. This issue is being addressed in later Delivery Orders through the "Rapid Assessment" methodology. Fewer full plant assessments, strategically based on selection by the level of environmental impact, would be more useful in the long-term.

To control the cost of plant assessments, energy and environmental audits should be combined. This integrated approach is more attractive to plant management. Also, cost

savings from energy conservation and efficiency interventions can be clearly shown to be available for environmental mitigation measures to ensure compliance with Environmental Law #4

Training and Promotion - The scope, implementation, and materials for the training program needs improvement. Tailored training is needed for Implementing Agencies' and ECEP/EP3 staff. The ambitious 1997 training program could benefit from a full-time coordinator. The program needs a comprehensive strategy including better monitoring, documentation, and analysis. There should also be more emphasis on Arabic presentation.

The most beneficial training was for plant managers, decision makers, and "train-the-trainer" activities. These activities requires careful thought and preparation regarding mechanisms and content. Comprehensive documentation of successful activities, in the form of "packaged courses" would be a useful asset for future training activity.

Sustainability - The Mainstream Activity has provided a sound foundation for there to be a fully developed institutional capacity at TIMS and DRTPC to implement pollution prevention programs by the end of the ECEP/EP3-Egypt project. However, the current high cost of plant assessments, and the fact that plants are accustomed to getting them at no cost, makes a sustainable market for this service by the Implementing Agencies doubtful.

Outreach - Outreach materials need to be leveraged and enhanced. The most effective products were the development and dissemination of case studies, newsletters and informational seminars. More outreach to a broader range of potential participants (for example, U.S. multinational corporations, other U.S. government environmental programs, and other bilateral/multilateral donors in Egypt) would be beneficial.

RECOMMENDATIONS

Technical Assistance

- Revise the procedure for selection and utilization of US consultants and experts to improve continuity and quality of the technical assistance delivered. Fewer, carefully screened, highly qualified consultants and experts would be far more effective in delivery of technical assistance and development of quality assessment reports than numerous one-time individuals.
- Make use of analytical tools to introduce the relationship between the environment and economics, including benefit/cost analysis, product/process life cycle analysis, risk assessment, and ecological impact evaluation.
- Expand the "clearinghouse" concept to a computerized knowledge-base using available sector-specific global information and data, lessons learned in Egypt, case studies, generic

options, etc The knowledge-base design should be Internet-compatible and include environmental and regulatory components relevant to Egypt

Training and Promotion

- Evaluate the most effective method to access USAID training programs for ECEP/EP3 purposes, such as the Development Training 2 project Consider utilizing the existing U.S EPA training modules or the U.S Environmental Training Institute (USETI), a Washington, DC-based "Public-Private Partnership" for demand-driven technical training
- Benefit from existing university programs. This could be synergistic as it expands the base of knowledge, teaching methodologies and teaching materials
- Expand on existing activities and develop a comprehensive three dimensional strategy matrix which synchronizes (a) target groups (individual directors, key members, staff ECEP/EP3-Egypt staff, agents, trainers, implementers, industrialists/ GOE leaders); (b) time domain (in terms of tasks); and (c) teaching methodology and technology (round table discussion / brain storming sessions / case methods / on the job training / one day seminar / workshops / study tours / etc)
- A full time training manager at the ECEP/EP3 office could be beneficial in the longer-term to (a) coordinate activities and follow up, (b) review job descriptions, (c) balance the U.S training visits, (d) structure tailored courses and assign trainers to transfer experience, and (e) work with ECEP to expand the formal environmental audit courses.

Sustainability

- Train the Implementing Agencies in business planning, marketing and sales strategies appropriate for the Egyptian market
- Implementing Agencies could benefit from assistance to develop their services on a fee-for-service basis in the near term to provide a practical assessment of the sustainability and market for plant assessments, evaluation of technical needs, establishment of equipment specifications and performance standards for specific operations or processes, and training programs. This assistance is being provided by OBI under the ECEP project.
- Evaluate industry's need for operations and maintenance contracts in the environmental and pollution prevention services sector.

Outreach

- Establish a private sector industrial, business or trade association for the environmental sector or for environmental services, similar to the USAID Asia Environmental Program (US-AEP) which creates Pollution Prevention Roundtables as a private sector-to-private sector linkage for pollution prevention.
- Coordinate and collaborate with NGOs, American Chamber of Commerce, research and development centers, etc as an outreach activity
- Broaden the scope of ECEP/EP3 activities to include environmental management systems (EMS) and assistance with Compliance Action Plans. Base this activity on the ISO 14000 definition of EMS Start outreach activities regarding EMS as a broad educational and training activity Consider partnering with other multinational corporations implementing EMS/ISO
- Leverage the trend to purchase from clean suppliers for compliance with Egyptian Environmental Law #4. Consider a supplier outreach or mentor program for EMS, or ISO certification using a multinational corporation as a partner
- Evaluate and consider using U.S government and other programs and activities, such as
 - Manufacturing Technology Center (MTC) in Egypt operated by the Executive Service Corp Identify what MTC is doing and leverage their efforts and investments
 - USAID's Private Sector Commodity Import Program (CIP) to develop preferences for the import of environmental technologies and equipment
 - USAID's Universities Exchange Program II (ULPII) for the transfer of appropriate U S. University-developed technology or laboratory expertise.
- Facilitate a dialogue between EEAA, the regulated community, and other GOE agencies on selected issues of mutual interest (for example, Law #4, ISO 14,000; or compliance)
- Produce Arabic videos which highlight success stories from different sectors in a before and after look at pollution prevention in Egypt Emphasize the connection between pollution prevention and cost savings, and include education about Environmental Law #4

I. BACKGROUND

On June 13, 1988, the Energy Conservation and Efficiency Project (ECEP) was authorized by the U.S. Agency for International Development (USAID) Science and Technology Office (HRDC/S&T) as a sub-project of the Science and Technology for Development Project (#263-0140). ECEP was designed as a US\$50 million, 8-year project (through September 30, 1996) to improve the productivity and competitiveness of the Egyptian economy by (Reference 1):

- promoting and accelerating the adoption of improved commercial technologies, processes, and practices to save energy and increase industrial efficiency, and
- enhancing Egyptian institutional capability to implement energy conservation measures through technical assistance, training, project promotion and information dissemination support to both the private and public sectors

The growth in the Egyptian population in general and in the industrial sector in particular has increased demand for energy and made the energy conservation initiatives of ECEP more valid today than in 1988. Furthermore, since that time, concern for environmental issues has steadily grown within USAID and within Egypt. In May 1992, the Government of Egypt (GOE) developed an Egyptian National Environmental Action Plan and in 1994 passed Environmental Law #4. In 1993, USAID/Egypt established an Environment Office (DR/ENV) to take the lead role in implementing the Agency's evolving strategic objective for the environment in Egypt.

In March 1992, a mid-term evaluation of ECEP concluded that one of the most serious problems facing Egypt was air pollution caused by the inefficient and excessive use of energy and that ECEP should focus on the problem as part of the USAID environmental program. USAID/Egypt sought to identify high impact activities that could be quickly implemented. The ECEP, which already had a substantial environmental impact and an established infrastructure through its energy activities, was selected as an appropriate vehicle to effectively and efficiently achieve this objective. On November 4, 1993, USAID/Egypt approved a project amendment for a redesigned ECEP that, while continuing to stress energy conservation and efficiency, used the established procedures and mechanisms of the earlier project to more directly address environmental issues (Reference 2). The redesigned project was re-named the Energy Conservation and Environment Project and retained the same acronym, i.e., ECEP.

The new environmental activities under the redesigned ECEP were not within the scope of the original contract for the implementing contractor, Overseas Bechtel, Inc. Therefore, to facilitate rapid initiation of environmental activities, the management and technical assistance services of the amended project were provided through a buy-in to an existing

USAID/Washington project, the Environmental Pollution Prevention Project (EP3). On August 15, 1994, a contract was signed with the EP3 contractor, RCG/Hagler-Bailly Consulting, Inc., to initiate Industrial Environmental Management in Egypt (Reference 3). This US\$2.7 million, 3-year project is the USAID/Egypt Energy Conservation and Environment Project's Pollution Prevention Component (ECEP/EP3). On September 6, 1995, the redesigned ECEP project was extended for two additional years through September 30, 1998 and US\$18 million in additional funds was approved to (1) accelerate the continued adoption of improved technologies and practices to save energy and protect the environment, and (2) ensure that the project has a greater impact towards achieving environmental goals set for Egypt (Reference 4) Exhibit I-1 is a summary of the goals, purpose and life of project for energy conservation/efficiency and environmental activity in Egypt

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Table I-1. Summary of Energy Conservation/Efficiency and Environmental Activity in Egypt

Project/Activity	Goal	Purpose	Life of Project
Energy Conservation and Efficiency Project (ECEP) [US\$49.5 million]	To improve the productivity and competitiveness of the economy by improving the energy efficiency of its industrial and commercial processes and practices	To promote and accelerate the adoption of improved commercial technologies, processes and practices to save energy and incr energy eff, and improve instit cap	Signed 6/13/88 LOP 6/13/88 - 9/30/96
Egyptian Environmental Action Plan passed in May 1992. Egyptian Environmental Law #4 passed in March 1994			
Energy Conservation and Environment Project (ECEP) [Amend No 1][No add funding]	To improve energy efficiency and environmental protection in Egypt	To accelerate the adoption of improved technologies and practices to save energy and protect the environment	Signed 11/04/93 LOP 9/30/93 - 9/30/96
ECEP/EP3 Mainstream Activity [DO #4] [US\$2.7 million]	To establish a sustainable pollution prevention program to reduce environmental pollution associated with urbanization and industrialization in Egypt To share and transfer the advances made in the US in pollution prevention, waste minimization and clean production technologies with industry through technical assistance, training, promotion/outreach, info dissemination, and audits, assessments and demonstration projects		Signed 8/15/94 LOP 8/1/94 - 8/1/97
Energy Conservation and Environment Project (ECEP) [Supp No 2] [US\$18M funding]	To have a greater impact to improve energy efficiency and environmental protection in Egypt	To accelerate the continued adoption of improved technologies and practices to save energy/protect the environment	Signed 9/6/95 Extended PACD to 9/30/98
ECEP/EP3 10th of Ramadan Activity [DO #10] [US\$1.8 million]	To establish a sustainable pollution prevention program in 10th of Ramadan City To initiate an Environmental Management Program, coordinate an Industrial Pollution Prevention Program, and institute a Training and Information Program		Signed 1/08/96 LOP 1/08/96 - 1/31/98
ECEP/EP3 Alexandria Initiative [Task #800] [US\$2.8 Million]	To support the Alexandria General Organization for Sanitation and Drainage (AGOSD) activities by lowering the quantity and improving the quality of industrial effluent discharges, expanding industrial pollution prevention activities, and lowering pretreatment requirements. To provide institutional and technical assistance and promotion/training in Alex and Cairo		Signed 1/30/97 LOP 1/01/97 - 7/06/98

II. GOALS, OBJECTIVES AND PROJECT OUTPUTS

II.A. Environmental Pollution Prevention Program in Egypt

The project goal for the Energy Conservation and Environment Project (ECEP) is to improve energy efficiency and environmental protection in Egypt by accelerating the adoption of improved technologies and practices. ECEP is structured to:

- stress dissemination, replicability and sustainability of energy conservation activities rather than the provision of high cost equipment,
- increase the environmental aspects of future energy conservation activities,
- add low-cost/no-cost energy conservation/environmental protection activities,
- complete initial pilot testing of ways to limit vehicle emissions, and
- develop an institutional capacity and infrastructure for environmental management in Egypt

New energy conservation activities focus on ongoing demonstrations of low-cost/no-cost and other technologies that have large environmental benefits (managed by Overseas Bechtel, Inc) The environmental activities include: (1) a pilot vehicle tune-up program (completed by an Egyptian firm), and (2) environmental assessment of production facilities, the procurement of selected equipment to facilitate environmental assessments, assistance to institutions' environmental efforts, and analyses of environmental issues in support of policy improvements [these are ongoing efforts under the ECEP Pollution Prevention Component (ECEP/EP3) managed by RCG/Hagler-Bailly Consulting, Inc).

Direct life of project outputs for environmental activities under ECEP/EP3 are specified in the ECEP Project Paper Amendment No 1 (Reference 2) and presented in Table II-1. ECEP Project Paper Supplement No.2 (which extended the life of project by 2-years and increased funding by US\$ 18 million) specifies that a greater number of industrial plants were expected to be using energy efficient and pollution prevention technologies with increased cost savings and resulting reductions in certain pollutants by the end of the project on September 30, 1998

Exhibit II-1 identifies these refined direct project outputs for environmental activities resulting from this project supplement in bold type, i e., (1) institutional development for the Cairo and Alexandria General Organizations for Sanitary Drainage, (2) at least 10 industrial plants will implement pollution prevention technologies as demonstration sites and another 40 plants will implement low-cost/no-cost pollution prevention measures, and (3) a pollution prevention information clearinghouse@ will be established to (a) make readily available to interested Egyptian users relevant information on topics related to cleaner production, and (b)

to serve as a catalyst to promote efforts towards replicability.

The redesigned ECEP uses the same basic organizational structure as the original project, i.e., the institutional capacity of the three original Egyptian implementing agencies is being enhanced to include environmental technology, management and training capabilities. Their responsibilities remain the same

- The Development Research and Technological Planning Center (DRTPC) - responsible for technology demonstrations, incorporation of energy conservation and environmental management, and design and development of training programs *for private sector plants*
- Tabbin Institute for Metallurgical Studies (TIMS) - responsible for technology demonstrations, incorporation of energy conservation and environmental management, and design and development of training programs *for public sector plants*.
- Federation of Egyptian Industries (FEI) - responsible for promoting replication in industry through information dissemination; and planning, scheduling, organizing and implementing training programs *for both the public and private sectors*

At the time of the ECEP redesign in 1993, the Government of Egypt (GOE) was about to pass an environmental law (subsequently accomplished in 1994). The Egyptian Environmental Affairs Agency (EEAA), established in 1982, was positioned to gain importance within the Egyptian environmental community as it began to formulate policy, develop additional specific legislation, review environmental impact assessments, oversee inspection of plants by outside contractors, and enforce environmental laws. Therefore, the EEAA became part of the redesigned project so that programmatic structure, technical assistance and environmental measures could support EEAA's monitoring activity and development of environmental regulations and standards

**Table II.1. Energy Conservation and Environment Project Pollution Prevention
Component ECEP/EP3 Direct Project Outputs for Environmental Activities**

Pilot Demonstrations	Policy Development Studies
<p><u>Conduct Six Pilot Demonstrations in the Industrial Sectors</u></p> <p>References <i>Industrial Environmental Management in Egypt Statement of Work</i> (Reference 4) for specific details</p> <p>Project Paper Supplement No. 2 states: at least ten industrial plants will have implemented pollution prevention technologies as demonstration sites and another 40 plants will have implemented low-cost/no-cost methodologies.</p>	<p><u>Conduct Four Policy Studies</u></p> <p>Conduct policy studies in a range of environmental management issues such as</p> <ul style="list-style-type: none"> • Study of the conversion of transportation fleets to compressed natural gas, • Investigation of methods for quantifying benefits of pollution prevention measures, • Cross-sectoral fuels optimization assessment, • Establishment of a pollution abatement policy support program for the 10th of Ramadan City, • Assessment of storage tank management <p>Project Paper Supplement No. 2 states: at least 10 ECEP-funded policy analyses will provide the technical analyses for GOE action on reform in industrial energy use policy.</p>
Training	Promotion
<p><u>Conduct Twenty Courses in Ten Topics for Five Hundred Persons</u></p> <ul style="list-style-type: none"> • Provide training in conducting environmental surveys and preparing feasibility studies and procedures for evaluation and selection of environmental technologies • Provide classroom and in-plant training for plant personnel and other professionals for environmental system operation, procurement, installation and operations and maintenance • Conduct a Training Effectiveness Assessment of training programs conducted to date <p>Project Paper Supplement No. 2 states: the Cairo and Alexandria General Organizations for Sanitary Drainage will be capable of implementing pollution prevention technologies.</p>	<p><u>Develop Five Technology-Specific Manuals and Fifteen Technical Briefs</u></p> <ul style="list-style-type: none"> • Promote environmental management to Egyptian industrial manufacturing plants, consulting firms, government agencies and the general public by providing information on environmental service firms, pollution reduction/control technologies, eligibility criteria and application procedures • Develop directories of Egyptian consultants and equipment suppliers and other directories and databases to support industry <p>Project Paper Supplement No. 2 states: a pollution prevention information clearinghouse will be made available to any interested Egyptian user.</p>

II.B. Industrial Environmental Management in Egypt (EP3 Mainstream Activity)

The Environmental Pollution Prevention Project (EP3) is a USAID/Washington global project to reduce environmental pollution associated with urbanization and industrialization. The purpose is to create the necessary conditions for decision makers in the public and private sectors to undertake proper urban and industrial pollution management in USAID-assisted countries. A buy-in to this existing project was used for implementation of environmental initiatives when USAID/Egypt added a pollution prevention component (ECEP/EP3) to their existing energy conservation and efficiency project (ECEP)

On August 15, 1994, a contract was signed with RCG/Hagler-Bailly Consulting, Inc. to initiate Industrial Environmental Management in Egypt (Reference 4). This US\$2.7 million, 3-year project implements ECEP/EP3 by:

- providing a broad range of technical assistance, training, demonstrations and information services for environmental awareness and pollution prevention at the plant, industry category and country levels,
- strengthening and expanding in-country sources of technical expertise for pollution prevention, including establishing national programs of pollution prevention training, information and technical assistance;
- identifying, promoting and expanding sources of financing for pollution prevention technology and creating linkages between firms and agencies in Egypt and U.S. suppliers of pollution prevention expertise and equipment,
- helping to improve national environmental policies, laws, regulations and their implementing institutions to expand incentives for cleaner production, and
- promoting activities to encourage, coordinate and combine the pollution prevention efforts of USAID and other U.S. and donor agencies to achieve maximum pollution prevention benefit

ECEP/EP3 assists local implementors through long- and short-term technical assistance from U.S., Egyptian and Near East industrial pollution experts; in-country training, workshops, seminars; technical information and technology demonstrations to

- demonstrate that pollution prevention is a broadly applicable approach that plays a major role in the overall environmental management program of an individual industrial facility and within Egypt as a whole,

- demonstrate that pollution prevention reduces the costs of environmental management compared to conventional pollution control technologies and that payback of investment costs can be achieved,
- develop a cadre of private sector Egyptian consulting firms with first-hand experience and training in the development and implementation of broad pollution prevention programs in industrial facilities,
- perform policy studies to identify appropriate steps to advance environmental management in Egypt, especially in the industrial sector, and
- implement a program of information transfer and training for Egyptian firms with the knowledge needed to implement industrial environmental management

ECEP/EP3 uses the global EP3 network to share and transfer the advances made in the United States in pollution prevention, waste minimization and clean production technologies with industry in Egypt. The approach follows the EP3 Project Paper design

- Phase 1 concentrate on demonstrating no-cost (housekeeping) and low-cost (US\$5,000 to US\$25,000) pollution prevention management techniques and procedures, and
- Phase 2 demonstrate medium-cost US pollution prevention procedures and products that can be (a) retrofitted into existing Egyptian industrial facilities without jeopardizing current production volume, quality or cost, or (b) introduced into the design of new industrial plants

The ECEP/EP3 program uses pollution prevention information available through an information center in EP3/Washington. The information system was established early in the EP3 program to consist of specialized environmental databases, pollution prevention publications, and information and education and product information. However, a cutback in EP3 core funding limited the intended growth of the system. Pollution prevention information and technologies are also provided through a variety of US pollution prevention technology data bases.

This information is currently available at no charge to Egyptian firms. Eventually a fee-for-service arrangement will be phased in at DRTPC, TIMS and FEI. Additionally, ECEP/EP3 is developing a computerized interactive knowledge base@ to make data bases readily available for Egyptian firms to explore pollution prevention options and to expand their pollution prevention capabilities.

EP3/Washington has primary responsibility to identify and provide short-term pollution

prevention experts to assist with audits, assessments and demonstrations, training and other ECEP/EP3 implementation activities. EP3/Washington will

- search through available pollution prevention databases for products, processes and supplies that meets the technical and economic needs of ECEP/EP3 and Egyptian companies;
- coordinate ECEP/EP3 activities with other programs, information exchanges and databases such as those operated by US Environmental Protection Agency, the UN Environment Programs, EPAT and GREENCOM,
- provide information, stateside research related to trade activity and stateside liaison with US firms, organizations and government agencies, and
- coordinate overall technical assistance for pollution prevention activities and workshops using industry experts

ECEP/EP3, the pollution prevention component of ECEP, has three ongoing activities over the period August 1, 1994 through July 6, 1998, i.e., (1) Mainstream Activity, (2) 10th of Ramadan Environmental management Program, and (3) the Alexandria Initiative. This document is the Final Report for the Mainstream Activity (Delivery Order #4), which was in effect from August 1, 1994 through August 1, 1997. A summary timeline for these USAID/Egypt energy conservation/efficiency and environmental activities in Egypt is presented in Table II-2.

Figure II 2 Timeline for Energy Conservation/Efficiency and Environmental Activity in Egypt

Project/Activity	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
ECEP [Cons/Eff] 13/6/88 - 30/9/96											
Env Action Plan											
ECEP - Amnd #1 [Cons/Eff & Env] 30/9/93 - 30/9/96											
Env Law #4											
ECEP/EP3 [Mainstream Act] 01/08/94 - 01/08/97											
ECEP Supp #2 [Cons/Eff & Env] 06/09/95 - 30/9/98											
ECEP/EP3 [10th of Ramadan] 08/01/96 - 31/01/98											
ECEP/Ep3 [Alex Initiative] 01/01/97 - 06/08/98											

III. ECEP/EP3 Mainstream Activity Requirements (Delivery Order #4)

III.A. Task 1. Strategy for Program Implementation

Task 1 addresses the needs of Egyptian industry and the priorities of USAID/Egypt through:

- ▶ establishment of a Pollution Prevention Office in Cairo,
- ▶ development of a strategy and convening of a Pollution Prevention Roundtable,
- ▶ introduction of Task 1 plant level innovative pollution prevention practices, and
- ▶ planning and implementation of a Leadership Conference on Pollution Prevention - Decision and Commitment Benchmark

III.A.1. Pollution Prevention Office in Cairo

An ECEP/EP3 Pollution Prevention Office was to be established in Cairo to

- assist the three ECEP GOE implementing agencies (TIMS, DRTPC and FEI) with promotion of interest and demand for the pollution prevention approach in Egyptian firms, and
- facilitate transfer of pollution prevention know-how and technologies to Egyptian firms by providing services in support of technology transfer through (a) information on US suppliers and product specifications; (b) liaison with US suppliers; (c) assistance with government, USAID and other donor programs, and (d) assistance to US firms using US export assistance programs

The requirement is to staff the office with a Chief-of-Party (COP) and two locally contracted Egyptian engineers/specialists - one for Pollution Prevention and one for Financial/Information. An American COP is to be in place for 2-years and then, after a six month overlap, an Egyptian COP is to replace him/her for the remaining life of the project.

III.A.2. Strategy Development and Pollution Prevention Roundtable

An ECEP/EP3 strategy was to be developed with USAID/Egypt, to include:

- rapid assessment of Egyptian environmental policy and regulations,
- identification of Egyptian pollution prevention and control experts,
- identification of in-country, regional, and other sources of financing for industrial pollution prevention equipment, and
- selection of an initial 10-20 target industrial plants

The initial target plants were to be private sector plants or public sector plants about to be

privatized that represented major industrial pollution problems in Egypt. They were to be identified through (a) an industrial pollution prevention survey; (b) research on existing data and studies; 8 consultations with USAID/Egypt, TIMS, DRTPC, and FEI, and (d) consultations with Egyptian industry associations, government agencies, and representatives of various industry categories and plants. Selection criteria were to include (a) indications of interest on the part of plant managers, (b) apparent practicability to introduce low-cost/no-cost and more capital intensive pollution prevention innovations, and (c) a high likelihood that such innovations would result in significantly cleaner production and have a significant positive effect on environmental quality.

The strategy was to be finalized at a Pollution Prevention Roundtable with the participation of USAID/Egypt, TIMS, DRTPC, FEI, EEAA and other invited guests.

III.A.3. Task 1 Plant Level Innovations

Plant level demonstrations of innovative pollution prevention practices were required. Technical teams comprised of U.S. experts and local Egyptian experts would be involved in a 5-step process that results in pollution prevention successes in the 10-20 target plants and the beginning of an Egyptian framework of experienced industrial pollution prevention professionals and advocates. The 5-step process for the ECEP/EP3 demonstrations would include

- (1) Preparatory Seminars - A seminar is held for in-country pollution prevention specialists and all plant personnel that will participate in the specific plant demonstration. Known pollution problems are identified and general procedures for the audits and assessments are discussed. The ECEP/EP3 team assists plants to develop or estimate baseline environmental data of the quality and quantity of discharges and emissions, cost and efficiency of raw material use, equipment specifications including water and chemical use, and other environmental assessment information.
- (2) Pollution Prevention Audits and Assessments - Audits and assessments are conducted to identify measures for reducing the plant's pollution. These involve several visits over a 2-week period. Low-cost/no-cost actions and their expected benefits are documented in detail. USAID grants of from US\$5,000 to US\$25,000 are available to acquire off-the-shelf hardware to implement these actions.
- (3) Recommendations for More Capital-Intensive Process Changes and Cleaner Production Equipment - Recommendations are made for actions that will cost more but enhance profitability and further reduce polluting discharges. Additional limited USAID-funded assistance may be provided in Task 2 of the ECEP/EP3 program after the plant has carried out the low-cost/no-cost actions.
- (4) Program of Low-Cost/No-Cost Pollution Prevention Innovations - technical assistance is provided for implementation of innovations, training plant

- (5) personnel and measuring pollution prevention and cost reduction benefits
Industry Study Tours in the U.S. - Egyptian industry and government experts are selected to participate in visits to U.S. industries, clean production equipment manufacturers, government programs and other U.S. institutions

III.A.4. Leadership Conference on Pollution Prevention

A *Leadership Conference on Pollution Prevention - Decision and Commitment Benchmark* was to be held in Cairo. This 1-day meeting among USAID/Egypt, TIMS, DRTPC, FEI, key members from industry and government, and other invited guests presents the results of implementing low-cost/no-cost innovations at the 10-20 target plants and their pollution prevention and economic benefits. Task 2 Pollution Prevention Action Plans for more capital-intensive actions are presented for each plant continuing into Task 2. The Conference constitutes a commitment on the part of the plant management to Task 2 implementation.

III.A.5. Deliverables

The ECEP/EP3 program was to complete Task 1 activities and provide the following deliverables.

- Within 4-weeks of issuance of DO#4, submit a *Time-Scaled Work Plan* for approval by USAID/Washington and clearance by USAID/Egypt, TIMS, DRTPC, and FEI.
- Establish and staff a *Pollution Prevention Office in Cairo* and identify ECEP/EP3 collaborators.
- Convene a *Pollution Prevention Roundtable and Leadership Conference on Pollution Prevention.*
- Establish an *ECEP/EP3 Clearinghouse*
- Prepare a *Task 1 ECEP/EP3 Report* which describes and/or provides the results of the (a) ECEP/EP3 strategy and Pollution Prevention Roundtable, (b) Task 1 plant level innovations, 8 Task 2 Action Plan and Leadership Conference on Pollution Prevention.

Section V.B discusses the accomplishment of these deliverables. The Task 1 report is included in this Final Report. Section IV presents the ECEP/EP3 strategy and identifies plant level pollution prevention options by industrial sector (textile, metal finishing, food and other), type (water, air and process), and cost category (no-low-medium- and high-cost) in Section IV.

III.B. Task 2. Demonstrations and Information Dissemination

Task 2 builds upon Task 1 results through completion of the following elements:

- ▶ plant level demonstrations of innovative pollution prevention practices at plants that demonstrated a serious commitment to pollution prevention in Task 1,
- ▶ industry level training and technical assistance,
- ▶ implementation of a municipal environmental management program,
- ▶ conduct of study tours to the United States,
- ▶ development of a pollution prevention program, and
- ▶ policy assistance study of leaking storage tanks.

III.B.1. Demonstrations of Pollution Prevention Practices

ECEP/EP3, TIMS, DRTPC and FEI are to collaborate on implementing plant level demonstrations at plants that demonstrated a serious commitment to pollution prevention during Task 1 interventions, i.e., those that completed low-cost/no-cost measures. In addition, new plants that express a serious commitment to pollution prevention are to be sought. A total of 10 plants are expected to participate in Task 2 demonstration projects that are selected in part by Egyptian industry based on their understanding of the benefits and applicability of the new processes and pollution prevention equipment. The cost of this program was expected to be shared by Egyptian Industry and ECEP/EP3 to include

- support for technical and economic appraisals for more capital-intensive pollution prevention and control technology,
- technical assistance to assess information from suppliers of pollution prevention equipment and to help identify sources of financing, and
- technical assistance and limited financial assistance associated with installing pollution prevention equipment

III.B.2. Industry Level Training and Technical Assistance

ECEP/EP3 is to provide industry level training and technical assistance to extend plant level pollution prevention innovations throughout the target industries through:

- training for plant managers and other personnel (either industry-wide pollution prevention and waste minimization in an industry category, plant-specific on-site, or demonstration-based) using innovations introduced in Task 1 plants;
- technical assistance to address pollution problems throughout an industry category and to develop industry-wide or region-wide pollution prevention

measures; and

- assistance for establishing linkages with in-country and U.S. suppliers of pollution prevention expertise and technology.

III.B.3. Municipal Environmental Management Program

ECEP/EP3, TIMS, DRTPC and FEI will collaborate on implementing a Municipal Environmental Management Program at a new industrial city in Egypt selected by ECEP/EP3. Included in the program is development of an effective industrial monitoring and control program and pollution prevention demonstrations. ECEP/EP3 assistance includes.

- design of an industrial wastewater monitoring and control system - including design of a laboratory for routine analyses that addresses equipment, staffing, quality assurance/quality control and training requirements;
- development of a city ordinance for the issuance of discharge permits - including a fee system to cover the cost of the sewage system,
- provision of information and training on municipal environmental management, pollution prevention and clean technologies, and
- conduct of industrial pollution prevention audits and assessments at 4 to 10 additional target plants with teams of U.S. and Egyptian experts

III.B.4. Study Tours in the United States

ECEP/EP3 will select industry and government experts for visits to U.S. industries, clean production equipment manufacturers, government programs and other U.S. institutions. The number of tours will reflect the number of industry categories in the ECEP/EP3 program.

III.B.5. Pollution Prevention Program Development

ECEP/EP3 will assist in designing a self-sustaining Egyptian pollution prevention and control program - including design of a fee-for-service component. ECEP/EP3 will experiment with fee-for-service elements including (a) collecting and disseminating information, (b) providing training programs, (c) providing technical assistance, and (d) developing and maintaining databases of pollution prevention and control expertise/technology through.

- training for operating and maintaining special measuring and testing equipment,
- hosting regular meetings of industry and government officials on specific pollution prevention and control problems;

- training of trainers - Apollution prevention managers@ who can train others and work with technical experts on audits and assessments; and
- conducting pollution prevention awareness programs including materials preparation

III.B.6. Policy Assistance Study of Leaking Storage Tanks

ECEP/EP3 will scope the potential problem of fuel leakage from above-ground and underground storage tanks in Egypt - including an assessment of potential environmental problems based on existing information, tank inventories, groundwater formations, water quality, field visits, simple mass balance calculations and other predictive tools. The study should also identify existing testing and monitoring methods and recommend testing requirements. If appropriate, the study should identify pollution prevention and control options for spills and leaks.

III.B.7. Deliverables

ECEP/EP3 is to complete Task 2 activities and provide the following deliverables:

- Prepare a *Task 2 Implementation Action Plan* for the approval of USAID/Washington and clearance from USAID/Egypt, TIMS, DRTPC, and FEI
- Prepare a *Task 2 Final Report* which provides the results of the (a) plant level innovations, (b) industry level training and technical assistance, (c) Municipal Environmental Management Program, (iv) industry study tours, and (v) Pollution Prevention Program Development
- Prepare a *Task 2 Policy Assistance Study on Storage Tanks in Egypt* to scope the potential problem of fuel leakage

Section V B discusses the accomplishment of these deliverables. The Task 2 Implementation Action Plan is an element of the Task 2 workplan. The Task 2 Final Report is included in this Final Report. Section IV discusses the implementation of Task 2 plant-level pollution prevention options and industry level training and technical assistance. Design of a Municipal Environmental Management Program was initiated under the Mainstream Activity. The program design is being completed under the ongoing 10th of Ramadan City activity. Design of a pollution prevention program was initiated under the Mainstream Activity. Overseas Bechtel, Inc. has the lead responsibility for its completion, including a fee-for-services component for TIMS and DRTPC. ECEP/EP3 provides technical input as required. The requirement for a policy assistance study on storage tanks was verbally deleted by

USAID/Egypt in August 1996 Hagler-Bailly Consulting, Inc. has requested a change to the Delivery Order #4 work statement (see Appendix 1) to reflex the deletion of this requirement.

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IV. ECEP/EP3 MAINSTREAM ACTIVITY ACCOMPLISHMENTS

IV.A Organizational Structure

Pollution Prevention Office in Cairo

The ECEP/EP3-Egypt Pollution Prevention Office in Cairo was established in August-September 1994. Since that time the office has physically moved twice - the current office, located at 19 Ahmed Heshmet Street, Zamalek is within a 10-minute walk of the TIMS and FEI offices and a 20-minute drive to the ECEP and DRTPC offices at Cairo University. The office flat provides ample space for visiting consultants and meetings with implementing agencies. It contains four individual offices, three multi-desk offices, two small administrative offices, two secretarial areas, one conference room, a supply/copy room, and a kitchen. The office is equipped with the latest electronic equipment to provide rapid communication and data transfer links to USAID/Egypt, USAID/Washington, EP3/Washington, and all implementing agencies. The office has telephone, facsimile, E-mail, and Internet access. CD-ROM storage/retrieval, electronic document scanning, color printing, and photocopy machines are available for document publication. The office has two rental project vehicles for official office business and rents larger vans and special transportation vehicles for field work as necessary.

The office staff has grown since the initiation of the Mainstream Activity to support the two other ongoing ECEP/EP3 tasks - 10th of Ramadan Project and the Alexandria Initiative. The office staff (in Cairo and Alexandria) currently consists of an American Program Director (Chief-of-Party), an Egyptian Deputy Program Director, and an Egyptian staff comprised of a senior Environmental Engineer, two environmental engineers, three junior Environmental Engineers, two Office Managers, two Translators, two Administrative Assistants, two Secretaries, two driver/expeditor/messengers, and three office helpers.

Project Workplans

An initial workplan was written in August-September 1994 to describe activity planned for the first 6-months of the program. The workplan addressed approaches to implementation of activities, schedule, level of effort, and assignment of responsibilities to each implementing agency (Reference 5). The workplan established a consensus on proposed activities through six components.

Component 1 Start-Up Activity - hiring of staff, staff orientation and training on the core EP3 program, and preparation of introductory informational materials,

Component 2 Kick-Off Meeting - development of promotional materials, mailing list, selection of speakers, and follow-up activities,

Component 3 Industry/Urban Profile and Initial Assessment Training Activity - contract for completion of an industry profile, selection of candidate facilities for assessment training, and conduct of assessment training,

Component 4 Initial Industry Assessments - select enterprises, negotiate agreements, gather preliminary information, conduct assessments, conduct follow-up, set-up technology demonstrations,

Component 5 Training and Outreach - identify and design specific initiatives, identify and participate in conferences; and

Component 6 Clearinghouse - develop an agreement, produce a strategy, provide training and start-up support

In March 1995, a second workplan was written to cover activities for an 18-month period from February 1995 through September 1996 (Reference 6). Activities were grouped under three major components which subsequently became the standard division for reporting on project status, i.e., Technical Assistance to Industry, Training and Promotion, and Outreach (Information Dissemination):

Component 1 Technical Assistance to Industry - follow-up for "Round 1" assessments, screening for "Round 2" assessments, pre-assessment for Round 2 facilities, Round 2 assessments, selection/evaluation of technology demonstration options, and monitoring/evaluation of installed equipment

Component 2 Training and Promotion - training for ECEP/EP3 Cairo office staff and implementing agencies, development and delivery of training in 1995, and development of training program for 1996

Component 3 Outreach (Information Dissemination) - preparation of case studies, publication of newsletters, solicitation of industry requests for information, and establishment of a pollution prevention library and information network.

A third workplan was written in August 1996 to cover the period through February 1997. At the time, this was the expected end date for the Mainstream Activity (Reference 7). This workplan modified and rearranged the ongoing technical tasks in response to the ECEP/EP3 plant assessment experience and the success achieved as measured by the level of implementation at specific Round 1 and Round 2 plants of pollution prevention options. For example during this period, Round 1 and Round 2 assessments (initiated in November 1994 and March 1995 respectively and designated as Pollution Prevention Diagnostic Assessments - PPDAs) were conducted at 26 plants. These PPDAs recommended about 260 cleaner production/pollution prevention and energy conservation options. Some of the low-cost/no-cost options were implemented while other plants incorporated them into upcoming annual maintenance plans. Many were not implemented at the plants. As a result of this experience,

it became necessary to revise the technical assistance and implementation approach to reflect approved funding levels and a change to consider funding "medium-cost" projects in a limited number of selected plants. An implementation concept was developed to select 5 or 6 plants for participation in an "industrial circle" that focused on one replicable sophisticated technology for each industrial sector, such as dye recovery, zinc cyanide substitution, etc. The revised technical assistance was implemented in four main tasks

Task 1 Implementation Follow-Up - selection of most promising private and public sector plant options, development and execution of a follow-up plan, formation of industrial circles, and implementation of circle activity.

Task 2 Medium-Cost Options Implementation - finalize requisition/specifications documents, arrange for equipment vendors, procurement and installation of equipment, and assess results of implementation

Task 3 Procurement of Monitoring Equipment for ECEP/EP3 - prepare proposals, issue tender documents, evaluate bids, and procure equipment

Task 4 Cleaner Production Monitoring Program - prepare a monitoring program proposal, issues tenders for procurement, procure monitoring instruments, and initiate the monitoring program

Specific accomplishments of the organizational approach described in these workplans are described below in Section IV B - Technical Assistance, Section IV C - Training and Promotion, and Section IV D - Outreach

IV.B Technical Assistance

The Statement of Work for Mainstream Activities calls for two specific activities related to the delivery of technical assistance

- Providing a broad range of technical assistance, training, demonstration and information services for environmental awareness and pollution prevention at the plant, industry category, and country levels
- Strengthening and expanding in-country sources of technical expertise for pollution prevention, including establishing national programs of pollution prevention training, information, and technical assistance

Activities carried out in connection with the Mainstream Delivery Order #4 were designed to improve Egypt's technical capability and know-how in pollution prevention at the plant level as well as building capacity through ECEP/EP3-Egypt staff training. This section is aimed at presenting the accomplishments of the project through direct delivery of technical assistance

in pollution prevention assessment and in following up with the implementation plans at the facility level. The training component of technical assistance is addressed later in this report.

IV.B.1 Approach to the Delivery of Technical Assistance to Facilities

The overall approach implemented in Delivery Order #4 was to work directly with selected facilities in identifying pollution-causing processes and in assisting the facility in taking measures to mitigate the problem. This approach would put the ECEP/EP3-Egypt local staff and US consultants/experts in direct contact with the facility staff and working together on a problem of importance and interest to the facility. This mechanism facilitated free flow of technical knowledge and assistance. Supported by a well coordinated training and promotion program outside the facility, this method of delivery of technical assistance was considered appropriate for achieving the objectives of project.

Four major processes were developed for the technical assistance component. Completion of these processes results in a Pollution Prevention Diagnostic Analysis (PPDA) document delivered to the facility for consideration and implementation. Roles and responsibilities of each participant during the completion of these processes were defined as follows:

Implementing Agency Executive Director - approves selection of facilities, makes official contact, and designates a Facility Project Manager.

Facility Project Manager - responsible for coordinating all activity at a specific facility throughout the entire ECEP/EP3-Egypt assessment process, responsible for incorporating quality assurance/quality control for the assessment process.

ECEP/EP3-Egypt Office - provides technical support to Implementing Agency staff, maintains project files and provides copies to TIMS and DRTPC as appropriate, conducts quality assurance/quality control (QA/QC) reviews of assessment process and reports, provides link to EP3/Washington to obtain additional support as required.

ECEP/EP3-Egypt Assessment Team - comprised of at least one representative from an Implementing Agency (TIMS or DRTPC), one or more U.S. experts, and a representative from the ECEP/EP3-Egypt office. The Facility Project Manager coordinates the team's activity in the field. The U.S. expert drafts the report and incorporates inputs from all team members. The Facility Project Manager finalizes the report before it is submitted to the facility.

EP3/Washington - supports ECEP/EP3-Egypt office by providing technical experts, develops training materials, reviews of ECEP/EP3-Egypt PPDA documents, and provides specialized consulting expertise as necessary to support medium-cost technology demonstrations at selected facilities.

IV.B.2 The Pollution Prevention Assessment Process

The facility assessment for pollution prevention opportunities was carried out through a series of sequential and logical processes. These processes utilized the US experts, both generalists and specialists, together with the Egyptian experts provided through the implementing agencies and the ECEP/EP3-Egypt technical staff. The assessment processes are described below.

Facility Pre-Screening and Screening

The purpose of facility screening is to select the best candidate for pollution prevention from among high priority industrial sectors and geographic areas. The screening is accomplished by the ECEP/EP3-Egypt Assessment Team. Candidate facilities are recommended for further consideration of implementation of pollution prevention options based on the following criteria: (a) the facility profile is representative of the number and type in the specific industry sector, (b) sufficient information is available to characterize the size and type of industry, (c) top-level management support is evident, (d) sufficient data are available to determine potentially feasible pollution prevention options, (e) willingness to implement options is apparent, (f) transferability of options to other sectors is apparent, and (g) the facility type and industrial sector are important for economic growth and industrialization in Egypt. Tasks to accomplish this process are:

Prepare an Industrial Profile - collect information on names of urban and industrial enterprises which are known/suspected polluters, potential environmental and/or health risks, type and quantity of emissions and wastes generated, and importance of economic and pollution prevention.

Select Sectors/Geographic Area - select most promising from the standpoint of pollution prevention potential, economic growth of sector, and potential for transfer of pollution prevention opportunities to other sectors.

Select Facilities to Visit - based on number of employees and level of production, number of toxic metals, hazardous chemicals, air emissions, regulatory compliance status, size of other plants in the industry; environmental impacts, financial status, visibility within trade associations, and potential benefits of applying pollution prevention techniques.

Conduct Screening Visit - a one-half to one-day visit to determine the facility's capability to implement options, identify obstacles to implementation, determine what process and material usage data may be available, and determine the commitment and availability of personnel to participate in the pollution prevention process.

Select Subset for Pre-Assessment - based on commitment of management to participate, availability of process and material usage data, availability of potentially implementable pollution prevention options, capability to implement the options, and the potential economic and environmental benefit associated with the options.

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Facility Pre-Assessment

This process is conducted by the Implementing Agency (TIMS or DRTPC) under the direction of the Facility Project Manager. ECEP/EP3-Egypt (a) provides data collection guidance, (b) is available to assist with data collection and synthesis if required, and (c) reviews data gathered prior to submission of the results to EP3/Washington for U.S. expert consultant selection. FEI is responsible for the associated facility manager workshops, including preparation of an agenda and all logistics.

Criteria for selection of a facility are:

- 1 The selected facility has a high probability for technically feasible and economically beneficial pollution prevention options
- 2 A letter of commitment is signed by plant management
- 3 The potential to transfer options to other industrial sectors is evident
- 4 Management understands pollution prevention concepts
- 5 Pre-assessment steps are prioritized and clearly defined
- 6 There is continuity of personnel and information between the initial screening visit and the pre-assessment visit
- 7 Sufficient data exist for selection of appropriate U.S. expert support for the assessment phase
- 8 The facility understands the schedule, purpose and content of the assessment
- 9 Appropriate facility personnel will be available to participate during the assessment

Tasks to accomplish in the pre-assessment process are:

- 1 Send Notice of Selection - plant management is notified of selection for the pollution prevention project
- 2 Conduct Data Gathering/Pre-Assessment Visit - the Facility Project Manager prepares a checklist to collect information on overall process descriptions, equipment maintenance and age, housekeeping and operational practices, material handling practices, basic material and process flow data, lists of chemicals used, input material usage, and waste generation.
- 3 Workshop for Plant managers - arranged by FEI during the data collection phase to inform facility managers about the pollution prevention process, explain potential opportunities and benefits, explain the steps in the assessment project, and impress upon them the need for plant commitment to pollution prevention implementation
- 4 Sign Letter of Intent - upon completion of the workshop and data collection phase, the plant manager must sign a letter of intent indicating that the plant is fully committed to the pollution prevention process
- 5 Submit Pre-Assessment Results - results are submitted to ECEP/EP3-Egypt so that an appropriate U.S. process expert(s) may be selected for the full assessment

Facility Full Assessment

The full assessment of a facility for pollution prevention involves a thorough review of the facility operations and processes in order to identify and prioritize specific pollution prevention options. The assessment process also includes an evaluation of the technical and economic feasibility of the pollution prevention opportunities and options identified. A technical report entitled Pollution Prevention Diagnostics Analysis (PPDA) is prepared by the evaluation team, is reviewed by the appropriate organizations, and is delivered to the facility.

Assessments are conducted under the following conditions

- 1 U S experts are adequately briefed by EP3/Washington
- 2 Plant management understands the goals and objectives and reconfirms the commitment to cooperate and participate
- 3 The assessment team has a good overview of facility data, understands which processes have the greatest environmental potential, and develops a plan to focus on the most important options
- 4 A material and energy balance is completed
- 5 A team consensus is reached that all available pollution prevention options have been identified
- 6 Appropriate QA/QC procedures have been instituted to ensure accuracy of the economic and technical analyses
- 7 The report is comprehensive with regard to the work statement
- 8 Recommendations on how to implement the options are clearly identified
- 9 Plant manager feedback is requested, documented and incorporated in the final assessment report
- 10 All major elements of the assessment process and recommendations are addressed
- 11 FEI is briefed on the results and conclusions of the final report

Tasks to accomplish in the PPDA process are

- 1 Select Assessment Team - EP3/Washington selects a qualified U S expert(s) based on the pre-assessment results
- 2 Hold U S and In-Egypt Briefings for the Assessment Team - EP3/Washington briefs U S -based team member(s) prior to travel to Egypt. A second briefing is held in Egypt to review roles, responsibilities, planned activities and schedule for the assessment
- 3 Meet With Plant Management/Owner - prior to the plant visit, the Facility Project Manager meets with the facility management/owner to review objectives, introduce team members, confirm data availability, and discuss management's objectives, concerns or issues for the assessment
- 4 Conduct Facility Walkthrough/Operations Review - review the entire operation of the facility and observe the processes identified in the pre-assessment for analysis during the assessment.

- 5 Review and Obtain Detailed Information - review pre-assessment data and obtain additional information as required to complete a process flow diagram, a material balance, energy and water consumption, waste quantities generated by type, and cost information.
- 6 Identify All Potential Pollution Prevention Opportunities - identify operations that have the highest pollution prevention potential and brainstorm opportunities for further analysis. Particular emphasis is placed on identifying medium cost (up to US\$250,000) pollution prevention technology demonstration projects
- 7 Conduct Economic/Technical Analysis and Prioritize Options - focus on options with the greatest potential for successful implementation and identify process changes and actions needed to implement them, and determine equipment capital costs and payback periods. Also, evaluate the effects of pollution prevention options on the need for improved treatment systems. Conduct daily team meeting to review progress and identify additional data needs
- 8 Draft Report and Recommendations - the U.S. expert(s) will prepare the draft PPDA report and be responsible for incorporation of team member input. The report summarizes all recommendations and identifies opportunities for medium-cost demonstration projects
- 9 Brief Plant Management/Owners and Implementing Agency Executive Directors and Submit Draft PPDA Report - the Facility Project Manager, supported by the U.S. expert(s) and ECEP/EP3-Egypt staff, presents this briefing on assessment results
- 10 Address Comments and Finalize PPDA Report - the Facility Project Manager and the responsible ECEP/EP3 staff person review and evaluate all comments on the draft report and incorporate valid inputs into the final report for submission to the Implementing Agency Executive Director, the facility management, EP3/Washington and FEI
- 11 Prepare Case Study - FEI prepares a case study, based on the final report, which contains a brief synopsis of the facility operation and a summary of pollution prevention findings and recommendations to serve as an outreach tool (with the approval of the facility management)

Implementation and Follow Up

This process implements no-, low-, and medium-cost pollution prevention options recommended in the PPDA report through the following tasks

- 1 Develop Implementation Plan and Schedule - define steps required by the facility to fully implement an agreed to set of options. The plan defines specific methods to measure progress. The schedule includes follow-up activity by TIMS/DRTPC and support from ECEP/EP3 as required
- 2 Prepare Implementation Agreement/Sign Agreement - the Facility Project Manager prepares an agreement which includes the implementation plan and schedule. The facility manager/owner and the Implementing Agency Executive Director sign the agreement as a commitment to carry out implementation of the designed options
- 3 Monitor/Track Progress for Six to Nine Months - progress is tracked by designated facility personnel with the assistance of TIMS/DRTPC and ECEP/EP3. For 6 to 9 months, monthly reports are prepared and submitted to the Implementing Agency

- 5 Review and Obtain Detailed Information - review pre-assessment data and obtain additional information as required to complete a process flow diagram, a material balance, energy and water consumption, waste quantities generated by type, and cost information.
- 6 Identify All Potential Pollution Prevention Opportunities - identify operations that have the highest pollution prevention potential and brainstorm opportunities for further analysis. Particular emphasis is placed on identifying medium cost (up to US\$250,000) pollution prevention technology demonstration projects
- 7 Conduct Economic/Technical Analysis and Prioritize Options - focus on options with the greatest potential for successful implementation and identify process changes and actions needed to implement them, and determine equipment capital costs and payback periods. Also, evaluate the effects of pollution prevention options on the need for improved treatment systems. Conduct daily team meeting to review progress and identify additional data needs.
- 8 Draft Report and Recommendations - the U.S. expert(s) will prepare the draft PPDA report and be responsible for incorporation of team member input. The report summarizes all recommendations and identifies opportunities for medium-cost demonstration projects
- 9 Brief Plant Management/Owners and Implementing Agency Executive Directors and Submit Draft PPDA Report - the Facility Project Manager, supported by the U.S. expert(s) and ECEP/EP3-Egypt staff, presents this briefing on assessment results
- 10 Address Comments and Finalize PPDA Report - the Facility Project Manager and the responsible ECEP/EP3 staff person review and evaluate all comments on the draft report and incorporate valid inputs into the final report for submission to the Implementing Agency Executive Director, the facility management, EP3/Washington and FEI
- 11 Prepare Case Study - FEI prepares a case study, based on the final report, which contains a brief synopsis of the facility operation and a summary of pollution prevention findings and recommendations to serve as an outreach tool (with the approval of the facility management)

Implementation and Follow Up

This process implements no-, low-, and medium-cost pollution prevention options recommended in the PPDA report through the following tasks.

- 1 Develop Implementation Plan and Schedule - define steps required by the facility to fully implement an agreed to set of options. The plan defines specific methods to measure progress. The schedule includes follow-up activity by TIMS/DRTPC and support from ECEP/EP3 as required.
- 2 Prepare Implementation Agreement/Sign Agreement - the Facility Project Manager prepares an agreement which includes the implementation plan and schedule. The facility manager/owner and the Implementing Agency Executive Director sign the agreement as a commitment to carry out implementation of the designed options.
- 3 Monitor/Track Progress for Six to Nine Months - progress is tracked by designated facility personnel with the assistance of TIMS/DRTPC and ECEP/EP3. For 6 to 9 months, monthly reports are prepared and submitted to the Implementing Agency

Executive Directors and ECEP/EP3. After this time, the plant management is responsible for sustained implementation and associated monitoring. The Facility Project manager may help plant management identify vendors or equipment, train staff, measure process inputs and outputs, evaluate effectiveness, and research answers to issues and problems

- 4 Evaluate and Pursue Medium-Cost Demonstration Projects - medium-cost pollution prevention options are identified early in the assessment process. Detailed technical and economic feasibility studies are completed by the implementing agency with ECEP/EP3 support. EP3/Washington accesses additional specialized experts to provide technical assistance and help with vendor and equipment selection, guidance for performance specifications, feasibility study review, etc. as required.

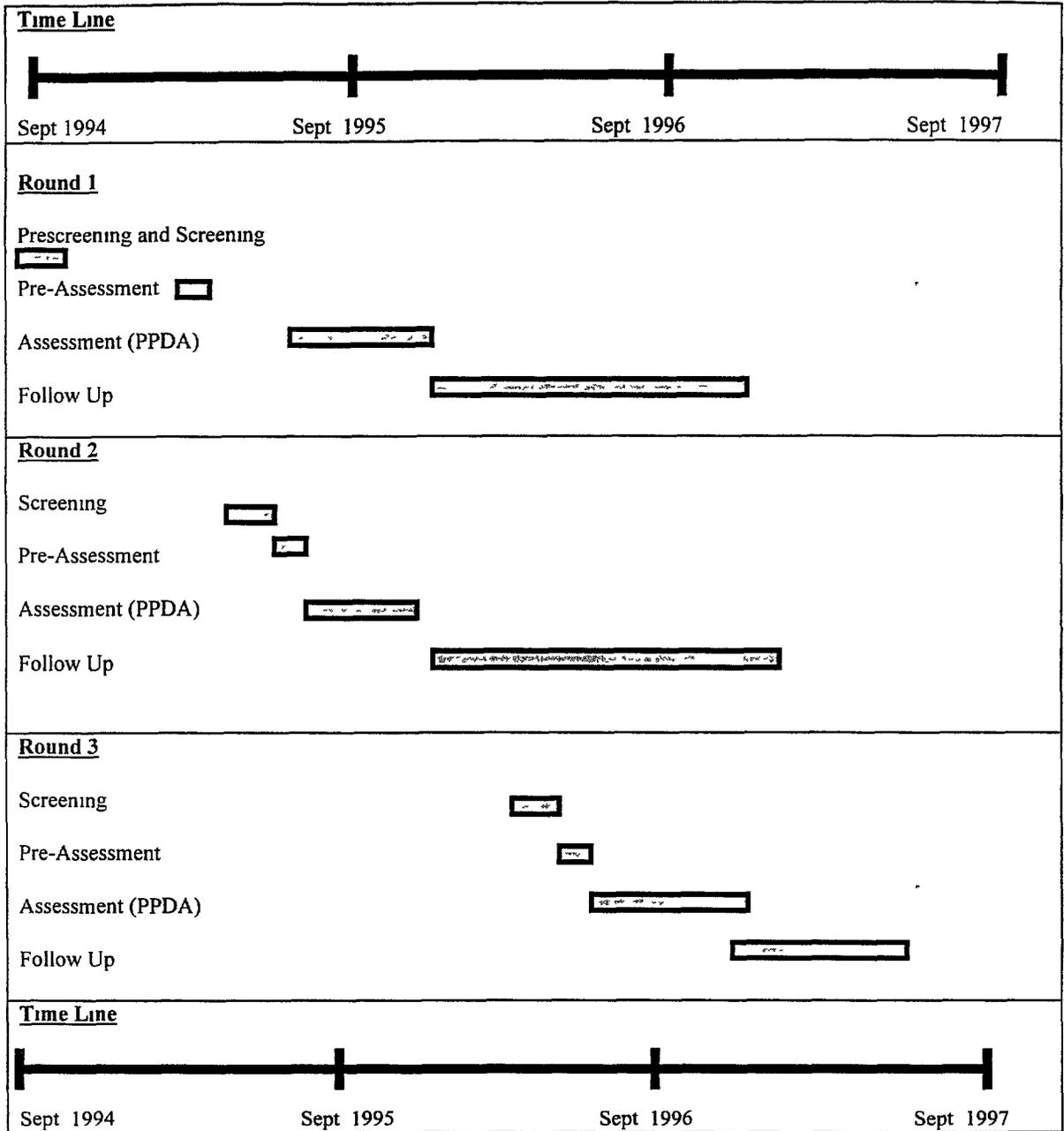
Implementation of the medium-cost pollution prevention options and opportunities identified in the PPDA report is conducted under the following conditions:

- 1 The plant manager clearly understands and signs the implementation agreement, and is committed to carrying out the process
- 2 A plan is developed to measure progress
- 3 Procedures and communication channels are available for adjustment of the plan if required
- 4 Remedial measures are prepared if the schedule is not being met or ample progress is not made
- 5 A tracking system for cost savings and environmental benefits is established, understood by all parties, and used.

IV.B.3 Assessment Activity Rounds

The pollution prevention activities were carried out in three separate rounds over the course of the project. This was, in part, by necessity and, in part, by design. The Mainstream Delivery Order #4 was the first in the sequence of three for the ECEP/EP3-Egypt office. This necessitated initiation of the delivery of technical assistance to the facilities in a manner consistent with the project's ability to initiate and successfully complete the work in each round. The three-round approach was also designed to allow the lessons learned from one round to be applied to the next round, thereby improving the process continuously. Activity duration for each round of the assessment work is depicted in the Table VI 1.

Table VI.1. Time Line of Assessment Activity Rounds



IV.B.4 Details of Pollution Prevention Assessments

The Pollution Prevention Diagnostic Assessment (PPDA) reports are the major tangible output of the assessment activities. The process started with reviewing a large number of facilities and ended with 32 assessments reasonably evenly distributed among the industrial sectors and private/public facilities. The Screening/Pre-assessment breakdown is shown below

Number of Facility Profiles Reviewed:	637
Number of Facilities selected after Screening.	96
Number of Facilities selected after Pre-Assessment.	34
Number of Assessments (PPDA) Reports Completed:	32

Listing of facilities for which full assessment was conducted is given in Table IV.2

Table IV.3 shows a numerical summary of pollution prevention options identified through the PPDA process. The number of options are summarized by sector and are broken down by both focus (i.e., water, air, industrial process) and by cost bracket (i.e., no cost, low cost, medium cost, high cost, and cost not determined). The subsequent tables of option costs and savings are keyed from this table in terms of focus and cost bracket.

Table IV.4 shows the summary estimated capital cost and actual cost (after implementation) of the options identified through the assessment process. The capital cost of each option was estimated by the members of the assessment teams, including input from the US consultants/experts. These estimates are based on preliminary data obtained from readily available sources and/or the experience of the individual(s) performing the assessment. These figures should be considered only a rough estimate. It should be emphasized that the capital cost figures are only the initial cost of implementing the particular option and those requiring specialized imported hardware do not reflect the transportation, duties, and other related procurement costs. Nor do the cost figures reflect the annual operating and maintenance costs. The actual implementation cost figures were provided by the facility staff. These figures have not been independently verified.

Table IV.5 shows the summary estimated annual savings and actual annual savings (after implementation) of the options identified through the assessment process. The annual savings are estimated by the assessment team based on the estimated initial cost and are subject to the same assumptions as the initial cost estimates. The actual savings figures are provided by the facility staff and have not been independently verified.

Naturally, a facility would be more committed to implementing the no cost or low cost options than it would the medium to high cost options. This is reflected in the final statistics of the options implemented as a result of the Mainstream Delivery Order. There are a few exceptions where the staff provided technical assistance in developing and/or reviewing

specifications for particular hardware or process change/modification. Some of the success stories are recounted in the later chapters of this report

Table IV.2. Listing of Facilities for which Pollution Prevention Assessment is Performed

Facility Name	Abbreviation	Zone	Sub Zone	Sector	Sub Sector	Ownership
Arab Ceramics Company	ARACEMCO	Shoubra El-Khema	Abou Zabal	Building & Construction	Clay Products	Private
Egyptian Company for Refractories	ECR	Helwan	Helwan	Building & Construction	Clay Products, Insulating Bricks	Public
International Company for Stone Ware Pipes and Ceramics	CIPAC	East Cairo	El-Katamia	Building & Construction	Clay Products	Private
El-Nasr Company for Rubber Products	NARUBIN	West Nile, Giza	Giza	Chemical	Rubber Tyres	Public
Nile Company for Oil & Detergents		Shoubra El-khema	Behtim	Chemical	Oil & Soap	Public
Egyptian Sponge Company	Misr Foam	6th of October City	Industrial Zo	Chemicals	Sponge	
El-Nasr Company for Television		Helwan	El-Madi	Engineering	Electrical Goods	Public
Cairo Company for Oil & Soap		West Nile, Giza	El-Badrashme	Food and Beverage	Edible Oils	Public
Egyptian Starch, Yeast & Detergents Company - Yeast Factory		South Alex.	Moharem Bey	Food and Beverage	Yeast	Public
Egyptian Starch, Yeast & Detergents Company - Starch & Glucose Factory		East Alex	El-Seyouf	Food and Beverage	Starch	Public
Starch & Glucose Company		Helwan	Turah	Food and Beverage	Starch & Glucose	Public
El-Rashidi El-Mizan Sweets Factory		6th of October City	A2 Zone	Food and Beverage	Teheena and Halawa	Private
National Company for Maize Products		10th of Ramadan City	A1 Zone	Food and Beverage	Glucose, Animal Food	Private
Sugar & Integrated Industries Company (Sugar Refinery)		West Nile, Giza	Giza	Food and Beverage	Sugar	Public
Source PPDA Reports						

**Table IV.2. Listing of Facilities for which Pollution Prevention Assessment is Performed
(Cont.)**

Facility Name	Abbreviation	Zone	Sub Zone	Sector	Sub Sector	Ownership
Arab Aluminum Company	AAC	Ismalia	Industrial Zone	Metal Processing	Non-Ferrous, Electroplating, Painting	Private
STEELCO		Helwan	A in Helwan	Metal processing	Ferrous, Galvanization	Public
Alexandria for Metal Products	AMP	Central Alex	Moharem Bey	Metal Processing	Ferrous, Enamelling, Painting	Public
Amerya Metal Company	AMC	Amerya, Alex	Merghim	Metal Processing	Ferrous, Non-Ferrous, Mechanical Finishing	Private
Delta Industrial Company	IDEAL	North Cairo	Shoubra	Metal Processing	Ferrous & Painting	Public
EL-Nasr Steel Pipes and Fittings Company		Helwan	A in-Helwan	Metal Processing	Ferrous, Non-Ferrous, Galvanization	Public
GMC		6th of October City	Industrial Zone	Metal Processing	Ferrous, Electroplating, Painting	Private
International Air Conditioning Company	PHILCO	10th of Ramadan City	A1 Zone	Metal Processing	Ferrous, Non-Ferrous, Electroplating	Private
International Company for Steel	INCO STEEL	West Nile, Giza	Cairo - Alex Desert Road	Metal Processing	Ferrous, Galvanization	Private
Light Transport Manufacturing Company	ELTRAMCO	West Nile, Giza	Cairo - Alex Desert Road	Metal Processing	Ferrous, Electroplating	Public
Modern Office and House Metal Furniture Company	MOHM	Shoubra El-Khema	El-Khanka	Metal Processing	Ferrous, Electroplating, Painting	Private
Source PPDA Reports						

**Table IV.2. Listing of Facilities for which Pollution Prevention Assessment is Performed
(Cont.)**

Facility Name	Abbreviation	Zone	Sub Zone	Sector	Sub Sector	Ownership
Arab American Vehicle Company	AAV	East Cairo	Cairo-Suez Desert Road	Metal Processing	Ferrous, Electroplating, Painting	Private
Middle East Paper Company	SIMO	Shoubra El-Khema	Behtim	Pulp & Paper Products	Paper Making	Public
Bishara Textiles Manufacturing Co	BTM	10th of Ramadan City	B2 Zone	Textile	Cotton, Finishing	Private
Cairo Company for Silk Textile		Shoubra El-Khema	Shoubra El-Khema	Textile	Cotton, Blend, Spinning, Weaving	Public
El-Nasr Company for Wool and Selected Textile	STIA	East Alex	Smouha	Textile	Cotton, Wool, Synthetic	Public
KAZAREEN Company, Ltd		6th of October City	Industrial Zo	Textile	Cotton, Dyeing Knitting	Private
The United and Arab Spinning and Weaving	UNIRAB	East Alex	El-Seyouf	Textile	Spinning, Weaving, Dying/Printing	Public
Source PPDA Reports						

Table IV.3. Number of Pollution Prevention Options by Industrial Sector

Sector	No. of Proposed Options				No. of Implemented Options			
	Water	Air	Process	Total	Water	Air	Process	Total
Textile								
No Cost	8	10	10	28	6	9	2	17
Low Cost	6	5	5	16		2	1	3
Medium Cost	6	1	3	10	1			1
High Cost			2	2				
Not Determined		3		3		2		2
Metal Finishing								
No Cost	21		17	38	7		1	8
Low Cost	5	1	21	27	1		4	5
Medium Cost	9		16	25			1	1
High Cost			3	3			1	1
Not Determined	2	2	8	12			2	2
Food								
No Cost	3	1	3	7				
Low Cost	11	6	8	25		4		4
Medium Cost	10	3	15	28				
High Cost	3	1	5	9				
Not Determined			1	1				
Others								
No Cost	2	1	1	4				
Low Cost	1	2	6	9				
Medium Cost	1	2	1	4				
High Cost	2	1	2	5				
Not Determined	2		7	9				
TOTAL	92	39	134	265	15	17	12	44

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Table IV.4. Capital Cost of Pollution Prevention Options by Industrial Sector

All figures are in Egyptian Pounds (LE)

Sector	Est. Cost of Proposed Options ¹				Actual Cost of Implemented Options ²			
	Water	Air	Process	Total	Water	Air	Process	Total
Textile								
No Cost	16,100	10,750	6,400	33,250	7,400	5,400	34,800	47,600
Low Cost	180,000	99,250	165,300	444,550		12,200	2,780	14,980
Medium Cost	621,000	240,000	647,000	1,508,000				
High Cost			1,862,700	1,862,700				
Not Determined								
Metal Finishing								
No Cost	30,500		20,200	50,700	2,000		27,000	29,000
Low Cost	83,000	20,000	437,760	540,760	4,700			4,700
Medium Cost	1,443,000		2,942,500	4,385,500			60,000	60,000
High Cost			1,765,000	1,765,000			50,000	50,000
Not Determined							50,000	50,000
Food								
No Cost	5,400	3,000	4,000	12,400				
Low Cost	174,100	143,000	292,000	609,100		163,300		163,300
Medium Cost	1,225,000	345,000	3,806,000	5,376,000				
High Cost	4,228,000	4,661,400	6,146,000	15,035,400				
Not Determined								
Others								
No Cost	1,700	1,000	500	3,200				
Low Cost	10,000	55,000	186,000	251,000				
Medium Cost	160,000	157,000		317,000				
High Cost	1,435,000	1,200,000	1,430,000	4,065,000				
Not Determined								
TOTAL	9,612,800	6,935,400	19,711,360	36,259,560	14,100	180,900	224,580	419,580
¹ Developed by the Pollution Prevention Assessment Team								
² Provided by the facility staff								

Table IV.5. Annual Savings of Pollution Prevention Options by Industrial Sector

All Figures are in Egyptian Pounds (LE)

Sector	Est. Savings of Proposed Options ¹				Actual Savings of Implemented Options ²			
	Water	Air	Process	Total	Water	Air	Process	Total
Textile								
No Cost	319,628	283,030	126,117	728,775	136,647	376,220	150,000	662,867
Low Cost	537,740	378,750	191,956	1,108,446		343,080	77,300	420,380
Medium Cost	832,700	186,000	759,020	1,777,720	615,850			615,850
High Cost			943,210	943,210				
Not Determined						70,264		70,264
Metal Finishing								
No Cost	116,260		625,164	741,424	31,760		60,000	91,760
Low Cost	43,101	9,600	817,775	870,476	4,700		18,500	23,200
Medium Cost	1,013,000		5,417,764	6,430,764			400,000	400,000
High Cost			1,552,000	1,552,000			2,800,000	2,800,000
Not Determined	302,000	64,000	778,280	1,144,280			188,200	188,200
Food								
No Cost	50,000	225,000	77,000	352,000				
Low Cost	206,660	303,900	779,600	1,290,160		344,000		344,000
Medium Cost	569,040	844,000	4,504,000	5,917,040				
High Cost	1,266,000	1,837,200	1,284,000	4,387,200				
Not Determined								
Others								
No Cost	27,000	5,400	390,000	422,400				
Low Cost		276,000	1,220,000	1,496,000				
Medium Cost	700,000	1,807,000	325,000	2,832,000				
High Cost	2,093,500	1,900,000	1,140,000	5,133,500				
Not Determined	2,090,000		2,989,000	5,079,000				
TOTAL	10,166,629	8,119,880	23,919,886	42,206,395	788,957	1,133,564	3,694,000	5,616,521
¹ Developed by the Pollution Prevention Assessment Team								
² Provided by the facility staff								

Due to the short duration of the project, opportunity has not been available to carry out full follow up through measurements and impact assessment analysis for each option implemented. Many facilities lack monitoring and measurement instrumentation and are unable to quantify the impact of implementing pollution prevention options or even report on improvement on environmental compliance. Effort is being made to address this serious shortcoming by making available instrumentation for monitoring and measurement

IV.B.5 Technical Assistance Delivered by US Consultants/Experts

The ECEP/EP3-Egypt monthly and annual progress reports document some 36 US consultants/experts having participated in the three Delivery Orders. Figure IV 1 shows the level of US consultants/experts activity in the course of the three Delivery Orders. As many as 24 different US consultants/experts delivered technical assistance as a part of the Mainstream Delivery Order between January 1995 to January 1996 while this Delivery Order was the only one of the three in effect. Duration of in-country service by consultants/experts varies from one week to four weeks per trip with a few longer assignments

The relatively high level of consultants/experts presence during the first five quarters of the project coincides with the kick-off and extensive initial activities related to Rounds 1 and 2 pollution prevention assessment work. Many consultants with diverse pollution prevention background, both generalists and process specialists, were required to assist with the assessment work being done in as many as 5 different industrial sectors. With a few exceptions, the individual consultants/experts carried out only one short term assignment. They did not necessarily participate in the assessment process from the start to the end. This lack of continuity contributed to a rather wide variability in the quality, content, and format of the assessment work, the analysis, and eventually the PPDA reports

IV.B.6 Success Stories

A number of success stories have been told over the course of the project. A success story is considered one where measurable pollution prevention has occurred as a direct result the project's technical assistance or pollution prevention assessment process. These stories are generally discovered at the follow up phase of the technical assistance delivery process, after the implementation phase. A selected number of the success stories at various industrial sectors are recounted below. The specific facility names are not give in the description below. The specific details of the stories given below, as well as other stories can be found in the project files and the monthly/annual progress reports

Textile Sector

- A facility started implementing some of the no cost and low cost options immediately after the on-site assessment was completed. This resulted in an annual savings of L.E 73,000 and an 84% reduction in water use

Metal Finishing

- A galvanizing plant invested L E. 151,000 in implementing most of the pollution prevention options and showed an estimated annual savings of L E. 273,000.

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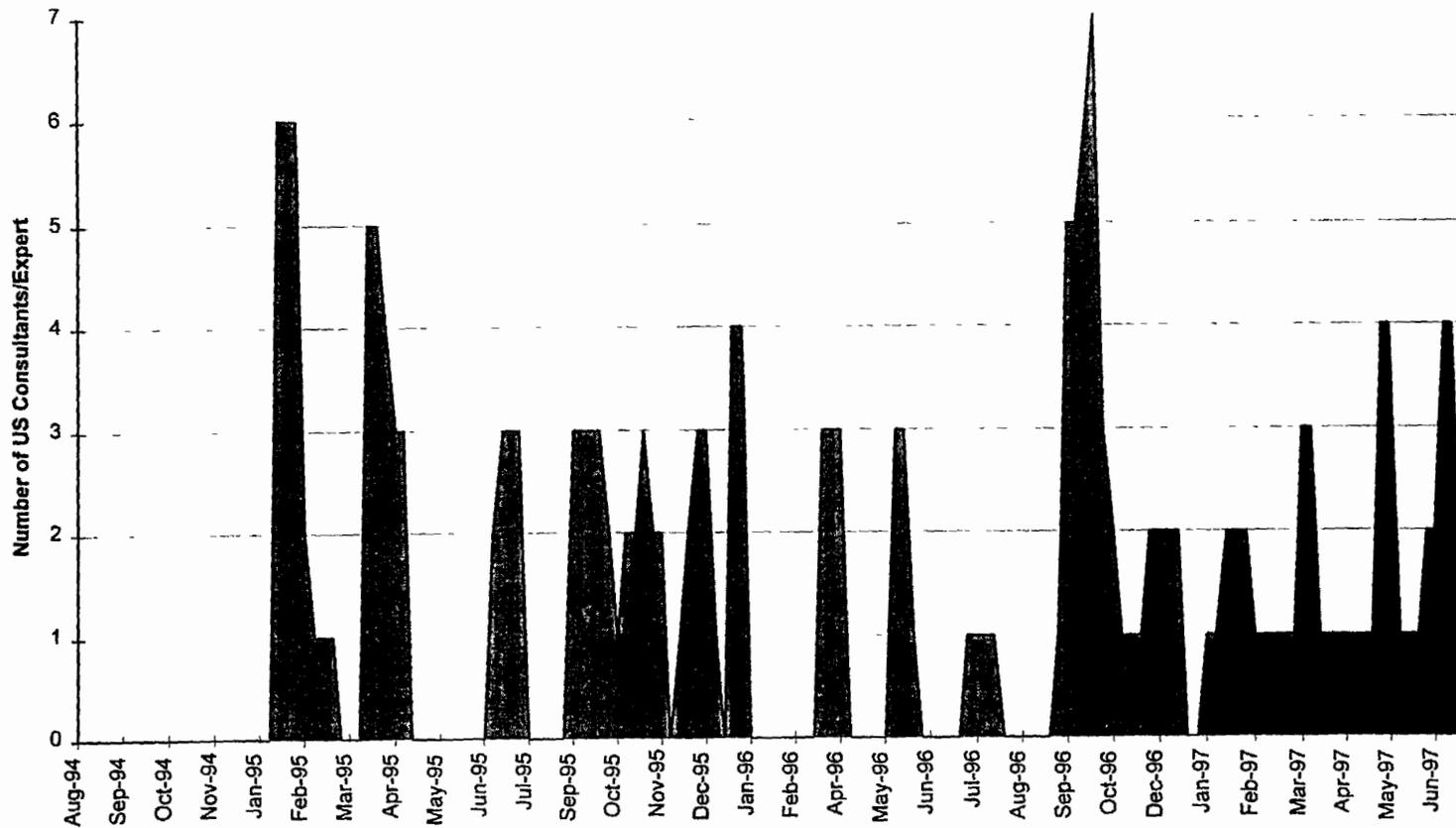


Figure IV.1 Presence Level of US Consultants/Experts

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- A metal finishing plant began the procurement process, utilizing internal funds, to acquire a new electroplating line. This is an application of a capital intensive option

Chemical

- A facility manager in Alexandra substituted an oil-based cleaner by a more environmentally friendly detergent using the concepts and approaches presented at an ECEP/EP3-Egypt workshop

Food

- A sugar refinery plant implemented some of the low cost pollution prevention options for a total cost of L E 72,100 Total estimated annual savings is L.E 273,000

Other

- An auto assembly plant included a \$500,000 investment in its 1995-1996 annual budge to implement three medium cost pollution prevention options

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IV.C TRAINING AND PROMOTION

Training and promotion of pollution prevention were recognized as key elements of the program, from the initial project design through the implementation phases. Training and promotion were utilized to reach the project objectives.

IV.C.1 Training

The training element comprised the following pollution prevention activities.

- Training courses for industrialists and professionals at large
- Training courses for specific industrial sectors.
- Training courses for the ECEP/EP3-Egypt and the implementing agencies (DRTPC, TIMS, and FEI) staff.
- Overseas training and study tours for ECEP/EP3-Egypt and implementing agencies (DRTPC, TIMS, and FEI) senior staff as well selected industrial managers

IV.C.2 Approach to Delivery of Training

The training function involved the ECEP/EP3-Egypt office, the Implementing Agencies and OBI. An assessment was made of what was needed to create awareness for pollution prevention practices in general as well as the skills and capabilities needed to implement the expected pollution prevention options in industrial firms as identified by the PPDAs. The interaction with industry through the various stages of industrial auditing starting from screening to options implementation was a valuable resource which helped focus the training needs.

Based on the needs assessments, outlines of the industry training courses were developed, predominantly TIMS and DRTPC, in consultation with EP3/Washington and based on the EP3 Global project manuals.

An annual training program was prepared and the in-country training courses and seminars were advertised in leaflets containing dates, titles, and duration of each course. Pamphlets containing the agenda of the promotional seminars and conferences were mailed to potential industrial beneficiaries and the targeted groups. All printing, advertising, and mailing of the training program the responsibility of FEI.

The general outlines of the course recommended that the number of participants be limited to about 40 in order to allow maximum interaction among participants and the course instructors. The number of attendees from each company was limited to two to ensure widespread knowledge among different companies. For these courses, printed materials were distributed to guide participants through the technical contents.

The training courses for ECEP/EP3-EGYPT and the implementing agents (DRTPC, TIMS, FEI) staff were designed within ECEP/EP3-Egypt and the Implementing Agencies to promote specific concepts and /or to acquire / enhance specific skills. These courses were run by consultants and senior staff from ECEP/EP3-Egypt and Implementing Agencies. The overseas training and study tours for ECEP/EP3-Egypt and the implementing agencies staff were designed by the agencies in collaboration with ECEP/EP3-Egypt and OBI

IV.C.3 Implementation of the Training

Through the program, 42 training courses were advertised to the industry. In 1995, twenty courses were offered, half of them conducted by DRTPC and the other half by TIMS. The 1995 courses marked a transition phase complying with the change of the project from the energy efficiency to the pollution prevention emphasis. This transition phase was necessary to put the project activities in a broader context correlating with previous ECEP activities. These courses covered (1) The general aspects correlating energy efficiency and environmental protection (e.g. Energy Efficiency and Environmental Protection, Opportunities For Business and Financing Energy Efficiency and Environmental Protection, Project and Project Management), (2) General aspects on pollution monitoring and prevention (e.g., Pollution Prevention Concepts and Applications, Environmental Impact Assessment and Environmental Auditing)

The 1996 course plan had 19 training courses where FEI took the responsibility of preparation, logistics and advertisement. Some of the 1995 courses were repeated (e.g. Pollution Prevention Concept and Application was repeated 6 times) while new titles were introduced, some of these were related to the general awareness of Pollution Prevention, (e.g. Accounting To The Financial Benefits From Pollution Prevention, Relevance Of ISO 9000 And ISO 14000, Law 4/94 Compliance Vs Enforcement). Other courses were rather specific to a pollution process or application relevant to Pollution Prevention (e.g. Industrial And Municipal Pretreatment, Waste Management, Implementation and Monitoring)

Each of these training courses was focused around 2-3 days workshops designed to appeal to practicing professionals. The courses were taught at the beginning by ex-patriot experts / a team of consultants aided by a team of Egyptian academics, experts, and members of the ECEP/EP3-Egypt and Implementing Agencies. In later stages, these courses were adopted and taught by the national team. The courses were supported by audio-visual aids (videos / slides / transparencies, etc) and conducted (when taught by the Egyptian team) in the Arabic and English languages. The audiovisual materials were in English, mainly for homogeneity of terminology, while the instructor explained his material and communicated with participants in Arabic.

An evaluation sheet was provided to participants to assess in a semi-quantitative way the various aspects of the course i.e. the course lectures, the course materials, and audiovisual aids used, the services offered to the course, as well as assessing the needs and possibility for adopting P2 policy in the companies. Moreover, participants were supplied with printed

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materials that could serve not only as the basis of a 2-3 day training course, but also as reference for the practicing professional when he/she returns to work. These materials were beneficial according to participants evaluation sheets.

Pollution Prevention courses which were attended by 1987 participants (according to FEI reports) representing various industrial companies and consulting firms, governmental and services agencies. Table IV.C 1 lists the training courses / workshops as well as seminars and conferences conducted between October 1994 and March 1997.

Table IV.C.1 Training Courses / Workshops

DATE	TITLE	PLACE	ATTEN-DEES	COMPANIES	REMARKS/ EVALUATION
23-24 Mar'97	P2 Concepts and Applications Workshop	Alex	81	46 companies + AGOSD	
26-27 Mar'97	“ “ “	Cai	62	50 companies	
4-5 Dec'96	Pollution Prevention Implementation and Monitoring	Cai Alex	36 38		
18-19 Nov'96	ISO 14000	Cai	48	Industrial firms and government	
20-21 Nov'96	“ “ “	10 of Ramadan	32	consultants	
24-25 Nov'96	“ “ “	Port Said	35		
19 Nov '96	ISO 14000 Promotional Seminar (Seminars Interaction)	Cai	43	43 key persons representing Industrial Firms	
18-19 Nov'96	ISO 14000	Cai	48		
20-21 Nov'96	ISO 14000	Port Said	35		
23-25 Jul'96	Integrated Energy in Environmental Management in Tourism Sector Seminar	Sharm El-Sheikh	30	12 Chief Eng Hotels/ 6 Eng contracting co./ 3 Vendors and Supplies/ 2 Press / 2 Univ / 2 EQI / 3 Int	2 American Consult , one is the author of the integrated energy and env manag in tourism sector

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DATE	TITLE	PLACE	ATTEN-DEES	COMPANIES	REMARKS/ EVALUATION
				Comp	
6-7 Jul'96	Pollution Prevention in Canning, Chemical and Petroleum Processing Industries	Alex	71	30 Industrial firms & consulting offices / R&D / Universities	
19-20 Jun'96	Industrial Effluent Management	Cai	47		
22-23 Jun'96	" " " "	Cai	34		
26-27 Jun'96	" " " "	Alex	46		
29-30 Jun'96	" " " "	Alex	41		
11 May '96	Cleaner Production and Pollution Prevention Abatement	Alex	35	Decision Makers / Consultants / AGOSD / NGOs Univ	Designed to reach decision makers
1 April'96	Using Low Cost Techniques for Improving Energy Efficiency	Cai	30		Lecturers ECEP/EP3
17 Aptil'96	" " " "	Cai	40		
April'96	Law 4/94 Compliance Vs Enforcement	10 th of Ramadan	24	Industrial firms / Decision Makers	Lecturers EEAA / EP3
March'96	Re-engineering the Training Education	Cai	43	Traning managers in industrial companies	

Training Courses / Workshops (continued)

DATE	TITLE	PLACE	ATTENDEES	COMPANIES	REMARKS
5-6 Mar'96	P2 Concepts and Applications	Cairo	34	19 industries / 9 research / public consultants / 6 public eng Chem	27 Evaluation Sheets
19-20 Mar'96	P2 Concepts and Applications	Alex	67	32 industry / 13 cons Firms / 6 public / 25 AGOSD	35 Evaluation Sheets
5-6 Sept'95	Pollution Prevention in Textile Industry	Car	31		EP3 prepared a manual on P2
19-20 Sept'95	“ “ “ “	Alex	31		in Textile industry
24-27 Jul'95	The Role of Cleaner Production in Meeting the Challenge of a Changing World Economy	Taba	84	(18 priv sect / 13 puplic sec / 40 ECEP / 1 AI Ahram)	American experience and successful Egyptian case studies were reviewed EP3 held several meetings with agencies EP3/WA to finalize agenda
5-6 Jul'95	Pollution Prevention in Metal Finishing	Car	36		
19-20 Jul'95	Industries	Alex	30		
June'95	Identifying Business Opportunities in Energy	10 th of Ramadan	31		

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DATE	TITLE	PLACE	ATTENDEES	COMPANIES	REMARKS
	Efficiency and Environmental Protection	Alex	42		
4 May'95	Seminar for the Top Management in the Plants Involved in PPDAs	Cai	30	Senior official USAID Washington / Cairo	
4-5 Apr'95 18-19 Apr'95	Pollution Prevention Concepts and Techniques " " " "	Cai			
26-30 Mar'95	International Conference and Exhibition for Energy Efficiency and Environmental Protection		300	24 Countries/ Industrialists / Scientists	65 papers presented / 13 Booths for exhibition
24-25 Jan'95	Environmental Auditing	Alex	30		
6 Nov'94	Pollution Prevention Training Exercises	Cai		Ideal Comp	
7 Nov'94	Pollution Prevention Plan in Industry	Alex	135	Kazareen	
9 Nov'94	Pollution Prevention Training Exercises	Cai			
26 Oct'94	Pollution Prevention Plan in Industry	Cai	145	Ministry of Industry / USAID Chairman Cairo / Chairman of EE	

IV.C.4 Courses Offered to Industry at Large

The course outlines were designed to suit wide variety of audience backgrounds. Typical descriptions of the course contents of the taught courses follows.

Course Description

a Courses making a transitory phase correlating energy and environmental emphasis

"Identifying Business Opportunities in Energy Efficiency and Environmental Protection" - What are energy efficiency and environmental business sectors?, overview of energy efficiency and environment in Egypt, business climate in Egypt, potential business activities, what is needed to take advantage of the opportunities?

"Financing Energy Efficiency and Environmental Protection Projects" - Why are energy efficiency and environmental protection projects implemented?, What is the potential market for energy efficiency and environmental protection business?, Options for financing energy efficiency and environmental protection, Establishing self-financing programs, Potential funding sources third party financing and energy service companies, Performance contracting?

b Courses for raising general awareness of pollution prevention concepts and applications

"Environmental Impact Assessment" - Introduction to environmental assessment (EIA); requirements for preparing an EIA in Egypt, elements of environmental assessment and determining environmental impact; environmental impact assessment concepts, strategies and methodologies, economic and social impact assessment, energy and environmental assessment

"Pollution Prevention Techniques" - What is Pollution Prevention?, Introduction to pollution prevention concepts, what are pollution prevention assessment? Steps in conducting pollution prevention assessment developing a pollution prevention plan, process characterization, generating pollution prevention options, financial and technical considerations, implementation and evaluation of the pollution prevention program; case studies

"Environmental Auditing" - What is environmental auditing, pollution prevention assessment, preplanning roles and responsibilities, developing the audit scope, and documentation requirements, site survey, post audit reporting; action plans, implementation of recommendation, audit follow-up, monitoring and evaluation.

IV.C.5 Training Courses Directed to Specific Industry Sector

Courses based on particular case studies and directed to industrial sectors were offered (e.g. Pollution Prevention Textile Industry Case Studies, and Pollution Prevention In Metal Finishing Industries. The courses were attended by industrialists who focused on the

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practices relevant to the special nature of the industry and furnished a platform to form a nucleus for the circle concept. Some of the contents of these courses are as follows.

"Pollution Prevention in the Textile Industries" - Overview of the textile industry in Egypt, introduction to pollution prevention?; Typical processes used in textile production, Wastes associated to the textile industry; Implementing a pollution prevention assessment, Good housekeeping practices; Process modifications, Options for recycling and resource recovery, Case studies

"Pollution Prevention in Metal Finishing Industry" - Overview of the metal finishing industry in Egypt; Introduction to pollution prevention?; Typical processes used in metal finishing, Implementing a pollution prevention plan in metal finishing facilities; Pollution prevention assessment, Good housekeeping practices, Process modifications, Options for recycling and resources recovery, Case studies

IV.C.6 Training Courses for the ECEP/EP3-Egypt and the Implementing Agencies Staff

Training courses for ECEP/EP3-Egypt staff and the Implementing Agency staff were conducted. One example is a two-day training on Environmental Audits (3-4 March 1997). The course covered the Law 4 requirements and the register, ISO 14000, EMS and environmental action plan concepts, preparatory phases of the audit, guidelines for conducting the audits, report writing and calculations. The course was taught by American and Egyptian consultants and experts. The course was attended by 14 persons (8 from ECEP/EP3-Egypt, 4 from ECEP/DRTPC, and 2 from ECEP/TIMS).

Attendees received EAP/EMS guidelines and forms, pointers for environmental audit of metal finishing facilities, photocopies of the slides about EAP/EMS/R and the law, and screening and pre-assessment report. In addition, the attendees received two examples of a preliminary information questionnaire, some appendices from Law 4, and a copy of the ISO 14001, 14004, 14010, 14011, and 14012.

In various occasions, the program encouraged and supported staff to join formal training programs in academic institutions in Egypt.

Study Tours Overseas

ECEP/EP3-Egypt selected industry and government experts to visit U.S. industries, clean production equipment manufacturers, government program and other U.S. institution involved in sustainability of Egyptian pollution prevention program. The Agency directors have been on study tours abroad, in one occasion they visited industrial plants in the Czech Republic, Tunisia, Ecuador, and the U.S. They held meeting with officials from USAID, NGOs and other organizations. Also, they attended a two-day course intensive workshop on pollution prevention applications during the trip. Support for attending international conferences held abroad was given to industrialists as well as ECEP/Agencies staff.

IV.C.7 Promotional Activities

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The project planned and organized conferences to promote its activities, as well as to introducing the concepts of pollution prevention. The International Conference On Technologies For Energy Efficiency And Environmental Protection was held in Cairo during March 1995. It was accompanied by an exhibition where pollution prevention technologies and equipment were demonstrated. The conference was attended by over 300 participants representing 24 countries. Sixty-four technical presentations and scientific papers were discussed. The conference was a forum for enhancing the knowledge base of the subject where participants gained from the presentations of the scientists and technologists present.

The theme of this conference focused on the use of energy efficiency and the application of appropriate technology to improve the environment. Topics discussed were policy and planning for environmental protection, promotion, manpower development, industrial effluents, waste water treatment technologies, air quality technologies, benefits from environmental instruments, pollution prevention case studies in industry, technology for reducing pollution in transport, and round tables. Six one-day workshops covering related energy efficiency and environmental topics were conducted prior to the conference.

A "Decision Makers Conference On Economic Benefits From Implementing Pollution Prevention In Industry And Government Programs" was held in Taba, July 24-27, 1995. Key decision makers in industry and government who attended the conference were introduced to the merit of pollution from a company and a societal perspective. The conference also covered the methodologies used in setting up pollution prevention programs in industrial facilities as well as on the national level. A series of pollution prevention case studies were presented and discussed. The conference was attended by 84 participants and had a dual effect, in training and pollution awareness.

ECEP/EP3-Egypt regularly contribute to various environmental and industrial conferences, exhibitions and association meetings. For specialized conferences, ECEP/EP3-Egypt and the Implementing Agencies present the program, its objectives and activities for general meetings, and give technical presentations including results of PPDA's and various implementation activities.

ECEP/EP3-Egypt has also held several meetings and interviews with media and promoted the project through newspaper coverage of events to publicize the program and its activities.

Meetings were held with industrialists and industrial leaders to introduce the program and to promote its activities. Moreover, meetings with other donor agents were held to coordinate with other activities in the area of pollution prevention.

Table IV.C 2 and IV C 3 highlight some of the promotional events organized by the project and the promotional events attended by the ECEP/EP3 Egypt and the Agencies Directors.

IV.C.8 Materials Produced (Training and Promotion Resources)

Case Studies

Seven Case Studies were produced. Each contains four pages, written in English, and has an Arabic version. They describe briefly a problem, reflecting on environmental pollution prevention issues which have been solved and contain a remedial action plan for pollution control follow up. These concise case studies contain colored illustrations and photographs. They convey a promotional as well as an educational message, and have proved effective as requests for replicating the process were received.

A specific example for these case studies is that of a textile company where a process change took place from an organic solvent base for dyeing into an aqua base process. This illustrated an example of an economically rewarding process as well as an environmentally protective one.

Another case study dealt with the tourism sector. It showed how the implementation of low and no cost options protected the environment and positively contributed to the economy of the sector.

Manuals

Twelve manuals were produced by ECEP/EP3-Egypt which address pollution prevention. Ten are in English and two in Arabic. The manuals deal with environmental auditing, environmental impact assessment, pollution prevention concepts and applications.

The manuals are revised and adapted at the implementing agents DRTPC and TIMS, printed and produced by FEI. These manuals have detailed international model case studies on environmental pollution as the Arabic version had introduced some of the Egyptian case-studies based on the PPDA's conducted by the project.

Table IV.C.2 Promotional Activities Organized by the Program

DATE	EVENT	PLACE	ATTENDEES	REMARKS
18/2/1997	Business Lunch with the Environmental Editors in Egyptian Press	Cairo	Dir USAID / Dir of Environment Office / ECEP USAID Project Officer / ECEP / FEI Executive Director and 12 Journalists	An Article in Al-Ahram published 20/2/1997
7/1/1997	An Article Was Published in Al-Ahram	Al-Ahram		
22/12/1996	An Article in Al-Ahram entitled "Environmental Prevention Is a Strategic Objective"	Al-Ahram		
19/11/1996	ISO 14000 Promotional Seminar	Cairo	43 Key Persons Representing 10 th of Ramadan Ind-Firms	
24/11/1996	TV Interviews, Channel 4		Interviewed Exec Dir and EP3 Chief of Party and ECEP/EP3	

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DATE	EVENT	PLACE	ATTENDEES	REMARKS
7/11/1996	National Program for ISO 14000 Seminar	Sponsored EEAA/ECOE	Industrial Leadres / Officials / Envi Agencies	50 Copies of ISO1400 Manual were Sent
17/9/1996	Article on "Demand Side Management Program"	Al-Ahram Newspaper		
12/10/1996	Article Published by Alam Al-Youm News Paper	Alam Al-Youm		
1/8/1996	Article Published entitled "Energy and Environmental Management Integrated in the Tourism Sector at Shram El-Sheikh	Al-Ahram News Paper		
19/6/1996	TV Interview with Some Participants in the P2 Course	Channel (1)and (2)		
23/6/1996	Article in Al-Ahram about P2 Meeting	Al-Ahram		
26/5/1996	Demand Side Management (DSM) Kick Off Meeting	Alex	49 attendees	Represented industries / Electrical Distributing Company / Consultants / Univ
15/5/1996	TV Interviews (Channel 5)	Alex	ECEP/FEI Exec Director	
26/5/1996	Article in Al-Ahram Newspaper	Al-Ahram		

DATE	EVENT	PLACE	ATTENDEES	REMARKS
April'96	Kick off Meeting of Env For Alex Ind Waste	Alex	48 attendees	
April'96	Interview ECEP/FEI/EP3 chief of party	channel 5		
16 April'96	Article in Al-Ahram Newspaper	Al-Ahram		
March'96	10 R Env Initiative	10 R	>100 chairman Amer and Egyptian Officials / Media etc	
March'96	3 Articles in AlAhram / Egyptian Gazzette	Al-Ahram / Gazzette		
March'96	TV Interviews	channel 3	ECEP/FEI Executive Director	
March'96	Radio Interview EP3	3 times		
March'96	Promotional Seminar for Cleaner Production and Pollution Abatement		Attended by 42 Industrial firms 10 R and ECEP	Round Table
March'96	A Demand Side Management Program		21 2 groups Industry and DSM	
20 March'96	Interview with ECEP 3 Exec Directors	TV / Scientific Magazin		

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DATE	EVENT	PLACE	ATTENDEES	REMARKS
		Program Channel (1)		
13/1/1996	10 th Ramadan Initiative Round Table	Cai	35 Key Persons	
Jan 1996	Discussion with KIMA to have a workshop on Energy Efficiency	-	-	
Sept 1996	2 Radio Interviews 2 Articles Al-Ahram		Concerning energy savings / Environmental Protection	
Aug 1996	2 Articles Al-Ahram on Taba Seminar Radio Interviews / TV Coverage			
26/31 July'96	Al-Ahram concerning the Taba Conference			
26 May 1996	Al-Ahram			
19 May 1995	Al-Ahram			
4 May 1995	Pollution Prevention Activities (Seminar)	Shepherd (Cairo)	30	USAID Global Centre for the Environment USAID attended this event
March 1995	International Conference and Exhibition		300	24 countries / 20 radio interviews / 2 TV interviews / Minister of Industry / 6 workshops

Table IV.C.3 Attended Events to Promote the Program

DATE	TITLE	ORGANIZED	ATTENDED BY	REMARKS
23/3/97	Guidelines and Production of EIA	EEAA / FEI / AEEC / DANNIDA / ODA / SEAM / OSP and EGTP	Executive Directors	
16-18/2/97	Environment 1997 Conference		ECEP/EP3 Booths / Videos	
14-15/2/97	Association of Enterprises for Environmental Conservation Workshop		ECEP/EP3 Executive Directors	publication given away prepared in organization
17/12/96	CEDARE Fifth Annual Celebration		Acting Executive Director	
29/12/96	Industry and Environment	Seminar organized by the Ministry of Military Production	Dr Ali El-Naggar	Delivered a lecture on "Environmental Auditing Methodology"
Sept '96	Environmentally Concious Technology Seminar	FEI head quarter	ECEP/FEI Exec Dir	Attended by American delegations, Ministry of Scientific Research, FEI, USAID, and Emb + ECEP
18-19/9/96	Lead exposure attacking plan (LEAP)	EEAA / TCOE	ECEP/FEI Executive Dir	
Aug 96	FEI and EEAA protocol	FEI / TCOE / EEAA	ECEP/FEI exec Dir	FEI environmental committee were

DATE	TITLE	ORGANIZED	ATTENDED BY	REMARKS
				involved
June 96	Cairo International Fifth Energy and Environment Conference	Cairo	ECEP/FEI exec Dir	
June'96	Completion of STC project	Cairo	ECEP/EP3 Directors	
March 96	The role of Science and Technology in the Development of Egyptian Industry	Arab Management Association	ECEP/FEI ecex Dir,	
-19 Nov 95 3 Nov'95	ECEP/FEI exec Dir training tour	USA		
Sept 95	ECEP/FEI computer Programmer back from 2 month training on multimedia			
June 95	Study Tour to Industrial Plants in the Czech Republic, Tunisia, Ecuador and U S A		Agency Directors EP3/ACOP	Meeting with officials, NGOs, attended two day workshop P2 application
April 95	Lessons without borders conference	SEATTLE USA	EP3/CAI, Director, Egyptian General Petroleum Co	Presentations were delivered

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DATE	TITLE	ORGANIZED	ATTENDED BY	REMARKS
			TCOE/EEAA	
Mar'95	Presentation to EEAA, ODA and Dannida	EP3/CAI	Representatives of the EEAA and foreign agents	EP3 activities were presented
Feb'95	Meeting held with CIDA and KFW	EP3/CAI	Inter-relation activities were discussed	
Feb'95	Pollution Solution Dollar and Sence of P2	EP3/USAID	USAID	Presentation to USAID

Technical Booklets

Five technical booklets were issued concerning pollution prevention. These booklets were published in Arabic and contained technical information on new methodologies. As an example, the technical booklet on metal finishing described new technologies which are economically and environmentally rewarding, e.g. metal plating using zinc hydroxide instead of zinc cyanide. Another technique described nickel and rinse water recovery via an advanced reverse osmosis system. A third technique concerned recycling nickel electroplating rinse waters by low temperature evaporation and reverse osmosis. The booklet addressed the feasibility and recycling, compared the quality of paint, and compared the toxicity level as well as the economic feasibility.

Technical Briefings

Five technical briefings addressing pollution and the environment were developed. These technical briefings are published in Arabic and contain a condensed message reflecting the technical information concerned with the project.

News Publications

Six news publications concerned with environmental pollution prevention were issued. These were special issues devoted to a specific subject or industry. They reported on developments of the project in general, and had some information on the environmental law and news. These publications were promotional material for the project.

VI.C.9 Impact of Training and Promotion

- The project trained 1987 participants who received in 4614 days of training. These participants represented a wide range of industries. Over 50 companies of various industrial sectors were reached through this training activity. This definitely reflected on increased awareness and industry as well as capacity building for the industrial cadre dealing with pollution prevention in industry.
- More awareness of pollution prevention in general was realized among the industrial community. It is interesting to note the participants of the course Pollution Prevention Concepts and Application in March 1996 responded to the question "would it be convenient to adapt the pollution prevention program in your company?" Six out of 21 responded negatively (i.e., around 27%). In March 1997, the response to the same question drew only two negative answers out of 51 participants (i.e., around 4%). This reflects the impact of the project (through training and promotion and indeed other activities run by other agencies) on the general understanding and awareness of pollution prevention activities among industrialists.

- The project has helped in capacity building in the area of pollution prevention. Now the Implementing Agencies staff and the ECEP/EP3-Egypt staff have become well trained and equipped to enter in to the open market for environmental services
- The project provided the Egyptian government institutions namely, Cairo University, Tabbin High Institute for Metallurgical Studies, and the Federation of Egyptian Industries with institutional infrastructure and trained staff, and equipment to offer services in the field of environmental protection
- The project is building two circle groups; i.e metal finishing and the textile industry, while the chemical industry circle is in progress The tourist industry may be another candidate for a circle group
- The project have produced numerous publications dealing with pollution prevention 7 case studies, 12 manuals, 5 technical booklets, 5 technical briefings and 6 news publications This material is useful as a reference, widens the knowledge base and increase awareness of industrial pollution prevention

V. PROJECT EVALUATIONS AND COMPLIANCE WITH DELIVERY ORDER #4 REQUIREMENTS

V.A. Project Evaluations

Mid-Term Evaluation

In January 1996, a mid-term evaluation was conducted of the ECEP/EP3 project (Reference 8). A two-person evaluation team visited Cairo between January 12-20, 1997, interviewed ECEP/EP3 Pollution Prevention Office staff, the ECEP Chief-of-Party, Executive Directors of the Implementing Agencies, representatives of EEAA/TCOE and the USAID/Egypt Program Manager. They also visited selected facilities in Alexandria and 10th of Ramadan City and spoke with some bilateral donor organizations in Cairo. Major findings and recommendations are summarized below.

Management

The team was impressed with the capability of the ECEP/EP3 office staff and noted that the office communicated well with Implementing Agencies and public and private sector industries, and was among the more transparent donor groups working on environmental problems. At the same time, they perceived some frustration on the part of ECEP/EP3 and Implementing Agency staff with regard to constraints on flexibility to work independently and to interface directly with participating plants. More continuity might be realized if the office organized some of its activities by industrial sectors rather than specific projects. The team suggested that the program give more emphasis to company-based pollution prevention activity and technical assistance to in-plant programs to enhance the sustainability, rather than to focus on maximizing individual plant assessments and quantifying pollution prevention options. Finally, they believed that more coordination among other donor organizations would be beneficial to increase the efficiency of implementing the concept of pollution prevention in Egypt.

The team recommended that the project

- Include pollution prevention as a larger element in the overall strategy of ECEP. Pollution prevention is now a small part of the overall ECEP Program.
- Establish industrial sector focal points in the ECEP/EP3 office and establish a network of facilities interested in pursuing pollution prevention.
- Give more attention to the number of continuing pollution prevention in-plant programs and to technical assistance to encourage more sustainability after the pilot program phase.

Technical Assistance

Technical assistance process and product were found to be good, although the layers of communication seemed to be a barrier and to slow the process at times. The plant assessments, each with 6-7 persons and a U.S. expert (s), appeared to be expensive to the team. The Pollution Prevention Diagnostic Analyses (PPDAs) were judged to be of good quality with a comprehensive description of the processes and pollution prevention options. However, they were missing clear recommendations on how the plant might continue the pollution prevention efforts and how they might prioritize the medium-cost options for systematic future implementation. Finally, the team noted that the PPDAs form a basis for a longer-term relationship with a plant, but do not outline how this relationship might continue.

The team recommended that the project

- Give more attention in PPDAs to establishing continuing in-plant programs and long-term relationships with plants, prioritize medium-cost options, and explain how they may be implemented
- Select, prioritize, and give extra attention to five or six medium-cost options through technical assistance to help the plants identify funding and implement the options
- Have more plant owners and operating personnel provide input to PPDAs. Currently only upper and middle management are involved with plant assessments

Training

The team concluded that in a short period of time, ECEP/EP3 had accomplished an impressive training agenda. However, to make a lasting impact on Egypt's industrial culture, the training element of the program needed to be significantly expanded. Specific goals and objectives had to be clearly defined and the specific audiences had to be identified. More training courses were needed along with training focused on pollution prevention policy and strategy for government officials. The team suggested that a standard one-half day pollution prevention course be presented at a broad range of industrial conferences to introduce the concept.

The team recommended that the project

- Write a clear training mission statement
- Increase the training activity, even at the expense of more plant assessments
- Develop more and better training aids. Give particular attention to establishing a pollution prevention "library" of available videos

Sustainability

The team found that the ECEP/EP3 program lacks a clear description of how sustainability will be accomplished. There does not appear to be a national pollution prevention policy or a clear focus on how to work with the GOE to establish policy and promote pollution prevention. It appeared to the team that the upcoming 10th of Ramadan City project and the Alexandria Initiative offered opportunities to build on the Mainstream Activity and work more closely with private sector plants in an industrial city setting and with municipal sanitary districts to promote sustainability.

The team recommended that the project:

- Sponsor a conference for public officials to explore establishing a sustainable pollution prevention program in Egypt
- Give courses and lectures at Egyptian universities on pollution prevention and sustainable development as a long-term strategy to raise environmental awareness and promote sustainable practices

Information Dissemination/Clearinghouse (Outreach)

The team believed that good progress had been made in the area of information dissemination. Reports and manuals were excellent, although some industry representatives stated that there was a need for state-of-the-art technical documents on various pollution prevention processes, strategies and technologies. The information function is divided among FEI, ECEP/EP3 and EP3/Washington without a clear definition of roles and responsibilities. The team suggested that a definition of information system components was needed, i.e., what should they be, who should they serve, and how could they be implemented.

The team recommended that the project:

- Hold a workshop for all ECEP/EP3 agencies to reach consensus on the functions of a pollution prevention library, clearinghouse, and electronic information system
- Identify the type and limitations of information/data that each ECEP/EP3 agency would provide

May 1996 Evaluation

In March - May 1997, a second evaluation of the ECEP/EP3 office was conducted to assess the progress and impact of two ongoing activities (Mainstream and 10th of Ramadan City) and to provide recommendations for the last 16-months of the project, within which a third activity, the Alexandria Initiative, would be completed. Operational guidelines for the 10th of Ramadan City environmental management program were in the initial development stage.

The Alexandria Initiative, to work with municipal sanitary and drainage organizations, was just starting and could benefit from "lessons learned" from the 40-50 pollution prevention assessments that the ECEP/EP3 program had completed to date. Thirdly, the evaluation provided input to the USAID-financed Egypt Environmental Sector Assessment from (a) an assessment of hands-on experience with pollution prevention practices in Egypt, and (b) evaluation of training to support USAID's environmental strategic objectives. The evaluation included interviews with all relevant persons in the ECEP/EP3 program and site visits to facilities in 10th of Ramadan City (Reference 9)

Management

The team concluded that the ECEP/EP3 staffing and technical composition was not adequate for timely environmental assessments, preparation of reports, implementation of options, and responsiveness to industry requests for additional technical assistance. Most of the environmental specialists@ were in disciplines related to chemistry or chemical engineering. The team believed that this limits a comprehensive approach to environmental issues. Internal information flow and communication were not adequate for the complicated project design which required close cooperation among many parties. The team stated that the delayed delivery of ordered computers and software hampered field and home office interaction.

The team recommended that the ECEP/EP3 office be strengthened with a broader professional base. Specifically the team recommended that the office hire

- a full time training coordinator to support intensified activity from 10th of Ramadan City efforts and the Alexandria Initiative,
- an experienced technical writer and translator for English to Arabic and Arabic to English,
- an Egyptian outreach coordinator to achieve the awareness-raising objective,
- a monitoring and evaluation specialist with direct responsibility to assure that project results are systematically quantified, and lessons learned are prepared, reviewed and disseminated,
- more staff to strengthen the EP3/Washington support

Technical Assistance

The team found that the 32 PPDA reports (18 public sector, 14 private sector) written in the Mainstream Activity provide a very useful base-line document for both plant personnel and U S pollution prevention experts. The reports contain valuable information on the plant operational data, processes, and system process diagrams. The team indicated that a follow-

up procedure for implementation of options was in place and that good records of contact and conversation with the industry sectors were maintained. The team observed that the program has been successful in identifying and documenting technical problems and options for pollution prevention, has gathered a good quantity of technical materials, and has begun the process of technical capacity building related to pollution prevention in industry

The team concluded that assessing environmental issues and energy issues together limits a comprehensive approach to environmental planning, management, and compliance. They found that the analytical element of the PPDA reports was generally weak due to very limited actual measurements/data and to the lack of a methodology to assess and quantify the impact of implementing options. The assessments seemed to end with the completion of the PPDA. Also, the reports do not sufficiently quantify impacts of pollution prevention, reduction and control. The team noted that the sole methodology used to measure and track the pollution prevention performance was the Acritical ratio analysis@ and believed that this approach was somewhat limited as pollution prevention and environmental management do not readily lend themselves to this conventional form of analysis. The team believed that the marketability and sustainability of the full PPDA process is questionable at an estimated cost of LE50,000 - LE100,000 (US\$15,000 - US\$30,000) per assessment. Industry would not be willing to pay for this product on the basis of environmental protection or even to satisfy Law #4 compliance requirements

The team recommended that the project:

- Examine the effectiveness of continued PPDA-type activities and shift emphasis from more PPDA's to fewer, more-in-depth assessments. This will help make the Alexandria Initiative more results-driven and better support the 10th of Ramadan City effort.
-
- Develop a formal data-base of the assessment work, implementations, results, lessons learned, etc for (a) analysis of cumulative effects, (b) quantifying results, and (c) identifying future activities
- Make implementation of medium cost options more attractive to the industry by introducing clean production technology and available financial mechanisms
- Incorporate analytical tools to introduce the relationship between the environment and economics, including benefit/cost analysis, product/process life cycle analysis, risk assessment, and ecological impact evaluation
- Develop a Knowledge-base@ using available sector-specific global information and data, lessons learned in Egypt, case studies, generic options, etc. The knowledge-base design should be internet-compatible and include environmental and regulatory components relevant to Egypt. The system should include a hypertext reference system to enhance training.

Training and Promotion

The team found that ECEP/EP3 had an intensive and useful training program. Industrialists have a general awareness of environmental protection, however, the team indicated that key industrialists were not fully aware of the objectives of the ECEP/EP3 and its activities. The team stated that the Mainstream Activity training did not include 10th of Ramadan activity needs. They believed that tailored training was needed for Implementing Agencies and ECEP/EP3 staff and that while the training for 1997 was ambitious, a comprehensive strategy for all activities was missing. The team noted that the trainer pool was limited in expertise and that training in Arabic was essential. Finally, the team believed that the scope, implementation, and materials for the training program could be improved.

The team recommended that the project

- Expand on existing activities and develop a comprehensive three dimensional strategy matrix which synchronizes (a) target groups (individual directors, key members, staff ECEP/EP3 staff, agents, trainers, implementors, industrialists/ GOE leaders), (b) time domain (in terms of tasks), and (c) teaching methodology and technology (round table discussion / brain storming sessions / case methods / on the job training / one day seminar / workshops / study tours / etc)
- Install a full time training manager at the ECEP/EP3 office to (a) coordinate activities and follow up, (b) review job descriptions, (c) balance the U.S. training visits, (d) structure tailored courses and assign trainers to transfer experience, and (e) work with ECEP to expand the formal environmental audit courses
- Invite an expert to teach a course on case study writing and documentation. Group training courses within the same sector and use case studies taught jointly by industrial experts and academics so technical and scientific issues will be adequately covered
- Develop audiovisual and promotion materials derived from the Egyptian case studies using Before and after@ documentation techniques
- Consider cost sharing for eventual sustainability of the training programs and increase the number of trainers from available resources (academia, research and development institutes, industrialists, Government officials, etc)
- Share US experts with local training activities, university/school programs, and other projects and donors
- Evaluate the most effective method to access USAID training programs for ECEP/EP3 purposes, such as the Development Training 2 project. Consider utilizing the existing

U S EPA training modules or the U S Environmental Training Institute (USETI), a Washington, DC-based APublic-Private Partnership@ for demand-driven technical training

Sustainability

The team believed that it was important to differentiate between “developing” and “sustaining” a market for pollution prevention services (demand side) on the one hand, and developing the sustainable capacity of the Implementing Agencies to provide those services (supply side). The team recommended that the project.

- Engage a marketing/business professional to (a) train the Implementing Agencies in business planning, and (b) to design marketing and sales strategies appropriate for the local market
- Encourage the Implementing Agencies to market their services in the nearer term to provide a practical assessment of sustainability.
- Evaluate industry’s need for operations and maintenance contracts in the environmental and pollution prevention services sector
- Evaluate a role for the Implementing Agencies to provide industry with services to evaluate their technical needs and establish the required criteria, specifications and equipment performance standards necessary for a specific operation or process

Information Dissemination/Clearinghouse (Outreach)

The team found that the ECEP/EP3 had undertaken a variety of outreach initiatives. The most effective were the development and dissemination of case studies, newsletters and the holding of a number of training seminars. However, the team noted that some key GOE agencies (for example EEAA/TCOE) had not been included and that often interested stakeholders were not effectively participating (for example municipal authorities). The team stated that there could be more outreach to potential participants (for example, U S multinational corporations, other U.S government environmental programs, and other bilateral/multilateral donors in Egypt). The team noted that the Aclearinghouse@ lacked definition, strategy and an action plan. The team believed that ECEP/EP3 had good outreach materials, but that they needed to be leveraged and enhanced.

The team recommended that the project

- Identify opportunities to engage additional key stakeholders, as well as opportunities to more effectively use existing participants
- Establish a private sector industrial, business or trade association for the environmental

sector or for environmental services.

- Replicate the initiative of USAID's U.S -Asia Environmental Program and create APollution Prevention Roundtables@ as a private sector-to-private sector linkage for pollution prevention
- Broaden the scope of ECEP/EP3 activities to include Aenvironmental management systems@ (EMS) Base this activity on the ISO 14000 definition of EMS. Start outreach activities regarding EMS as a broad educational and training activity Consider partnering with other U S multinational corporations implementing EMS/ISO
- Leverage the developing trend to purchase from Aclean@ suppliers for compliance with Egyptian environmental regulations Consider a Asupplier outreach@ or Amentor@ program for EMS, or ISO certification utilizing a U.S multinational corporation as partner in implementing the activity.
- Evaluate and consider using U S. government and other programs and activities, such as
 - U S Department of Commerce to identify markets and demand for US industry Consider using the Foreign Commercial Service office to track specific opportunities for equipment, environmental services and technologies
 - Manufacturing Technology Center (MTC) in Egypt operated by the Executive Service Corp Identify what MTC is doing and leverage their efforts and investments Consider MTC in the Aclearinghouse activity.@
 - USAID's Private Sector Commodity Import Program (CIP) to develop preferences for the import of environmental technologies and equipment
 - USAID's Universities Exchange Program II (ULPII) for the transfer of appropriate U S University-developed technology or laboratory expertise
- Facilitate a dialogue between EEAA, the regulated community, and other GOE agencies on selected issues of mutual interest (for example, Law #4, ISO 14,000, or compliance)
- Develop materials and activities in Arabic (90%), not English (10%), including training and educational videos . Ensure quality technical translation
- Define the intent and purpose of the Aclearinghouse,@ including the role of FEI and sustainability of the activity Ensure end-user demand for intended materials and obtain input from appropriate GOE entities. Evaluate similar initiatives from other donors Evaluate whether any US-based technology centers may be a possible resource to utilize in developing an electronic Aclearinghouse@ and database
- Produce a video which highlights three (3) success stories from three different sectors in a

Abefore and after@ look at pollution prevention in Egypt industry Emphasize the connection between pollution prevention and cost savings and educate regarding Law #4.

V.B. Compliance with Delivery Order #4 Requirements

The following items are specifically identified in the Statement of Work (PIO/T 263-0140 3) of Contract PCE-5559-Q-00-3022-00, Delivery Order No. 4 as deliverables under the contract

Task 1: Setting-Up Strategies

- Establish and Staff a Pollution Prevention Office in Cairo
- Time-scaled Task 1 Workplan
- Convene a Pollution Prevention Roundtable
- Hold a Leadership Conference on Pollution Prevention - Decision and Commitment Benchmark
- Establish an ECEP/EP3 Clearinghouse
- Prepare a Task 1 Final Report

Task 2 Demonstrations and Dissemination

- Prepare a Task 2 Implementation Action Plan
- Prepare a Task 2 Final Report
- Prepare a Task 2 Policy Assistance Study on Storage Tanks in Egypt

Establish and Staff a Pollution Prevention Office in Cairo - The ECEP/EP3 office in Cairo was established in August - September 1994. The office staff has grown since the initiation of the Mainstream Activity to support the two other ongoing ECEP/EP3 tasks - 10th of Ramadan Project and the Alexandria Initiative. The office staff currently consists of an American Technical Director (Chief-of-Party), an Egyptian Deputy Technical Director; and an Egyptian staff comprised of a senior Environmental Engineer, three junior Environmental Engineers, one Office Manager, one Translator, two Administrative Assistants, two Secretaries, two driver/expeditor/messengers, and one office helper.

Time-Scaled Task 1 Workplan - Three workplans have been written.

- Workplan for Energy Conservation and Environmental Program/Environmental Pollution Prevention Project: September 1994 - February 1995, EP3/Cairo, August 29, 1994
- Workplan for Energy Conservation and Environmental Project/Environmental Pollution Prevention Project: February 1995 - September 1996, EP3/Cairo, March 13, 1995
- Main-Stream Workplan: August 1996 - February 1997, EP3/Cairo, August 24, 1996

Convene a Pollution Prevention Roundtable - The initial ECEP/EP3 workplan stated that the APollution Prevention Roundtable@ was renamed the AECEP/EP3 Kick-off Meeting@ based on the global EP3 experience initiating projects in other countries. The meeting was held on October 26, 1994 in Cairo. It provided a high profile introduction to the ECEP Pollution Prevention Component (ECEP/EP3), i.e., information to the government of Egypt, the private sector and others on the significant contribution which urban and industrial pollution prevention can make in Egypt. Main speakers were the Minister of Industry, the Chairman of FEI, the USAID Mission Director, and the Chairman of EEAA. In addition, the USAID/ECEP Project Officer, the RCG/Hagler-Bailly EP3 Project Director and the ECEP/EP3 Program Director spoke. About 200 professionals and decision makers from USAID/Egypt, EEAA, DRTPC, TIMS, FEI, universities, public and private industries and NGOs participated. On November 7, 1994, a Kick-Off@ meeting was held in Alexandria, Egypt. About 200 participants attended to receive the same information from the USAID/ECEP Project Officer, the Executive Directors of TIMS, DRTPC and FEI, and the ECEP/EP3 Program Director.

Hold a Leadership Conference on Pollution Prevention - Decision and Commitment Benchmark - In many respects, the intent and content of a Leadership conference@ was satisfied by the Kick-Off Meeting@ which introduced government and industry leaders to the ECEP/EP3 program. Since the October 1994 time frame, the Mainstream Activities have included two major public awareness meetings. Numerous Industrial Roundtables,@ seminars, and conferences have been organized and held by the Federation of Egyptian Industries (FEI). For example, ECEP/EP3 provided papers for two sessions and managed a booth at the International Conference for Energy Efficiency and Environmental Protection in March 1995. ECEP/EP3 also held a seminar on The Role of Cleaner Production in Meeting the Challenges of a Changing World Economy@ in Taba on July 24-27, 1995 attended by 60 industrial leaders. For additional details see Section IV.D.

Establish an ECEP/EP3 Clearinghouse - During the Mainstream Activity, the concept of an ECEP/EP3 Clearinghouse@ went through significant discussion regarding design, content, accessibility, location, etc. Initially, FEI became the repository of project documents, the focus of organization and implementation of seminars, workshops, conferences, etc., and the center for information requests. The ECEP/EP3 office provided rapid electronic access to the EP3 information data base in Washington. FEI was given the capability to access relevant websites on the internet for rapid access to a great variety of environmental information and databases, i.e., the US Environmental Protection Agency (www.epa.gov), the UN Environmental Program (www.unep.com????????). As ECEP/EP3 facility assessments were completed, PPDAs were written that included proprietary process and operational data. It became clear that the Clearinghouse@ concept required further thought for it to serve as a useful information source, yet provide some degree of Asecurity@ for information retrieval.

A CD-ROM information database was delivered at the end of the Mainstream Activity as an initial part of a larger, more comprehensive Aknowledge base@ development that will be

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completed by the end of ECEP/EP3 in July 1998. The initial capability provides electronic access to PPDAs, and other key documents produced during the Mainstream Activity. The information base is menu driven with a search capability for easy document recovery. Eventually, the fully developed Knowledge base@ will provide interactive access and internet links to environmental information and data worldwide.

Prepare a Task 1 Final Report - The Task 1 Final Report is included in this ECEP/EP3 Mainstream Activity Final Report.

Prepare a Task 2 Implementation Action Plan - The Task 2 Implementation Action Plan is a part of the second and third ECEP/EP3 workplans submitted in March 1995 and August 1996 respectively.

Prepare a Task 2 Final Report - The Task 2 Final Report is included in this ECEP/EP3 Mainstream Activity Final Report.

Prepare a Task 2 Policy Assistance Study on Storage Tanks in Egypt - This study was verbally deleted as a Task 2 requirement by USAID/Egypt in August 1996. Hagler-Bailly Consulting, Inc. has requested that the requirement be formally dropped from the ECEP/EP3 Delivery Order #4 work statement (see Appendix 1).

On an "as needed" basis, ECEP/EP3 supports other USAID/Egypt programs by providing technical assistance to assess pollution prevention opportunities. For example, ECEP/EP3 was asked to support Winrock International's ecotourism initiative. A team of pollution prevention experts participated in a 2-3 week workshop as part of the USAID/Egypt's Promotion of Environmentally Sustainable Tourism (EST) project.

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VI. LESSONS LEARNED

Technical Assistance- The 18 public sector and 14 private sector Pollution Prevention Diagnostic Analyses (PPDAs) are of good quality with a comprehensive description of the processes and pollution prevention options. However, the analytic element is generally weak due to a lack of a clear methodology, actual measurements, and a systematic monitoring program. The PPDAs do not clearly recommend how the plant might continue the pollution prevention efforts and how they might prioritize the medium-cost options for systematic future implementation. The PPDAs form a basis for a longer-term relationship with a plant, but do not outline how a "follow-up" relationship might continue. The assessments, each with 6-7 persons and a U S expert (s), appeared to be expensive. Therefore, a market to sustain the activity is doubtful. Finally, the layers of communication seemed to be a barrier and to slow the process.

The required technical assistance varied over a wide range depending on the capability of the plant operating staff. The technical assistance plan should have addressed this issue early in the project and assigned the appropriate level of U S expertise.

A very broad range of pollution prevention options was identified in the assessments. Valuable technical assistance with low-cost/no-cost options (the ones that industry is most interested in at the current time) is valuable at the pre-assessment level without the expense of a detailed analysis. This issue is being addressed in later Delivery Orders through the "Rapid Assessment" methodology. Fewer full plant assessments, strategically based on selection by the level of environmental impact, would be more useful in the long-term.

To control the cost of plant assessments, energy and environmental audits should be combined. This integrated approach is more attractive to plant management. Also, cost savings from energy conservation and efficiency interventions can be clearly shown to be available for environmental mitigation measures to ensure compliance with Environmental Law #4.

Training and Promotion - The scope, implementation, and materials for the training program needs improvement. Tailored training is needed for Implementing Agencies' and ECEP/EP3 staff. The ambitious 1997 training program could benefit from a full-time coordinator. The program needs a comprehensive strategy including better monitoring, documentation, and analysis. There should also be more emphasis on Arabic presentation.

The most beneficial training was for plant managers, decision makers, and "train-the-trainer" activities. These activities requires careful thought and preparation regarding mechanisms and content. Comprehensive documentation of successful activities, in the form of "packaged courses" would be a useful asset for future training activity.

Sustainability - The Mainstream Activity has provided a sound foundation for there to be a fully developed institutional capacity at TIMS and DRTPC to implement pollution prevention.

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programs by the end of the ECEP/EP3-Egypt project. However, the current high cost of plant assessments, and the fact that plants are accustomed to getting them at no cost, makes a sustainable market for this service by the Implementing Agencies doubtful.

Outreach - Outreach materials need to be leveraged and enhanced. The most effective products were the development and dissemination of case studies, newsletters and informational seminars. More outreach to a broader range of potential participants (for example, U.S. multinational corporations, other U.S. government environmental programs, and other bilateral/multilateral donors in Egypt) would be beneficial.

VII. RECOMMENDATIONS

Technical Assistance

- Revise the procedure for selection and utilization of US consultants and experts to improve continuity and quality of the technical assistance delivered Fewer, carefully screened, highly qualified consultants and experts would be far more effective in delivery of technical assistance and development of quality assessment reports than numerous one-time individuals
- Make use of analytical tools to introduce the relationship between the environment and economics, including benefit/cost analysis, product/process life cycle analysis, risk assessment, and ecological impact evaluation
- Expand the "clearinghouse" concept to a computerized knowledge-base using available sector-specific global information and data, lessons learned in Egypt, case studies, generic options, etc The knowledge-base design should be Internet-compatible and include environmental and regulatory components relevant to Egypt

Training and Promotion

- Evaluate the most effective method to access USAID training programs for ECEP/EP3 purposes, such as the Development Training 2 project Consider utilizing the existing US EPA training modules or the US Environmental Training Institute (USETI), a Washington, DC-based "Public-Private Partnership" for demand-driven technical training
- Benefit from existing university programs This could be synergistic as it expands the base of knowledge, teaching methodologies and teaching materials
- Expand on existing activities and develop a comprehensive three dimensional strategy matrix which synchronizes (a) target groups (individual directors, key members, staff ECEP/EP3-Egypt staff, agents, trainers, implementers, industrialists/ GOE leaders); (b) time domain (in terms of tasks), and (c) teaching methodology and technology (round table discussion / brain storming sessions / case methods / on the job training / one day seminar / workshops / study tours / etc)
- A full time training manager at the ECEP/EP3 office could be beneficial in the longer-term to (a) coordinate activities and follow up, (b) review job descriptions, (c) balance the US training visits, (d) structure tailored courses and assign trainers to transfer experience, and (e) work with ECEP to expand the formal environmental audit courses

Sustainability

- Train the Implementing Agencies in business planning, marketing and sales strategies appropriate for the Egyptian market.
- Implementing Agencies could benefit from assistance to develop their services on a fee-for-service basis in the near term to provide a practical assessment of the sustainability and market for plant assessments, evaluation of technical needs, establishment of equipment specifications and performance standards for specific operations or processes, and training programs This assistance is being provided by OBI under the ECEP project
- Evaluate industry's need for operations and maintenance contracts in the environmental and pollution prevention services sector.

Outreach

- Establish a private sector industrial, business or trade association for the environmental sector or for environmental services, similar to the USAID Asia Environmental Program (US-AEP) which creates Pollution Prevention Roundtables as a private sector-to-private sector linkage for pollution prevention
- Coordinate and collaborate with NGOs, American Chamber of Commerce, research and development centers, etc as an outreach activity.
- Broaden the scope of ECEP/EP3 activities to include environmental management systems (EMS) and assistance with Compliance Action Plans Base this activity on the ISO 14000 definition of EMS Start outreach activities regarding EMS as a broad educational and training activity Consider partnering with other multinational corporations implementing EMS/ISO
- Leverage the trend to purchase from clean suppliers for compliance with Egyptian Environmental Law #4 Consider a supplier outreach or mentor program for EMS, or ISO certification using a multinational corporation as a partner
- Evaluate and consider using U S government and other programs and activities, such as
 - Manufacturing Technology Center (MTC) in Egypt operated by the Executive Service Corp Identify what MTC is doing and leverage their efforts and investments.
 - USAID's Private Sector Commodity Import Program (CIP) to develop preferences for the import of environmental technologies and equipment
 - USAID's Universities Exchange Program II (ULPII) for the transfer of appropriate U.S. University-developed technology or laboratory expertise

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- Facilitate a dialogue between EEAA, the regulated community, and other GOE agencies on selected issues of mutual interest (for example, Law #4, ISO 14,000, or compliance)
- Produce Arabic videos which highlight success stories from different sectors in a before and after look at pollution prevention in Egypt. Emphasize the connection between pollution prevention and cost savings, and include education about Environmental Law #4

References

- 1 Project Paper - Energy Conservation and Efficiency Component (263-140.3), U.S. Agency for International Development, Cairo, Egypt, June 1988
- 2 Project Paper Amendment No 1 - Energy Conservation and Environment Project (263-140 01), U S. Agency for International Development, Cairo, Egypt, November 4, 1993
- 3 Industrial Pollution Prevention Project (Industrial Environmental Management in Egypt), Contract PCE-5559-Q-00-3022-00 between USAID/Washington and RCG/Hagler-Bailly, Inc , dated August 15, 1994
- 4 Project Paper - Energy Conservation and Environment Project (263-0140 3), Project Paper Supplement No 2, U S Agency for International Development, Cairo, Egypt, September 6, 1995.
- 5 Workplan for Energy Conservation and Environmental Program/Environmental Pollution Prevention Project September 1994 - February 1995, EP3/Cairo, August 29, 1994
- 6 Workplan for Energy Conservation and Environmental Project/Environmental Pollution Prevention Project February 1995 - September 1996, EP3/Cairo, March 13, 1995
- 7 Main-Stream Workplan: August 1996 - February 1997, EP3/Cairo, August 24, 1996.
- 8 Evaluation of the Environmental Pollution Prevention Project (EP3) - Cairo, Egypt, H Freeman and D. Thomas, February 1, 1996
- 9 EP3/Egypt Evaluation Report, S Klein, P Illig, S Kandil, V Alavian, May 1997.

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May 13, 1997

Mr. Ron Stanley
Contracting Officer
U.S. Agency For International Development
Office Of Procurement FA/OP/B/PCE
Washington, DC 20523-1425

**SUBJECT: Contract PCE-5559-Q-00-3022-00 Delivery Order # 4, Egypt.
Request to update Delivery Order for Reallocation of Estimated Costs**

Dear Mr. Stanley,

As you may already know, Hagler Bailly is in the process of examining all work statements under the EP3 contract for currency and completeness. The review is part of our effort to update work statements in order to reflect project initiatives and work statement definition subsequent to award. We are also recording technical directions and possible work statement discrepancies. The purpose of this correspondence is to respectfully request your consideration of changes in the Statement of Work and budget under the subject Egypt Delivery Order.

The original Delivery Order requested a study of leaking storage tanks (IV.E.6). Early in the project, the USAID Mission informed Hagler Bailly that this study was unnecessary and that we should use resources that would have been spent on this study for additional pollution prevention audits, assessments and demonstrations as specified in Section III.C of the Delivery Order. An adjustment to the work statement would seem prudent.

Our original budget was formulated in 1994 as an estimate. Most budgets are basically predictions of how funds are to be spent and they can be susceptible to change. Since the inception of this budget, inflation has increased prices on airline tickets, rent, utilities, equipment and other items. Conversely, other areas of the budget have become less important than originally anticipated and therefore require less money. We recommend updating the budget to reflect the changed areas.

Together, an updated budget and work statement will better serve both USAID and the eventual audit team. We recommend your consideration of the following adjustments, none of which increase cost. This reallocation will not require extra funds.

Labor - Decrease the labor line item by \$106,422 as we have been successful in identifying consultants at a lower daily rate than originally anticipated;

Allowances - Increase this line item by approximately \$20,000 due to our underestimation of the actual costs of maintaining a US COP in Cairo;

Travel - Increase the travel line item by \$153,084; \$108,084 of this is caused by increases in local travel, airline tickets, and per diem rates since the original budget estimate in 1994 and an additional \$45,000 based on 9 round-trips to Cairo at \$2,500 each and an average stay of 12 days at \$1,875 per trip (hotel and per diem), based on additional requests for short-term technical assistance by the Mission and our Egyptian counterparts.

Data Acquisition - Decrease this line item by \$111,500. This reflects a limited emphasis on the clearinghouse under this Delivery Order and a decision to complete development of the clearinghouse under other Delivery Orders (#10 and #14).

Training - Decrease the training line item by about \$22,000 to reflect the fact that most of the planned training activities were paid for by our counterparts or funded under other Delivery Orders (DO # 10 # 14).

Equipment - Decrease this line item by \$21,000, reflecting less spending for equipment than originally anticipated.

Subcontractors - Decrease the subcontractor line item to match the amount spent to date. This reflects the fact that actual project implementation did not require the level of local subcontractor support originally anticipated, coupled with the fact that the project used more local consultants than previously expected.

ODC's - Increase the ODC line item to reflect the higher costs of operating a field office in Cairo than was originally anticipated in 1994 when the budget was estimated, specifically the higher cost of office rent, office supplies, office utilities and communications as well as other miscellaneous costs.

Our proposed budget modification is as follows:

<u>Line Item</u>	<u>Current Budget</u>	<u>Actual Spending</u> <u>(As of 2/97)</u>	<u>Proposed Budget</u>
Labor	1,766,582	1,412,124	1,660,160
Allowances	100,000	119,997	119,997
Travel	373,588	477,146	526,672
Data Acquisition	121,500	8,804	10,000
Training	32,960	10,743	10,960
Equipment	91,000	67,489	70,000
Subcontractors	88,200	66,775	66,775
ODC's	120,000	178,445	229,266
TOTAL	2,693,830	2,341,523	2,693,830

Thank you for your assistance in this matter and please let me know of any interim concerns you might have. I look forward to hearing from you. I can be reached by telephone at 703 312-8692.

Sincerely,



Mark Jeleniewicz
EP3 Project Administrator

cc: James Gallup, USAID/W
Elizabeth Marcotte, HBI
Jay Stanford, HBI
Bob MacLeod, USAID/W
Kathy Frascella, USAID Contracts