



Project in Development and the Environment

**PRIDE Information
Systems Requirements:
Final Analysis and
Recommendations**

February 1993

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PRIDE

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and its associates

The objective of the Project in Development and the Environment (PRIDE) is to help the U.S. Agency for International Development (AID) design and implement programs that foster the agency's environmental and natural resources strategy for sustainable economic growth in the Near East and Eastern Europe.

PRIDE provides AID and participating countries with advisory assistance, training, and information services in four program areas: (1) strategic planning, (2) environmental policy analysis, (3) private sector and NGO institutional strengthening, and (4) environmental information, education, and communication.

The project is being implemented by a consortium selected through open competition in 1991. Chemomics International is the prime contractor; subcontractors include RCG/Tagler, Bally, Inc., Science Applications International Corporation, Capital Systems Group, Inc., Environomics, Inc., Industrial Economics, Inc., Lincoln University, and Resource Management International, Inc. In addition, AID has entered into a cooperative agreement with the World Environment Center to support implementation of PRIDE.

The opinions expressed in this paper are those of the author(s) and do not necessarily reflect the positions of the sponsoring agency or contractors.

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Recommendations**

Prepared by
Capital Systems Group, Inc.

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EXECUTIVE SUMMARY

A. Background

Capital Systems Group, Inc. (CSG) under contract to the Project in Development and the Environment (PRIDE), has completed the final task as outlined in Work Order #27, "Services to support the development of the USAID/PRIDE environmental information systems." This work order called for an analysis of the environmental information requirements of the PRIDE project, including specific needs of the project team, the AID/NE Bureau, and others. The work order also required a summary analysis, recommendations, and a draft Statement of Work (SOW) for the follow-on completion of the project

The following activities were performed during this work order.

- An information needs assessment survey was developed to identify areas/types of information needed (and to validate the three areas identified by PRIDE).
- A detailed resource needs survey was developed to identify sources of information and missing information in these areas:
 - Environmental training of special interest
 - Private sector pollution prevention technologies
 - Sources of environmental information
- In-depth interviews using the surveys developed by CSG were conducted with PRIDE and AID/NE staff.
- A summary report of the interviews was prepared.
- Sources of environmental information were identified and reviewed.
- A requirements analysis of the needs for PRIDE environmental information systems was prepared.
- A preliminary report, based on an analysis of the interviews, was presented to John Woods, PRIDE.
- CSG's findings and recommendations were presented at a meeting with AID/NE attended by Gil Jackson, Paul des Rosiers, and Alex Segarra.
- A final report, based on the accumulated information, interviews, the requirements analysis, and recommendations, was formulated and is presented in this paper.

B. Requirements Analysis Summary

Of the three areas identified in Work Order #27, sources of environmental information, and private sector pollution prevention technologies were the highest priorities. Environmental training did not appear to be an area with an immediate need for a special database. As information is available elsewhere, environmental training could be included with the general sources of environmental information.

Key findings include a need to validate information and make it more accessible. In

addition, a lack of information or inaccessibility compromises the quantity and quality of information PRIDE is able to provide. Ultimately, this could result in a loss of funding if the information necessary to justify the project cannot be obtained. The increased effort necessary to obtain information also results in a direct loss of time and money for the project.

C. Sources of Environmental Information Summary

Approximately 30 source groups in the following four major categories have been identified:

1. Development and environmental organizations

- USAID (NE Bureau, other bureau and field offices)
- PRIDE
- Chemonics
- EPA
- World Bank
- United Nations (UNEP, UNESCO, UNDP, UNIDO)
- WEC

2. Related organizations

- Associations
- Environmental consultants and companies
- Universities and educational organizations
- Fortune 500 companies
- Near East embassies
- State, regional, and local organizations
- Other government agencies
- World Health Organization

3. Environmental databases and clearinghouses

- Environmental databases
- International databases
- Pollution Prevention Information Clearinghouse (PPIC)
- Pollution Information Exchange System (PIES)
- Clearinghouses/source databases

4. Additional environmental information resources

- Grants
- Patents
- Law firms
- Publications/journals
- Directories and buyers guides

- U.S. Government Printing Office
- Libraries

Information on accessing more than 200 potential sources of information has been collected and put into a source book. Details on these sources are provided in Section 4 ("Sources of Environmental Information") and in Annex C.

D. Recommendations Summary (Short- and Long-term)

In general, it was determined that two priority areas exist. private sector pollution prevention technologies; and sources of environmental information. Environmental training would be collapsed under the latter category. The recommended second phase of Work Order #27 is a six-month project that will result in the development of two information systems: an environmental information system and a pollution prevention information system. The deliverables of this phase would include:

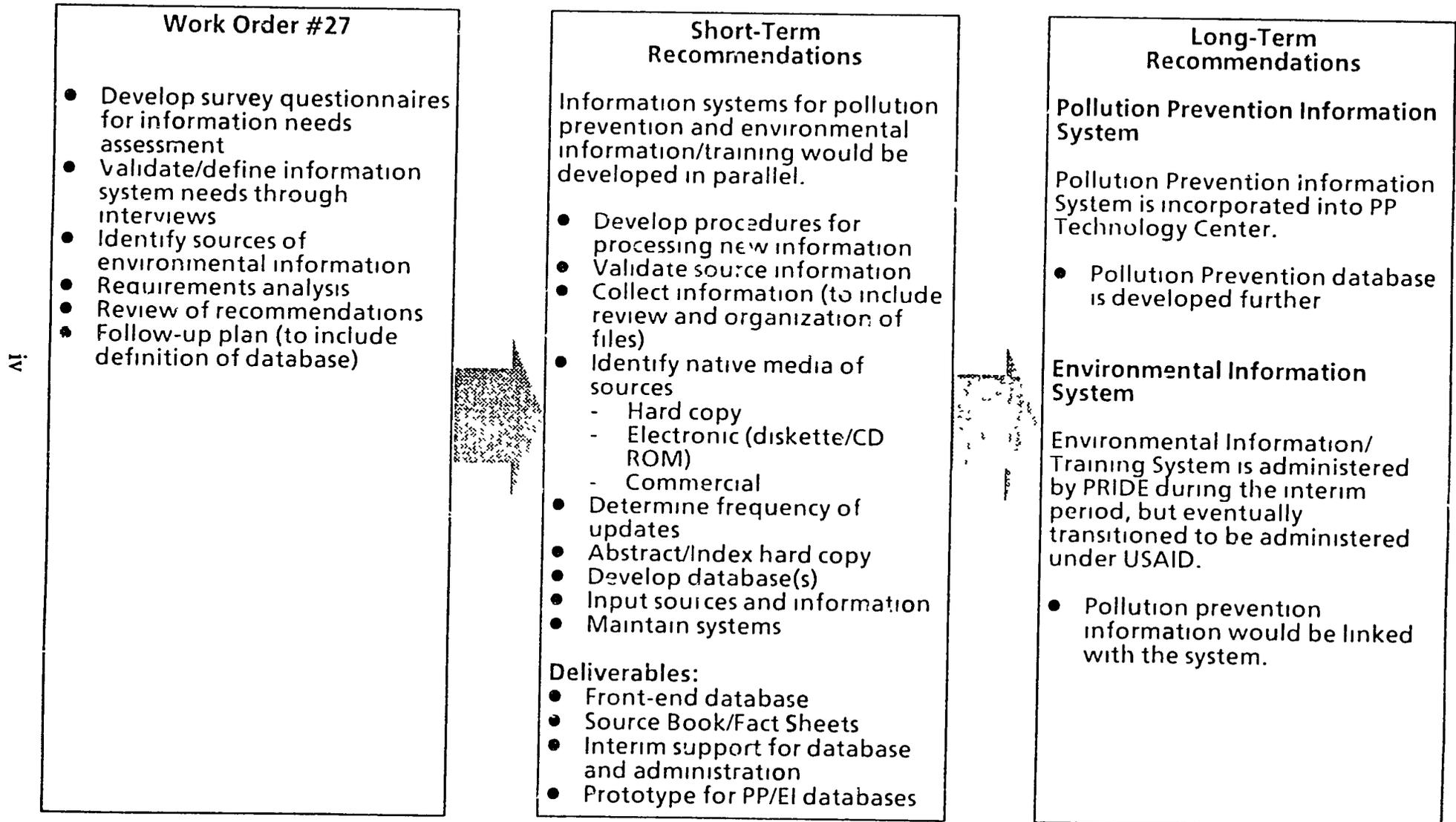
- A front-end general PRIDE environmental information systems database
- A prototype for an environmental information database
- A prototype for a pollution prevention industrial database
- A source book containing fact sheets and access information for sources of information related to both systems.

PRIDE would serve as an interim administrator of the systems during this development phase.

Although a pollution prevention information system needs to be developed immediately for critical information needs, the long-term recommendation would be for the pollution prevention information system developed in Phase 2 to be used in the technology centers in the Near East with few or no alterations required and with information downloaded to the environmental information system. It is recommended that the Environmental Information System eventually be administered and maintained by USAID with the potential to develop into an agency environmental information center. Figure 1 shows a summary of the development of the PRIDE information systems and the short- and long-term recommendations.

Figure 1.

DEVELOPMENT OF PRIDE ENVIRONMENTAL INFORMATION SYSTEMS



SECTION I INTRODUCTION

USAID/PRIDE contracted with Capital Systems Group, Inc. (CSG) under Work Order #27 to provide services to support the development of the USAID/PRIDE environmental information systems. The work order consisted of the five tasks listed below with potential follow-up action required (see Annex A).

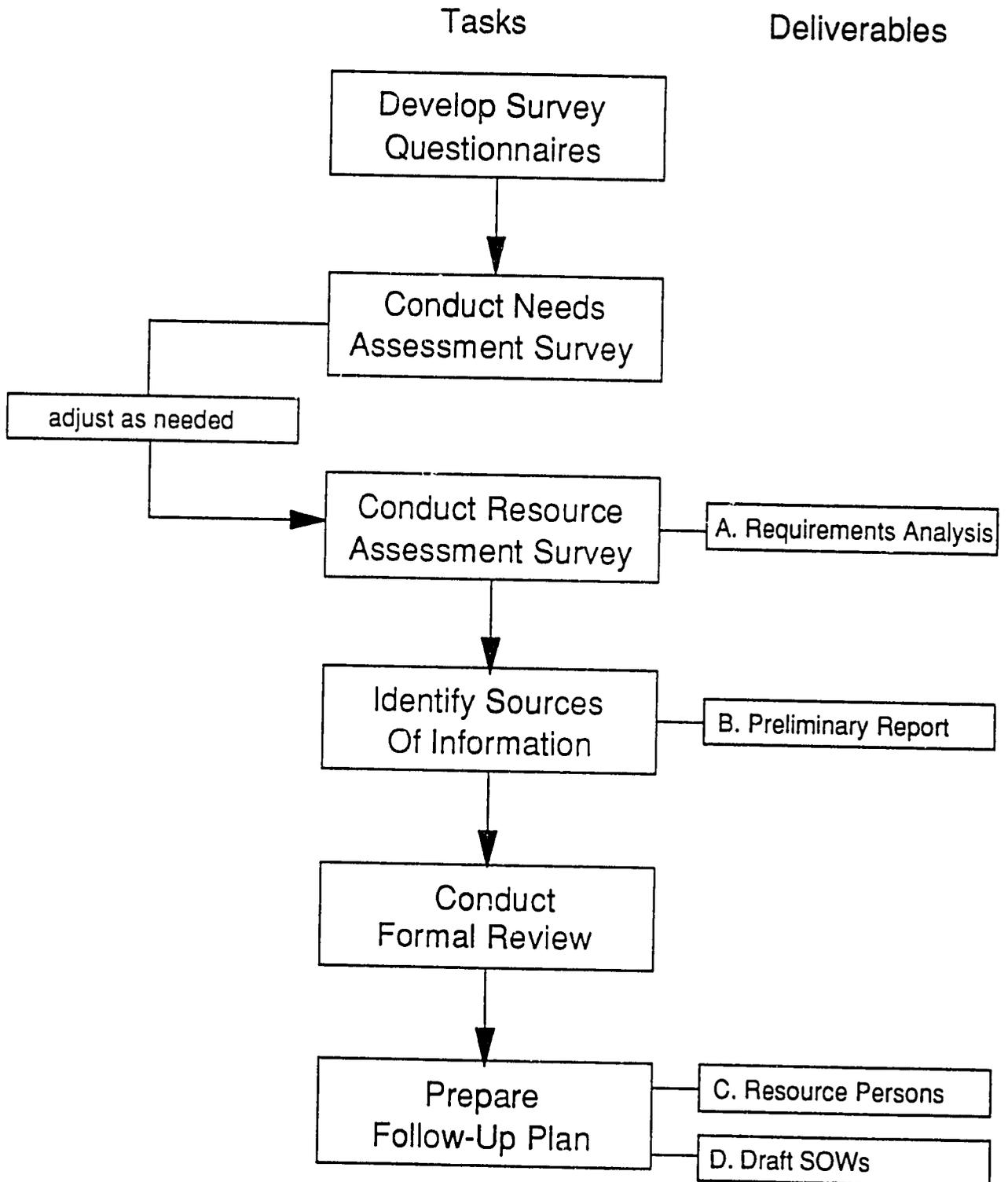
- Task 1: Requirements Analysis for Environmental Training of Special Interest
- Task 2: Requirements Analysis for Private Sector Pollution Prevention Technologies
- Task 3: Requirements Analysis for Sources of Environmental Information
- Task 4: Identification of Sources of Environmental Information
- Task 5: Review and Decision Making

The requirements analysis for Tasks 1-3 was conducted with two survey instruments CSG developed for Work Order #27. One was a general Information Systems Needs Survey, and the other was a Resource Assessment Survey, focusing on the three areas identified in Tasks 1-3 above. In-depth interviews were conducted with PRIDE and AID/NE Bureau staff using these surveys. The findings of the interviews were then summarized. This summary and sample surveys can be found in Annex B. Sources of environmental information were identified and a requirements analysis of the environmental information systems needs for PRIDE and AID/NE was completed (see Figure 2 PRIDE Work Order #27 Work Flow).

This document, *PRIDE Information Systems Requirements. Final Analysis and Recommendations*, represents the completion of Task 5. It summarizes CSG's assessment of the environmental information systems needs of the PRIDE project. A recommended second phase to this work order is outlined. "Section II: Terms and Abbreviations" identifies the terms that will be used in this report. "Section III. Requirements Analysis" is a synopsis of CSG's conclusions based on the information gathered from the Information Needs and Resource Assessment surveys, analysis of the interviews conducted, and analysis of the identification of sources for environmental information. "Section IV: Sources of Environmental Information" identifies the sources of information for each of the three areas listed in Work Order #27 with recommendations for how the sources would be utilized. "Section V: Short-Term Recommendations" presents detailed steps that can begin immediately to develop or implement the environmental information systems for PRIDE. Recommendations for developing information systems, priorities for obtaining information sources, and an estimated level of effort/timeframe to complete the tasks are also given. "Section VI: Long-Term Recommendations" explains the longer term actions recommended to maintain the flow and accessibility of information required to improve efficiency of PRIDE, AID/NE, and other USAID projects.

Figure 2.

PRIDE Work Order #27 Work Flow



SECTION II TERMS AND ABBREVIATIONS

The terms and abbreviations presented below are referenced in the analysis documents.

CDIE - Center for Development Information and Evaluation (AID)

Cleaner Production (Clean Technologies) - as defined by UNEP, cleaner production technologies are those technologies or practices that reduce or eliminate discharges to the environment through source reduction, recycling, implementation of low and non-waste technologies, and product life-cycle management.

DIALOG - DIALOG Information Retrieval Service

EPA - U.S. Environmental Protection Agency

ICPIC - International Cleaner Production Information Clearinghouse

NE - Near East Bureau of the Agency for International Development

NGO - Nongovernment Organization

NOAA - U.S. National Oceanic and Atmospheric Administration

PIES - Pollution Information Exchange System

Pollution Prevention¹ - Pollution prevention refers to source reduction as defined under the Pollution Prevention Act and other practices that eliminate or reduce the creation of pollution through increased efficiency in the use of raw materials, energy, water, or other resources; or protection of natural resources through conservation.

PPIC - Pollution Prevention Information Clearinghouse

PRIDE - Project in Development and the Environment

R&D/ENR - Research and Development, Office of Environment and Natural Resources

Source Reduction² - Any practice that reduces the amount of any hazardous substance, pollutant, or contaminant entering any waste stream or otherwise released into the environment (including fugitive emissions) prior to recycling, treatment or disposal; and reduces the hazards to public health and the environment associated with the release of such substances, pollutants, or contaminants.

UNEP - United Nations Environmental Programme

UNESCO - United National Education, Science and Cultural Organization

UNIDO - United Nations Industrial Development Organization

USAID - U.S. Agency for International Development

USAID/DIC - USAID Development Information Center

¹As defined in the EPA Memorandum, May 28, 1992, The Definition of Pollution Prevention, Henry Habicht, Deputy Administrator, EPA

²Ibid.

USGS - United States Geological Survey
WEC - World Environment Center
WHO - World Health Organization

SECTION III REQUIREMENTS ANALYSIS

A. Background

The Environmental Education component of the PRIDE contract specifies that an information clearinghouse function be developed in cooperation with the AID/NE Bureau. As stated in Work Order #27:

"PRIDE, the AID/NE Bureau, and other groups have been gathering large amounts of environmental information on companies and services, training opportunities, databases, and other related subjects. This information is not currently being organized and packaged into a form which can easily be used. There exists a clear need to create some sort of 'information systems' which would allow USAID and other groups to access information that has been collected. There is also a need to access additional information which is not routinely collected, but which is of particular relevance to the USAID clientele."

Work Order #27 is the first phase in developing these information systems. PRIDE identified three information areas of high priority in this work order:

- Environmental training of special interest
- Private sector pollution prevention technologies
- Sources of environmental information

The interviews revealed, not surprisingly, that use of existing information sources was limited and not well integrated. A lack of readily available information also forces employees to go to many sources to find information, thereby increasing the possibility of inaccurate or inconsistent information. The result is a compromise in the quality and quantity of information used/provided by PRIDE. Another direct result from this increase in effort is that the project loses time and money.

B. Definition of Initial Subjects for Information System

To validate the need for information in the three areas outlined in Work Order #27, CSG developed an in-depth Information System Needs Survey and interviews were conducted with USAID/NE Bureau and PRIDE staff. Following is a summary of the findings for each area.

B1. Environmental Training of Special Interest

An immediate need for additional information in this area was not demonstrated. Some training areas are of interest but actual training needs do not appear to be a high priority. R&D/ENR has assembled information on training and the environmental

information system should tap this and other sources.

The training needs identified fell into three categories:

- Training for staff (USAID, PRIDE, missions)
- Training that would be offered as part of PRIDE (short courses held in regions)
- Requests for training information from clientele groups

B2. Private Sector Pollution Prevention Technologies

An immediate need for information in this area was demonstrated. The information sources that PRIDE staff are using are inadequate or do not provide appropriate information. Specifically, information is not readily accessible on:

- Pollution prevention equipment manufacturers and service companies
- In-country case studies (showing costs, follow-up reports, observed results, etc.)
- Pollution prevention training, maintenance, and operation providers

B3. Sources of Environmental Information

This information is clearly needed. Specifically, more information is needed on:

- Environmental education (colleges and universities)
- Environmental experts
- Environmental communication materials
- A wide range of technical subjects

In addition to the initial three areas, needs were identified in the following areas:

- Information related to Near East countries
- Mission and site-specific information (including previous projects)
- Policy-related information
- Development indicators
- Baseline data on environmental conditions/problems in Near East countries

C. General Analysis

Several general issues were identified:

- People are reluctant to use information because they do not know if it is valid. Information and sources must be validated to determine if they are accurate, relevant, useful, and current.
- The information must be easily accessible to users. Existing resources for information, such as CDIE and the Chemonics librarian, are underutilized, while project staff have not identified other resources (i.e. the *Access EPA* publication).

The information sources must be summarized in fact sheets and other media to present the information in a way that increases awareness and accessibility.

- Current practices of obtaining information are time-consuming. Most efforts require a two- to three-step process (calling someone who has to call someone else, etc.) which result in time delays and excessive costs for the PRIDE project
- The PRIDE environmental information systems must be flexible, offering a variety of media to maximize the transferability of information and allow access to the maximum number of relevant users.
- The information systems should be able to access, or at least identify, existing databases not developed or controlled by PRIDE or the NE Bureau and allow for information retrieval.
- Information system users should help strengthen the database and systems.

D. The Need for Environmental Information

Environmental information is used by a variety of agencies and organizations such as:

- USAID missions
- Clientele based on requests (the Hill, etc.)
- National environmental affairs agencies
- Other government agencies. EPA, Commerce, USGS, NOAA, Coast Guard, Department of the Interior
- Procurement officers and decision makers
- Participating developing countries (government ministries, NGOs, private sector)
- World Bank, WEC

This information is used to write reports, develop programs, prepare for environmental evaluations, and prepare for pollution prevention audits. It is also used to answer requests. Accurate, comprehensive, and timely data is essential in defending PRIDE's positions to the U.S. government and providing for a monitoring and evaluation framework

E. Impact of Inability to Obtain Information

Incomplete information could result in expenditures on the wrong activities with a potential loss of future funding. More likely is a compromise in the quality and quantity of information that PRIDE can provide its clientele. Difficulty in obtaining information can also result in delays that can damage the organization's credibility and disrupt work flow. Requested information often requires a two- to three-step process involving several people before the information is obtained or is determined to be unavailable.

To compensate for missing information, networking and referrals are often used. Theoretical knowledge, experience, and statistics are used as well.

F. Environmental Training of Special Interest

Several key sources of information on environmental training have been identified. In general, environmental training was not a priority for those interviewed (pollution prevention training is dealt with separately). Training information provided through USAID and EPA met most staff training needs. The need for training offered by PRIDE could best be supported by maximizing the availability of environmental information to be used in developing training courses.

The goal for maximizing the use of training resources would be to collect existing information and develop a listing of training opportunities which would be readily available to users.

Actual training is available in a variety of media: video, classroom, hands-on, etc. The effectiveness of one type of training compared to another depends on the situation, although survey participants preferred hands-on training. To be most valuable, training must:

- Present a set of principles
- Provide for practical exercises that take a participant through all relevant learning experiences in applying those principles
- Emphasize applications to real world problems
- Be cost- and results-effective

F1. Certifications

Certificates were thought to be important for developing countries, but easily abused. It is often difficult to determine the quality of the degrees offered through certificates or diplomas conferred in developing countries.

G. Private Sector Pollution Prevention Technologies

There is an *immediate* demand for more information related to pollution prevention. This area is one where information particularly needs to be validated. Additionally, the distinction between pollution control and pollution prevention must be maintained. Many sources may have information on pollution control--not pollution prevention. Pollution prevention technologies and information of special interest for applications in the Near East as identified by James Westfield of PRIDE include technologies that:

- Conserve water
- Deal with organic solvents
- Focus on handling, reclaiming, and reusing metals and metal salts

Required information related to pollution prevention is difficult to obtain due to the relatively new focus in this area. Information is lacking (or limited) for:

- Costs and returns of the production process (specifically in-country)

- Pollution prevention technologies to be applied
- Pollution prevention equipment and service providers

A need for an institutional pollution prevention database, listing specific company and production information was also confirmed. This database would contain the following pollution prevention information (or access to existing sources):

- Service/maintenance companies
- Equipment manufacturers and providers
- Equipment and technology performance data
- New manufacturing technologies
- Pollution prevention consultants

H. Sources of Environmental Information

Environmental information is not readily accessible and/or shared among organizations. Individuals have their own resource pool and one-of-a-kind reports. It is likely that although AID/NE has the "best source of information on the environment and the Near East," this information is not organized in a manner that is readily accessible, and there is no complete inventory of it. The limited use of CDIE may be due to the fact that many documents used by the NE Bureau are not submitted or not generated by USAID projects. To determine existing resources, a complete inventory and organization of the NE Bureau files would be necessary.

PRIDE staff rely heavily on referrals and networking to obtain environmental information. However, this is very time-consuming. Information needs to be readily accessible and reliable to avoid the need for referrals.

Telephone directories are heavily used (in particular the EPA and USAID directories). The World Bank and Chemonics directories are used as well. Other types of information are used primarily on a project basis with only a small portion of the necessary information being relevant to the PRIDE project.

The form of information varies -- electronic diskettes, CD ROM, hard copy, and reports. Directories are mostly accessed on-line through local networks, but a large portion of the environmental information used is in hard copy.

Environmental information needs to be up-to-date, as the environmental field is changing constantly. It is important for the PRIDE project to be on the cutting edge of technologies and information as it is a source for the U.S. Government as well as other clients. With the new government administration's emphasis on the environment, it is likely that PRIDE will see an increase in demands for information.

Abstracting is critical; a thesaurus with clear descriptions is needed (pollution prevention is new and not always listed).

SECTION IV

SOURCES OF ENVIRONMENTAL INFORMATION

This section summarizes the sources of environmental information that were identified during Task 4. CSG has maintained a "Source Book" which contains all notes and access information for the sources described in this section. This information is available to PRIDE project staff upon request. A small sampling of this information is included in Annex C. The source book will also serve as the starting point for phase two of the development of PRIDE environmental information systems. It contains information on how to access more than 200 sources of environmental information. Each identified source may also have information in a variety of identified areas of need. The following matrix shows the multiple uses for the sources listed (Figure 3). Following is detailed information for the source groups identified in this matrix, divided among the four groups listed below:

- Development and environmental organizations
- Related organizations
- Environmental databases and clearinghouses
- Additional environmental information resources

Figure 3. PRIDE Information Systems Sources

Source	Environmental Training of Special Interest	Private Sector - Pollution Prevention Technology	Sources of Environmental Information	International & Country Specific Information	Environmental Experts
USAID	•	•	•	•	•
Chemonics	•	•	•	•	•
PRIDE	•		•	•	•
EPA	•	•	•	•	•
World Bank	•		•	•	
UNIDO	•	•	•	•	•
UNEP	•	•	•	•	•
WEC	•	•	•	•	•
WHO			•	•	•
Universities	•	•	•		•
States	•	•	•		•
Consulting Firms	•	•	•		•
Fortune 500	•	•	•		•
Associations	•	•	•		•
N E Embassies				•	
International Databases		•	•	•	
Environmental Databases	•	•	•		
Clearinghouses	•	•	•		
PPIC/PIES		•	•		
Directories		•	•		
Publications/ Journals		•	•	•	
Patents		•			
Law Firms			•		
Grants		•			
G.P O			•		
Libraries			•	•	

A. U.S. Agency for International Development

USAID serves as a source for a variety of information. Environmental impact statements and assessments, on-line reports, PIDS, and other reports may be useful sources of information as well as the following sources within AID/W.

A1. USAID Library

All publications from the USAID library in Rosslyn, Virginia are available through CD-ROM. There is no hard copy inventory. A search for country-specific pollution prevention and environmental information should be done to provide an abstract of available relevant information.

A2. USAID Directory

A directory of all USAID staff and bureaus is available on-line. Hard copies are also available. The directory is updated every month (with a six-month lag).

A3. Center for Development Information and Evaluation (CDIE)

Located at AID's Development Information Center (DIC) in Rosslyn, Virginia, CDIE provides the most complete set of AID-funded documents as well as other materials related to development and AID work. Documents are available on microfiche or in hard copy (free to AID employees). The database of all documents is available on CD-ROM for \$120 per year with quarterly updates. CDIE also provides a *New This Month* newsletter.

A4. USAID Training Officer/Courses

Information on USAID-sponsored training opportunities is available through regular AID notices and also by contacting the training officer.

A5. Environmental and Natural Resources Policy and Training Project (EPAT)

EPAT is a resource for information on environmental training, consulting companies, experts, and in-country research data. The project produces a publication which outlines training opportunities.

A6. Short-Term Training Opportunities in Environment and Natural Resources

This publication lists more than 350 training opportunities offered by international organizations, universities, NGOs, and other agencies. Training opportunities are grouped into 15 categories. Although the original document was released in January 1991, complete address and contact information is provided for the organizations listed and is still of great value. A listing of the training categories is provided in Annex C.1.

B. PRIDE/NE Bureau

The PRIDE project has environmental assessments and various field reports that serve as a resource. In addition, several other sources exist:

B1. Resume Files

Chemonics maintains a PRIDE resume file for experts who have been used on the project. In addition, John Woods maintains a file of approximately 30 resumes of environmental experts.

B2. PRIDE Library

A complete listing of all information maintained in the PRIDE library at the Chemonics field office is in hard copy format.

B3. NE Bureau

Historic files and one-of-a-kind reports can be accessed. The files would have to be organized and indexed to provide more complete information that would be easier to obtain.

B1. PRIDE Mailing List

This list is available on diskette.

C. Chemonics

C1. Library (M street office)

In addition to the library resources, Chemonics librarian Richard Wahl is available to do on-line searches. Requests can be sent by E-mail or fax, listing subjects with specific terms to be searched via DIALOG. There is no charge for these searches. A summary of the library information related to PRIDE would also be prepared for inclusion in the information systems.

C2. Master Roster File

A master roster file listing all Chemonics consultants and employees can be accessed to obtain information on environmental experts.

D. EPA

D1. Access EPA

Access EPA, an annual publication, provides key publicly available information resources on every environmental topic. Detailed descriptions with complete contact

information are provided. It includes environmental resources of EPA and other public sector organizations in these areas: clearinghouses, databases, dockets, EPA scientific models, documents, libraries, and records programs. It also contains information on state environmental libraries, government document ordering services, and federal depository libraries. A description of this document is found in Annex C.2.

D2. EPA Library

On-line searches can be done from any computer with a modem. The library is also open to the public. Routine searches for pollution prevention information and country-specific information should be done and summaries provided.

D3. EPA Telephone Directory

The EPA telephone directory offers an EPA organizational listing, an alphabetical listing of personnel, a subject guide to offices, E-mail addresses, a hotline directory, listing of regional offices, and general information. It is produced twice a year with supplements and is available on-line or in hard copy.

D4. Training Courses

The EPA Institute serves as a national clearinghouse for all EPA training activities. It also serves as a "broker" with other agencies. Services are provided to all federal agencies and environmental organizations. EPA also produces an annual list of pollution prevention training opportunities which is available through PPIC.

E. World Bank

The World Bank is a source of country-specific information, training, development indicators, and case studies. World Bank sources of information are listed below.

E1. Index of Publications

A complete listing of publications produced by the World Bank is available in hard copy and on-line.

E2. Environment Division

Unpublished reports and other types of information may be available from the Environment Division.

E3. Economic Development Institute

Training courses are offered at no cost to participants from developing countries.

E4. World Bank Libraries

Information is available on-line. World Bank libraries are located at several locations.

F. United Nations

The United Nations has several programs that provide both on-line and hard copy information related to the environment. A listing of publications can be obtained as well as information on how to access the databases. UN programs are listed below:

F1. United Nations Environmental Programme (UNEP)

UNEP has publicly available publications as well as several other programs. Its Cleaner Production Program focuses on pollution prevention and waste minimization and establishment of a network to provide for the transfer of environmental protection technology. The International Cleaner Production Clearinghouse (ICPIC) is also a UNEP activity (accessible through PIES). ICPIC contains information on cleaner production methods, and on industries using such technologies.

F2. United Nations Industrial Development Organization (UNIDO)

UNIDO assists developing countries with technology transfer and cleaner production processes through technical projects, equipment and/or advisory services, investment promotion schemes, and human resource development through training and fellowships. UNIDO also maintains a database with abstract information on such projects.

G. World Environment Center (WEC)

WEC is an independent, non-advocacy organization that makes available a consortium of volunteer experts in the areas of environment, economics, energy, and education. The WEC sponsors two programs:

G1. International Environment and Development Service (IEDS)

IEDS provides pro bono services of environmental, health and safety volunteer experts to developing countries

G2. International Environment Forum (IEF)

This program provides for an international network of government and industry contacts dealing with environmental and resource management issues.

H. Related Organizations

H1. Associations

Associations are a source of information on pollution prevention companies, environmental experts, training opportunities, publications, journals, and newsletters. The associations need to be validated to ensure that the membership and resources are relevant to PRIDE, and to determine the costs of obtaining information. Abstracts on each association can be obtained through on-line searches in DIALOG from the *Encyclopedia of Associations*. A listing of potentially relevant associations is provided in Annex C.3.

H2. Environmental Consultants and Companies

The *Consultants & Consulting Organizations Directory 1992*, a listing of over 17,000 consultants and organizations by major industry, can be accessed on-line through DIALOG. It is also available in hard copy at most reference libraries. A search can be conducted for environmental experts (even by specific terms) for a more detailed listing of experts. A sample abstract is included in Annex C.4. The *Who's Who in Environmental Engineering* directory, produced by the American Academy of Environmental Engineers, is also a source of information.

H3. Universities and Colleges

Information on all U.S. institutions offering graduate programs in the environmental field can be found in *Peterson's Guide to Graduate and Professional Programs*. This reference book is available in hard copy and can be accessed on-line through DIALOG. Information is indexed by institution as well as by degree offered. The abstract on each program includes a detailed description of courses and programs offered as well as a listing of all faculty. This information is a source of environmental experts, case studies, pollution prevention technologies and training opportunities. It is recommended that each institution offering environmental degrees be contacted (by letter) to obtain such information. Sample abstract/index listings as well as a list of additional educational organizations identified are included in Annex C.5.

H4. Fortune 500 Companies

Fortune 500 companies such as Dow Chemical and 3-M (see Annex C.6 for complete listing of those identified) are a source of the following information:

- Experts (consultants/retired employee lists)
- Pollution prevention and other related case studies
- Training opportunities
- Pollution prevention vendors
- Environmental communication materials

H5. Near East Embassies

Embassies representing Near East countries are a source of country-specific information, travel, trade and regulatory information. A list of the Near East embassies is provided in Annex C.7.

H6. State, Regional, and Local Organizations

States offer information on pollution prevention companies in their state, experts, environmental communication programs, and recycling and training opportunities. Information on state offices and programs can be accessed on-line through DIALOG. Each state should be contacted for information on programs, training, and companies related to the environment. Additional sources include:

- *Directory of State Environmental Agencies*, produced by the Environmental Law Institute, lists state environmental agencies and programs offered.
- *Access EPA* lists all state environmental libraries, etc.
- *State Representatives*, a directory of all senate and house offices, is available free.

H7. Other Government Agencies

Other government agencies are sources for limited training opportunities and trade and investment information.

H7a. National Oceanic and Atmospheric Administration (NOAA)

NOAA has an environment division and its database (Norlink) can be accessed. In addition, the NOAA library is open to the public.

H7b. U.S. Coast Guard

The *Directives, Publications, and Reports Index*, available from the Coast Guard, lists all its literature including library materials. Requests can be made for publications from this list.

H7c. Patent Office

A search of pollution prevention technology and equipment patents would be conducted as well to identify additional sources of information.

H7d. World Health Organization (WHO)

WHO provides information on the impact of environmental factors on health and has a listing of its publications.

I. Environmental Databases and Clearinghouses

Test searches need to be conducted to determine the types and usefulness of data and

information available from environmental databases and clearinghouses.

I1. Environmental Databases

A listing of environmental databases available through DIALOG is provided in Annex C.8. Additional sources of information on environmental databases include:

- *Directory of On-line Databases*
- *World Environmental Directory*

I2. International Databases/Clearinghouses

Several international databases have been identified, such as those listed below. Additional database information can be found in the CSG "Source Book."

I2a. INFOTERRA

INFOTERRA is an international environmental referral and research service made up of 140 countries coordinated by UNEP. It provides access to more than 600 international sources of environmental information. INFOTERRA's office in the United States is located at the EPA library.

I2b. International Cleaner Production Information Clearinghouse (ICPIC)

The ICPIC relays the activities of the UNEP industry working groups which presently include leather tanning, textiles, solvents, metal finishing, pulp and paper, biotechnology industries, petroleum mining, and food processing industries. This database is linked with PIES.

I2c. Technical Information Packages (TIPS)

TIPS is a miniature resource library that focuses on 14 environmental topics. TIPS compiles in one location a large amount of technical environmental information. TIPS can be accessed through selected sites worldwide and a directory is available. It is tailored to developing countries where environmental information is difficult to obtain.

I2d. Pollution Prevention Information Clearinghouse (PPIC)

PPIC is a distribution point for EPA documents and fact sheets dealing with source reduction and recycling. It also provides a referral service for pollution prevention questions. A list of free pollution prevention publications is found in Annex C.9.

I2e. Pollution Information Exchange System (PIES)

PIES is a database that provides the following information: federal, state and corporate program summaries, case study abstracts, general publication abstracts, PPIC

Contact List, pollution prevention grants, and the Pollution Prevention Environmental Education Abstracts Database. A brief description of PIES can be found in Annex C.10.

I3. Clearinghouses/Source Directories and Databases

- Trade Database (Hagler, Bailly)
- Environmental and Energy Efficient Technology Transfer Clearinghouse
- Info-Power
- The Clearinghouse Directory

J. Additional Environmental Information Resources

J1. Grants

A listing of publicly available government grants may provide information on companies receiving awards in the environmental field and new technologies being funded.

J2. Law Firms

Major law firms specializing in environmental policy/law need to be contacted to identify sources of information on legal issues related to the environment.

J3. Publications/Journals

A listing of environmentally related publications and journals is provided in Annex C.11. PRIDE staff need to identify specific publications of interest. Sample copies of other publications could be obtained and solicited to determine if they should be maintained. Abstracts of publications can also be accessed through on-line services such as DIALOG.

J4. Industry Directories and Buyers Guides

To obtain information on companies that provide services and equipment for pollution prevention, several key associations and directories with specific company information would be targeted. An on-line search of PRETICAST, which lists U.S. companies and profiles, can also be done through DIALOG. Annex C.12 lists industry directories and buyer's guides.

J5. Libraries

Information on accessing other libraries, such as the Library of Congress and city and university libraries, should be compiled along with a summary of the types of environmental and country-specific information they have available.

J6. U.S. Government Printing Office (GPO)

A variety of publications are available from the GPO. Subject specific indexes are free of charge.

SECTION V SHORT-TERM RECOMMENDATIONS

This section contains CSG's recommendations for immediate implementation of PRIDE information systems. A description of each recommendation includes guidance on how to implement it. The recommendations are presented in a suggested priority order. These suggestions were developed with the intent to not only provide cost-effective solutions to information flow problems (through automation and work flow/process reorganization), but also to provide more integrated information systems, which will minimize the redundancy and inefficiency involved in gathering, using, and maintaining environmental information that PRIDE needs. The recommendations are oriented toward a set of unified information systems which can be relied upon to provide immediate and accurate information for PRIDE needs.

A. Structure of the PRIDE Information Systems

Development of two PRIDE information systems is recommended, based on the areas of priority identified in "Section 3: Requirements Analysis." Information would be accessible between the two systems. The systems are described below.

A1. Environmental Information System

Environmental training would be collapsed under the general sources of environmental information. This system (which includes a database) would contain the following types of information, listed in the suggested priority order for obtaining information:

- Consultant roster file (for environmental experts)
- Broad-based institutional files
- Access to USAID files
- USAID project data
- Sample environmental education materials
- Country-specific information
- Key technical literature, journals
- Training opportunities/materials
- Key newsletters
- Pollution prevention information (downloaded from Pollution Prevention Information System)

A2. Pollution Prevention Information System (PPIS)

This system would have the following types of pollution prevention information, listed in the suggested order of priority for obtaining information:

- Institutional database
- Technologies
- Training opportunities

- Training opportunities
- Trade and investment information
- Practices/case studies
- Research data
- Access to additional pollution prevention databases
- Association information

The information systems for these two areas would be developed over a six-month period. The initial PPIS database would be completed and made available to the project users within two months. This would allow PRIDE staff to use the database as a tool in other tasks, while generating suggestions to refine and augment it with materials the user suggests or supplies.

B. Deliverables

CSG recommends that the four products listed below be developed for the PRIDE environmental information.

B1. General Front-End Database

A user-friendly front-end database following a simple pull-down menu structure, would contain abstracts, source information, and on-line access for existing sources where possible. This database would provide the user with access to the Environmental Information and Pollution Prevention databases.

B2. Environmental Information Systems Database Prototype

This database would provide on-line access to information that could not be accessed easily from other databases. Such information may include a consolidation of training opportunities (which would allow retrieval of training opportunities on a monthly/weekly basis); a consolidation of information on environmental experts, including contact information; and a listing of universities that provide environmental degrees.

B3. Pollution Prevention Industry Database Prototype

This database, drawing from existing sources plus additional sources to be identified, would contain the following information:

- Company name
- Address
- Phone/fax
- Contact name
- Capacity of company (size of operation in United States and overseas)
- Export ability (to include information on export licenses held, branch offices or sales agent locations, and a list of Near East countries where the firm's product(s) are known to have been sold or installed)

- Cost of equipment/services
- Products manufactured (to encompass data on product names, product descriptions, industries/processes/settings where the product could be applied, other requirements for product usage, and any limitations on the product applications)
- Competitors (optional)
- Performance data (optional)
- Date information obtained (routinely updated)

B4. Source Book

This source book would contain fact sheets, information on how to access existing sources of information, information summaries, etc.

C. Database Maintenance, Management and Upgrading

Database maintenance, management and upgrading under a database administrator will require routine cost investments in people, licensing data, computers, software upgrades, etc. Depending on its value and importance to USAID, an independent contractor such as SAIC, an NGO, or a service bureau, one organization would take ownership and responsibility for that function. The responsible organization will develop the appropriate financial mechanisms to recover the cost of maintenance, management, and upgrades through license fees, subscription fees and other appropriate charges.

It is also recommended that a database administrator be assigned responsibility for providing interim support for the database and processing of information during development of the Environmental and Pollution Prevention Information Systems. The level of effort required to fulfill the tasks of the database administrator is estimated at between 25 percent and 75 percent of a full-time equivalent. The precise level will be determined by the size and volatility of the databases which will be derived during the Work Order effort and "live" usage of the prototypes. To maintain the systems, PRIDE would need to provide the following:

- A 486 class PC computer with a 9600 baud modem, 5 1/4" and 3 1/2" floppy drives, a 200 MB or larger hard disk, and a CD ROM drive
- Space for bookshelves that would contain reference materials, publications, etc.
- An optional VCR and screen (for viewing training/technology videos)
- An administrator (initially part-time) to answer calls for requests and to collect and update information
- Telephone and access to a fax machine
- Budget for the purchase/renewal of information and database sources

D. Recommended Tasks for Phase 2

This section outlines the recommended tasks and timeframe for the second phase of the PRIDE environmental information systems development project. The major tasks for this phase are grouped into two categories:

D1. Database Development

These five steps are recommended for design and development of these databases:

- Step 1. **Requirements Analysis:** Evaluate types of information to be input into the system and the desired output of that information. Verify information suitability and completeness with users.
- Step 2. **Design:** Based on the requirements, the database design would include:
 - User interface
 - Database structure and design
 - Application functionality
 - Review of interface design with key users through rapid-prototype examples of screens and function options
 - Development and implementation of a test plan based on the database design and requirements identified during analysis and design
- Step 3. **Development:** Create screens and database to meet design specifications.
- Step 4. **Testing:** Conduct testing utilizing test plan devised and approved in Step 2.
- Step 5. **Documentation:** Develop end user documentation.

D2. Processing/Collecting Information

The following steps are recommended for processing and collecting information for both the Environmental Information and the Pollution Prevention systems:

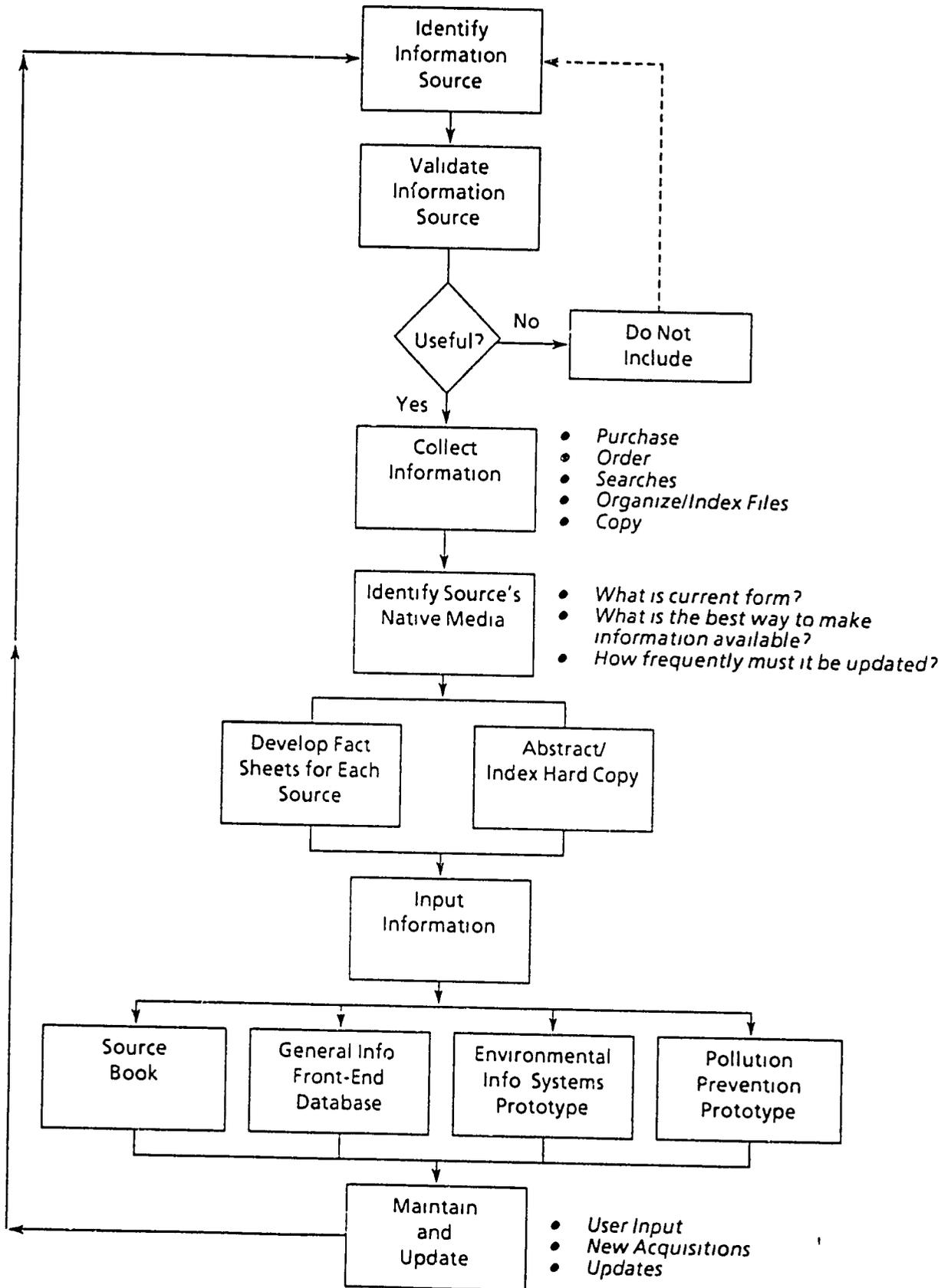
- Step 1. **Procedures:** Set up procedures for collecting and processing new and incoming information immediately. As suppliers/manufacturers are identified and contacted for information on the capabilities and offerings, the data will be added to the database. Additionally, an established pattern of re-contacting sources (by phone or mail) should be initiated to obtain on-going information on product upgrades and new offerings. This will help keep the database current.
- Step 2. **Validation:** Validate information and sources for accuracy, relevance, etc. The re-contact cycle will serve this function as well.
- Step 3. **Collection:** Collect and organize information and sources in the form of fact sheets, inventories, abstracts address information, etc.
- Step 4. **Determine Appropriate Medium:** Determine the appropriate medium and then maintain or convert information to that form. The media to be used would include electronic (diskette/CD ROM), hard copy (books, fact sheets), and commercial (linking into existing sources/databases). Each

source will be reviewed to determine the frequency of updates needed to maintain accuracy of information. The update, re-contact cycle timing will become part of the data carried on the database for the manufacturer or supplier.

- Step 5. Abstract/Index: Abstract and index documents to be included in source information.
- Step 6. Input Information Input information and sources into the database to generate reports and allow easy access to information and sources.
- Step 7. Maintain and Update: Maintain and update the systems (responsibility of administrator).

The flow for processing and collecting information is outlined in Figure 4.

Figure 4.
PROCESSING/COLLECTING INFORMATION FLOW



E. Recommended Timeframe and Level of Effort for Phase 2

It is recommended that the PRIDE information systems be developed over about a six-month period from April 5 through September 15, 1993. Maintenance of these systems would be ongoing. The total level of effort for Phase 2 would be 105 days, broken out as follows:

E1. Develop General Systems (22 days total)

E1a. Develop Procedure (2 days)

This activity would be a design effort to synthesize more exactly the activities that would be part of the database systems implementation, usage, and maintenance.

E1b. Develop General Front-end Database (10 days)

In this activity, the front-end database requirements would be converted into system applications, the functional linkages between the database components detailed, and the interfaces laid out for review. Once the design is finalized and approved, the software routines to implement the design would be written and tested.

E1c. Develop Source Book (10 days)

Under this activity, materials to be included in the source book would be assembled and reviewed. Its format and contents would be specified and reviewed. Once the contents are approved, the source materials would be converted into the required format and entered into the source book files. The book would be then edited and proofed before being published.

E2. Develop Pollution Prevention Information System (33 days total)

E2a. Develop Pollution Prevention Industrial Database Prototype (13 days)

Under this activity, the design and contents of the Pollution Prevention Industrial Database will be finalized and reviewed with the PRIDE staff contact. Existing databases containing pollution prevention companies and equipment will be reviewed and obtained if appropriate. Once the database structure has been approved, and the anticipated patterns of database usage discussed and outlined, the database and its interfaces will be implemented. Testing of functionality will be performed to ensure operational integrity.

E2b. Validate Sources (5 days)

This activity will involve reviewing known sources with the assistance of the PRIDE staff contact to finalize the initial set of sources from which information on manufacturers and suppliers of pollution prevention and clean technology equipment and processes will be extracted and/or solicited. The names/addresses/phone numbers of manufacturers and

suppliers active in pollution prevention and clean technology areas will be derived from this list. A letter will be drafted soliciting information from these organizations to establish their records in the database. These letters will be sent to all identified organizations to supplement any specific data that is already in hand or available from other sources (external databases, source books, trade journals, etc.). Phone contact, where appropriate, will be made in lieu of, or as a follow-up to, the solicitation letter.

E2c. Collect Information (7 days)

This activity will focus on assembling information from the sources identified in Work Order #27, as well as from the solicitation to manufacturers and suppliers outlined in the previous activity. Information will be reviewed and follow-up contact initiated with the manufacturer or supplier where it is felt to be incomplete, out of date, or inappropriate for the Near East Region.

E2d. Identify Native Media (1 day)

This activity will involve building a source-by-source data log noting the media in which the source information is being made available to the Pollution Prevention Information System. This information will be included in the source book records

E2e. Abstract/Index (3 days)

Information for each record will be abstracted for entry from the material acquired in the data/information collection activity.

E2f. Input Information (4 days)

Once the data has been assembled and the data elements abstracted for each database entry, information will be entered into the database. The database software functionality and integrity will also be tested in this phase.

Note that it is extremely difficult to estimate the anticipated size of the prototype database that will result from the activities outlined above. Many of the results depend on the rate of response to the information solicitation of manufacturers and suppliers. Given the sources of names of potential contributors that have been identified during Work Order #27, at least 500 organizations could be contacted during the prototype effort with the resulting database size estimated at approximately 250 companies. At least one follow-up letter or call could be made three to four weeks after the first letter was sent to generate feedback from non-respondents. Further attempts to obtain information from organizations not responding after two attempts would have to be moved beyond the scope of the prototype effort because of the need for PRIDE staff to have a working prototype 10 to 12 weeks after the start of this activity. Even so, the basic contact information in every organization would be included in the prototype database so that ongoing efforts could be made to increase participation in the Near East Region.

E3. Develop Environmental Information Systems (50 days total)

E3a. Finalize Environmental Information Systems Database (10 days)

Under this activity, the design and contents of the Environmental Information Systems Database will be finalized and reviewed with the PRIDE staff contact. Once the database structure has been approved, and the anticipated patterns of database usage discussed and outlined, the database and its interfaces will be implemented. Functionality will be tested to ensure operational integrity.

E3b. Validate Sources (10 days)

This activity will encompass a review of known sources with the assistance of the PRIDE staff contact to finalize the initial set of sources from which information on the environment will be obtained. Sources and sample materials will be reviewed to ensure that they are useful and easily accessible. Samplings from various environmental databases will be obtained and summaries of materials from sources (such as libraries) reviewed to ensure that they are appropriate for the database. Efforts will also be made to simplify the access to sources. For example, PIES provides access to ICPIC as well as many other databases, so that each one does not have to be accessed individually.

E3c. Collect Information (13 days)

This activity will focus on assembling information collected from the sources identified in Work Order #27, as well as received as a result of solicitation efforts, such as to universities. Information will be reviewed and follow-up contact initiated with the sources where it is felt to be incomplete, out-of-date, or inappropriate for PRIDE applications.

E3d. Identify Native Media (4 days)

This activity will involve building a source-by-source data log noting the media in which the source information is being made available to the Environmental Information System. The best way to maintain the data will also be determined. This information will be included in the source book records.

E3e. Abstract/Index (7 days)

Information from reports, documents, and other sources will be abstracted for inclusion in the database as necessary. Where reports/information abstracts already exist, efforts will be made to access these sources (such as the CDIE CD-ROM). One-of-a-kind reports and miscellaneous information will need to be abstracted and indexed.

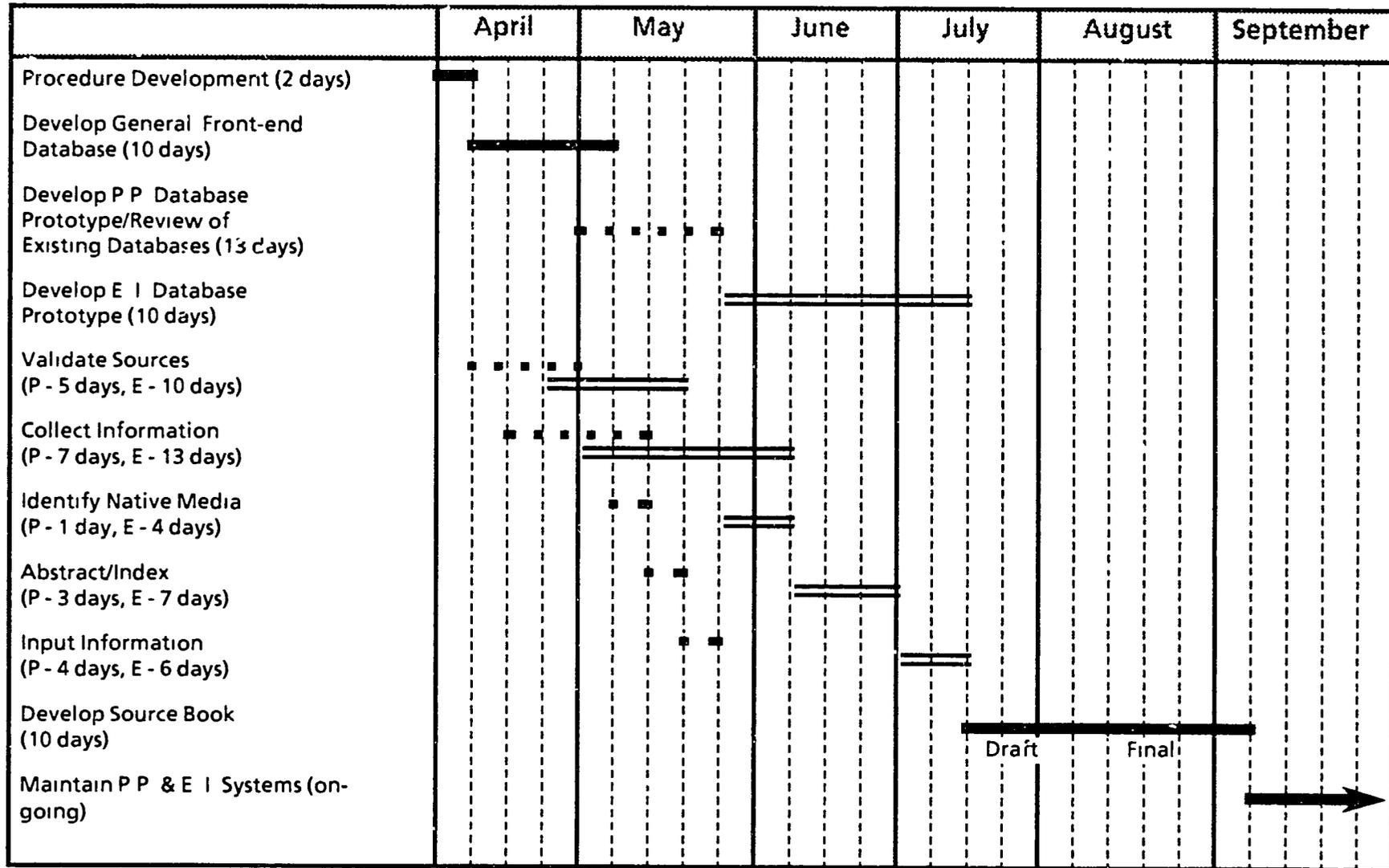
E3f. Input Information (6 days)

Once the data has been assembled and the data elements abstracted for each source entry for the database, information will be entered into the database. The database software

functionality and integrity will also be tested in this phase. The proposed timeframe for the PRIDE information systems development is outlined in Figure 5.

Figure 5.
Proposed Time Frame For
PRIDE INFORMATION SYSTEMS DEVELOPMENT (April 5 - September 15, 1993)

V-11



General **—————** Pollution Prevention (P) **■ ■ ■** Environmental Information (E) **====**

19

SECTION VI
LONG-TERM RECOMMENDATIONS

A. Pollution Prevention Information System

A pollution prevention information system should be developed immediately for critical information needs. As a long-term recommendation, the proposed design could be integrated into the Pollution Prevention and Clean Technology Center project in the Near East with little or no alteration necessary if deemed appropriate.

B. Environmental Information System

The environmental information system is expected to develop into an Environmental Information Center, under USAID's supervision.

The Source Book for the Center would be widely circulated (or even sold). The center would require an administrator to maintain the database and information.

ANNEX A

**PRIDE WORK ORDER # 27
AND STATEMENT OF WORK**



PRIDE Work Order #27

TO: Raj N. Shah
Capital Systems Group, Inc.

FROM: Larry Morgan, PRIDE Team Leader *Larry C Morgan*

REF: Project in Development and the Environment (PRIDE)
USAID Contract ANE-0178-C-00-1046-00
PRIDE Subcontract NE-0178-C-00-1046-00-04

ACTIVITY: PRIDE Environmental Education Component AWP-2 Activity #4.F
NE Source Book and Data Base

DATE: 23 November 1992

Under the terms of the referenced subcontract, this Work Order is issued to Capital Systems Group, Inc. (CSG) under the following terms:

SCOPE OF WORK -- CSG will provide services to support the development of the USAID/PRIDE environmental information systems.

A. Background

The PRIDE Core Contract, Task 2, specifies that an "information clearinghouse" will be developed in cooperation with the NE Bureau. It is to serve the Bureau, USAID Missions and host country organizations. During the first year, a small Work Order was given to CSG to prepare a Scope of Work for developing a PRIDE clearinghouse. CSG completed this and submitted it to PRIDE on April 10, 1992. This led to a series of discussions with the NE Bureau where there was a feeling that "another clearinghouse was not needed." Therefore, the work was put on hold

During the discussions for the PRIDE Second Annual Work Plan it was realized that PRIDE, NE Bureau and other groups were gathering large amounts of information on companies and services, training opportunities, environmental data bases, and other subjects. This information was not being organized and packaged in a form which anyone could use. While it was agreed that a full fledged information clearinghouse was not needed, there is a need to create some type of "information system" which allowed USAID and other groups to access information that had been collected and in some cases to access additional information of particular relevance to the NE and PRIDE clientele. Therefore, it was decided that this activity would be once again opened up and a new look be made.

This Work Order is the first phase in developing these information systems. Three areas have been selected--private sector, training, and environmental information sources--where high priority has been given to develop information systems. The information systems created in the future could be simple files, electronic data bases, communication systems to access other data bases, or a combination of these.

B. Definition of Initial Subjects for Information System

1. Sources of Environmental Information: The objective of the PRIDE work is to avoid duplicating other information systems. Therefore, the heart of this activity is to identify what information is already available, determine what is relevant to the NE region AID program, and establish mechanisms to access the information. This data base would focus on gathering information on environmental clearinghouses, data bases, libraries, CD-ROMS, and other information sources which could be of interest to USAID and cooperating environmental agencies in the NE (government, private sector, NGOs, educational institutions, research organizations, etc.)

2. Environmental Training of Special Interest to the NE: This data base would include information on the following types of courses which would be of interest for officials of governmental and non-governmental agencies in the NE:

- a. One-time courses
- b. Courses offered repeatedly
- c. Courses offered on demand

3. Private Sector--Pollution Prevention Technologies: The PRIDE Private Sector component, NE Bureau EPSINE activity, and other initiatives will require information on companies supplying pollution prevention technologies, consultants, research data, and other information. This data base should focus on water conservation, organic solvent reclaiming, and metal reclaiming. The first priority will be to identify companies who are producing PP equipment and non-polluting raw materials (estimated 100-500 companies); second priority is PP service and supply companies (est. 200-500 total); and third priority is consulting/training/technical assistance related companies (est. 1,000-2,000). PRIDE is interested in getting the highest coverage, or "hits," on the first priority companies (hopefully 85 percent hits). If information can be captured on associations, associate government agencies, conferences/meetings, and journals/publications, then it should be included in the data base. However, the primary focus will be on companies.

C. Tasks to be Performed

For this initial activity, requirements analyses will be done in three areas--training, private sector, and information sources. This should serve as a broad based survey of the key information needs for USAID and PRIDE. The second task will be to survey the sources of environmental information and how they can be accessed. The third step will be to begin grouping categories of information needed by various users so that priorities can be established. The final step in this WO is to prepare recommendations for how to proceed on phase two of this activity.

1. Environmental Training of Special Interest to the NE

a. Requirements Analysis--Working with John Woods, Brenda Wilson (Chemonics Participant Training Manager), NE Bureau, John Swallow (R&D/ENR) and others to determine what information is needed and how it will be used. Prepare a flow chart/plan of action.

Estimated LOE: 4 days

The follow up phases for this area will be done as part of the follow up action to this Work Order, after the review (step #5 below) is done on these systems.

2. Private Sector--Pollution Prevention Technologies

a. Requirements Analysis--Working with the PRIDE PS Analyst, NE Bureau and others, determine what types of information is needed, prepare a flow chart/plan of action on designing the data base.

Estimated LOE: 3 days

The follow up phases for this area will be done as part of the follow up action to this Work Order, after the review (step #5) has been done on these systems.

3. Sources of Environmental Information

a. Requirements Analysis--Working with John Woods, Larry Morgan, James Westfield, NE Bureau, Richard Wahl, HCG/RGI, SAIC, and others to determine what other types of information is needed. This will build upon items 1 and 2, but will also explore if there are other priority areas where clients will need information. Prepare a flow chart/plan of action. As part of this assessment, CSG will look at the PRIDE mailing list and see where it fits into the overall information systems to be developed.

Estimated LOE: 5 days

4. Sources of Information--Identify where environmental information needed by AID and PRIDE can be captured through various sources. Included in the search will be reviewing the RCG/HBI energy data base, SAIC Pollution Prevention clearinghouse, EPA data bases; working with Richard Wahl (Chemonics Librarian/Archivist), WEC librarian, and others who are knowledgeable on environmental information systems; identifying traditional and other sources of environmental data/information that exist in clearinghouses, data bases, libraries, etc. Each data source should be studied to determine the types of information available, how it can be accessed, and other characteristics based upon the requirements analyses above.

Estimated LOE: 11 days

5. Review & Decision Making--CSG will conduct a formal review with NE Bureau and PRIDE team on the findings of the three requirements analyses; the findings of the information sources identified; present preliminary recommendations on priorities for AID/PRIDE information needs; and outline actions that can be taken. The meeting would decide upon the following:

- a. If follow up action is required. If so, then
- b. decide which subject areas (ie private sector, training, other) which information systems should be prepared and what the system should be (fact sheets, computer data base, mechanisms for accessing other data bases, filing system, etc.) and
- c. agree on a SOW for further work.

Estimated LOE: 3 days

D. Potential Follow up Action Required

This is the first phase Work Order for preparing in-house PRIDE/NE Bureau data bases. Depending upon what is found during this phase and the decisions made during the review meeting, the design and operationalizing of the data bases will be done in the second phase Work Order.

DELIVERABLES: -- CSG will provide the following:

- A. Requirements Analysis Reports/Flow Charts/Action Plans on
 1. Training Inventory
 2. Private Sector data base
 3. Sources of Environmental Information
- B. Preliminary Report on sources of environmental information and categories of information needed by various clientele.

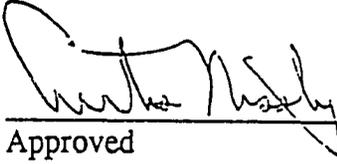
- C. Serve as resource persons for a Bureau/PRIDE review of information systems.
- D. Draft SOWs for implementing the follow up action.

DURATION OF WORK -- This task will be completed by 15 January 1993.

LEVEL OF EFFORT -- This WO is authorized for up to 26 work days.

KEY PERSONNEL -- CSG will assign a project coordinator and staff who will work on this Work Order. It is expected that it will be a mix of senior staff, who will provide oversight and participate in the decision making process, and technical staff, who will gather information and do the design work.

AID APPROVAL -- This Work Order is approved below:



Approved

11/23/92

Date

Disapproved

Date

**PRIDE INFORMATION
NEEDS ASSESSMENT**

ANNEX B.1

**SUMMARY OF INFORMATION
SYSTEMS NEEDS SURVEY**

SUMMARY OF INFORMATION SYSTEM NEEDS SURVEY

The following PRIDE and AID/NE Bureau staff were interviewed or contacted to obtain information for this survey:

John Woods, PRIDE
Jim Westfield, PRIDE
Larry Morgan, PRIDE
Gil Jackson, AID/NE
Paul des Rosier, AID/NE
Alex Seggara, AID/NE
Ann Patterson, AID/NE

1. What information does your organization need in order to accomplish its goals and objectives related to PRIDE and the NE Bureau?

- "Anything to do with pollution, trade, and investment"
- National and international information
- Long term -- pollution control information
- Pollution prevention companies that manufacture pollution prevention equipment (American)
- Publications in pollution prevention
- Associations with pollution prevention members
- Training related to pollution prevention
- Pollution prevention database
- Gil Jackson - "Pride/AID has biggest kind of information on the environment - "one-of-a-kind" - reports that are not shared
- Institutions involved in legal/financial aspects of environment
- Communication materials
- Individuals - environmental experts
- Universities offering environmental programs (formal degrees)
- Information needed is based on clients
- Information related to N.E. (all 6 countries) - more site specific information
- Information on observed results that improve technology and use U.S. technology lessons.
- Mission specific information
- Policy related information
- Development indicators

2. What is the source of this information, i.e. within your organization or outside the organization?

- SAIC (pollution prevention database) case studies from database
- PPIC database
- UNIDO (United Nations Industrial Development Organizations) database; provides environmental assessments of developing countries, but does it have abstracts of reports?
- United Nations Environmental Program database
- Library at AID (limited)
- EPA information systems
- Historical files of environmental assessments (Paul has) but they need to be cataloged and inventoried
- Environmental Assessments (only country specific)
- Environmental Impact Statements
- Articles
- Conferences
- State pollution prevention programs
- Database from Joel Hershhorn (doesn't know what's in it)
- Mostly Chemonics
- none
- "Experience" information
- People - networking
- Library
- Personal files
- E.P.A.
- Hagler Bailley
- Library of Congress
- John Swallow
- Macro level: "World Development Report 1991"
"World Watch State of the Environmental Report"
Buzzworm - publication and database
W.R.I.
- Data most interested in should have point estimates for the state of the environment - also time series data (changes over time)
- Policy related information/country specific
- (tax rights, regulatory policies, legislative information
- use World Bank reports
 - 1) Economic development indicators
 - 2) Indicators of environmental quality
 - 3) Health indicators
- Measures of pollution in these countries is lacking
- Mission specific information - AID/Chemonics - reports/programs developed.

3. Who uses this information?

- AID missions/developing countries
- EPA
- World Bank
- Commerce
- NOA
- Coast Guard
- Department of the Interior
- U.S.G.S.
- Embassies
- Procurement
- Decision makers
- Missions
- Chemonics/AID
- PRIDE
- National Environmental Affairs Agencies
- WEC
- Agencies and outside people based on requests (Hill,OMB, etc.)

4. How this information is used?

- Writing reports
- Seasonal reviews for missions
- Preparation for initial environmental evaluations
- Information sources for others making requests
- Presentations
- Reports (could benefit from more selecting/compiling -- some sort of "retrieval" database)
- AID - defend positions to U.S. government
- Monitoring evaluation framework
- Can it be documented to justify AID's existence?
- To develop programs
- To answer requests from AID/missions/host countries (ad hoc)
- Pollution prevention audits in plants (in country)
- Writing reports
- Several regional, some in-country workshops in p.p. technologies for a specific industry (i.e. tanneries, cement, etc.)
- Newsletters

5. What use do you make of this information?

- Checking for inconsistencies
- Looking for incorrect data
- Verification of statements
- References
- Guide for supplying information
- Promotion/involvement of U.S. companies
- Aid - to evaluate program performance down it's impact on host countries
- Allows application of data to improve policy dialog process
- To learn more about environment management process
- To utilize lessons we've learned in the U.S.
- Development of policy and control mechanisms/interventions
- Guidelines
- Mailing lists
- Be able to use more boiler plates - "United Nations Conference RIO Report"
- To justify a new project - trying to demonstrate the need for this technology/approach for N.E. countries

6. What are the effects in terms of time delays or incomplete deliverables, etc. when this information is not available:

- Could kill projects, key reports
- A good part of the program is totally dependent on this information -- to promote and involve companies
- If money is spent on the wrong activity, you could risk losing funding
- Need information to help identify areas of most beneficial improvement
- Difficult to penetrate technical and political veils
- Rarely say it's not available but the quality and quantity of information suffers
- Takes time - networking to get information is a 2-3 step process
- Time delays with WEC experts creates havoc, embarrassment in dealing with reputation with foreign government and continued funding.
- Always get information - somehow - Chemonics always delivers on time

7. What process do you use to compensate for the lack of information when it occurs?
- Phone/fax to find information, most of the time it is critical -- have to have it
 - Refers to EPA phone directory/labs.
 - The quality and quantity of information suffers.
 - Relies on referrals to others who might have the information.
 - Have to find it.
 - Statistics.
 - Economic parameter data from other areas is plugged in theoretical knowledge - acknowledge that some errors have been made - sometimes more money is spent to be sure.
 - Use some decision tools, but they often require almost perfect information.
 - Refer to others who might have information.
 - Brain storm to identify technologies.
 - Paul and Gill's experience.
 - Personal contacts.
 - Cut and paste.
 - Where we are, where we've been what are the effects of the environmental program inventions?

8. What systems/mediums do you use to make information available to others who may find it useful?

- E-mail (limited)
- Fax
- Database - need to extract information into customized search.
- International level data - economic data is published and in electronic form.
- Country level - data is available, quality is weak, almost none in electronic - most environment quality data has not even been collected - not available to the public.
- Verbal
- Letters
- Reports
- Workshops
- Reports (held confidentially by in-country plants/governments)
- Memos
- Distribution copies

9. What would be the best way to make environmental information available to you?
- Electronic (EPA has software "decision tree".
 - Needs to be flexible to adapt to a mission's limitations
 - Database
 - Central directory
 - Needs to be structured to access existing databases.
 - Minimum - published and widely circulated under AID's overall approval (hard copy and electronic).
 - Through AID's/Chemonics and clients (government and private sector) convenience is important.
 - Electronic - Database/diskettes that are simple to operate and stand alone.
 - Maximize - transfer ability of information and access to the widest relevant number of users.
 - Fact sheets - sources of information.
 - Training
 - Flexible - adapt to computer illiterate/limitations.
 - Ability to retrieve information (i.e. for newsletters, etc.)
 - Database that can be accessed both by technology and industry.
 - Database/diskette
 - Hard copy
 - Ability for users to go back to generators and suggest areas of improvement/errors.
 - *Users contribute to strengthen database.

10. What is your preferred medium for the information that you require (hard copy/electronic)?

- Both, has computer with access to E-mail (no modem)
- Spec sheets
- Electronic (modems/diskette)
- Catalog and other information
- Hard copy is probably the best way/realistic
- "Evolving" database - to use process to assist developing countries in exploiting data information system to use the best they can
- Need to capture feedback into systems related to validity of training.
- Updated as frequently as possible
- Diskette access/MCI E-mail
- Decision of system - Features:
 - Flexibility
 - Abstracting/indexing - multiple levels

**SUMMARY OF RESOURCE
ASSESSMENT SURVEY**

SUMMARY OF RESOURCE ASSESSMENT SURVEY

This survey is intended to identify existing resources and missing resources in relation to the three areas of: Sources of Environmental Information; Environmental Training of Special Interest (to PRIDE/NE Bureau staff); and Private Sector - Pollution Prevention Technologies.

The following PRIDE and AID/NE Bureau staff were interviewed or contacted to obtain information for this survey:

John Woods, PRIDE
Jim Westfield, PRIDE
Larry Morgan, PRIDE
Gil Jackson, AID/NE
Paul des Rosier, AID/NE
Alex Seggara, AID/NE
Ann Patterson, AID/NE

Sources of Environmental Information

1. What environmental information resources do you have in your office (or in your unit)?

- Historic files of Bureau for mission - Reports
- Pesticide information
- PRIDE contract files
- Telephone directories (EPA)
- Library - Chemonics
- Few personal articles
- Little information - no time to collect on own
- 30 or so resumes of people in environmental education field
- Directories of associations in education/communication field
- UN organizations
- World Bank
- Tennessee Valley Authority
- AID (CD Rom of all AID projects)
- CDIE - Development information systems
- EPA litigation/company pollution levels
- EPA right to know network
- Econet
- AID directory
- Chemline database (searches)
- AID on-line reports (searches by key words)
- AID main library (limited)
- Chemonics - Master roster (resume) file
- AI (Chemonics) PRIDE resume file

2. What sources of environmental information do you use? (databases, hard copy, etc.) and how often do you use this source?

- PIDS
- Pollution Prevention Reports
- Database mailing lists - few times a week
- World Bank information - convenient and reasonably accurate, reputable
- Directories - daily
- Resumes - weekly
- Files - weekly
- Local University Libraries
- AID Directory
- Chemline (search monthly) other databases too
- CDIE - Once a month

3. How much of this information is relevant to what you do for the NE Bureau/PRIDE program?

- Only parts - would like to see more of a "team" effort
- Related both to PRIDE and other environmental projects
- AID and Chemonics staff requesting information
- Very little - here as a technical advisor (Anne)
- Nothing related to PRIDE (in his job). If missions request information then they go to PRIDE.

4. What is the form of this material (electronic, personal, etc.) and it can be accessed readily?
- No, mostly hard copy
 - AID - too much paper work in initial assessments
 - Missing original documentation
 - Hard copy/electronic sometimes
 - Diskette
 - AID phone directory - electronic - used often not easily accessed, combination of microfiche, databases, hard copy
 - 99% hard copy

5. Does this information need to be timely? (give time span)

- Yes!
- EPA's system weakness is lack of good abstracts
- Needs to be validated/ data verified
- Pollution prevention equipment - updated 6 months
- Practices (p.p.) don't get out of date
- Equipment change more frequently
- "Clean technology", new equipment, changing philosophy
- Macro level - annually
- Time series - trend information
- Directories monthly - (6 month log)
- CD Rom - semi-annually
- Paper files - no systematic update
- Yearly - prefers 6 months
- Technologies can be updated less frequently
- Quarterly updates - Topics/new technologies
- Need to be on the cutting edge/aware of newest technologies

6. What type of environmental information do you need, but not yet available?

- UNIDO database
- Environmental experts to evaluate projects
- Pollution prevention equipment - how it performs in a pollution sense and how it does it
- Environmental data at a local level
- Illustrative examples in each country of time series of environmental quality data (mostly water) that can be tied to most obvious health statistics to demonstrate causality
- Epidemiological data (narrow case - studies showing cause and effect)
- More specific data on nature of problems and geographic sites
- Organizations/American Universities that are outstanding in the environmental field (all areas)
- "Real experts" in the field - especially environmental communications with overseas experience - and need to validate capabilities
- Abstracting is critical - need to thesaurus with clear descriptions, pollution prevention is new and not always a way to look things up
- Case studies in NE countries - need to start building this into projects
- No - can get most everything

Environmental Training of Special Interest

1. What environmental training resources do you have in your office? (or in your unit)?

- ASET - environmental impact assessment training - under contract to AID
- EPA - training courses/kits
- State training courses
- John Woods
- Vicki Boyd - Michigan
- Dow Chemical
- National Association of Environmental Educators
- Ad hoc, random, AID announcements
- More about John Swallows work
- "EPAT" list of courses (John has copy)
- PRIDE
- EMS has training, but seldom time to take courses
- Limited AID training courses

2. What type of environmental training courses would be of interest to you (officials of governmental and non - governmental agencies in the NE) in the area of environmental training?

- Oil/chemical spills (taking in February)
- Training for mission staff
- Up to date pesticides - trends, new, how more beneficial
- Disposal methods (not much out there)
- Pollution prevention (workshops)
- Environmental programs for kids - in developing countries
- Training at: 1) Private sector
2) For pollution control/pollution prevention
3) How to start/operate and expand environmental businesses

- EPAT's economic policy
- W.B. may be a source
- Understanding level and nature of pollution and how it causes damage
- More proactive; Short courses held in regions (NE)
- Environmental education
- Environmental management
- Institutional development
- Environment - communication
- Environment - in management and information systems field
- Bob Curn - contracted to develop environmental communications training package
- Focused training with NE, i.e. waste water treatment, hazardous waste response, etc.
- All of them

3. List any environmental training courses you are aware of such as:

One time courses

UNIDO - several industry courses
American Institute of Chemical Engineers - pollution prevention
EPA - "Pollution Prevention Training Opportunities in 1991"
State training
Environmental Impact Assessment
EPAT
University
University of Toronto - "Information seeking patterns"
NOAH, Coast Guard

Courses offered repeatedly

Courses offered on demand

4. What types of training are available (video, classroom, etc.)?

- Classroom with variety of speakers
- Video, classroom, hands - on
- Has to be practical:
 - 1) Present a set of principles
 - 2) Practical exercise carrying participant through all relevant learning experiences in applying principles
 - 3) Must have some emphasis on application to real world problemsetting - how to get, analyze, and present
- Short courses - can't get off work for extended periods of time
- Information Environmental Communication - new academic courses or traditional short courses
- Bob Curn's package - hope to provide self-study/guidebook/references
- UNIDO - computer assisted instruction
- Training is situation dependent

5. What form of training do you find most effective (video, etc.)?
hands on stuff

- lots of visual aids
- combo of videos/classroom
- field specific/site visits
- workshops, 1-4 wks. long
- "see, hear and do"
- hands-on demonstration
- graphics
- practical exercises
- video is powerful, but costly to produce
- training that gets a critical mass from a Country
- situation dependent
- interested in training that changes job performance
- cost and results effective
- feels developing Countries have difficulty with self-instruction

6. Are there certain certifications in the environment field that are important to have?
What are they?

- degree certifications most credible
- certifications through training courses are too common/not monitored
- not for pollution prevention
- 3 types: formal education, licensing, memberships/certifications
- in developing Countries training certification is most important but not often abused
- workshops are most effective as supplements to what they already know, may be a forerunner of a licensing procedure
- should have both formal and informal training
- degrees can be tricky in developing Countries where you don't know the qualities of degrees
- not aware of any
- no certifications in social sciences, maybe there should be
- interested in training in country government and non government people (not AID mission staff) so they can work with their own country, countries can't afford to send someone for formal education

7. What are your sources of information to learn about environmental training?

- AID training officer
- E-mail notices/flyers
- John Woods

8. What sources of information are missing related to environment training?

- start up operation/expansion of environmental business
- don't know
- funds, limited by away/expense i.e. Jordan does not have international phone system
- information on training offered by all other govt. agencies
- environment communication, education and management
- pollution prevention

validate courses offered

Private Sector - Pollution Prevention Technologies

1. Do you have any info (in your office or unit) related to:

Companies supplying pollution prevention technologies:

- EPA p.p. technology database
- no
- no

Environmental consultants: quality experts

- Tennessee Valley Authority - retired consultant list
- pollution prevention consultant database (who has it?)
- no
- no

Do you use this information? How often?

- couple of times a week
- use more with project implementation
- not much out there to use
- no, but will if it provided:
 1. nature of production process
 2. cost and returns of production process
 3. pollution prevention technology to be applied
- use research data fairly often

2. What types of information do you use? How often? How recent must the data be?

- states have good small scale programs
- need to see more medium/large scale variety

3. What do you use the information for?

- justify programs
- internal memos
- environmental assessments for various projects

4. What are your sources and what type of information is most helpful for:

Companies producing pollution prevention equipment and non-polluting raw materials:

- networking people
- conserve water
- organic solvents
- handling/reclaiming, reuse of metals, metal salts, etc.

Pollution prevention service and supply companies:

- no info yet

Consulting companies:

- not too many

Training companies:

- internal AID notices

Technical assistance related companies:

- some

Related associations:

- use somewhat directories

Associated government agencies:

- EPA, Commerce, World Bank

Conferences/meetings:

- internal AID notices

Journals/publications:

- Chemical Engineering
- Chemisphere
- economic journals
- no real easy access to PRIDE's resources and not well aware of what it contains

SAMPLE SURVEY

Information System Needs Assessment Survey

1. What information does your organization need in order to accomplish its goals and objectives related to PRIDE and the NE Bureau?

2. What is the source of this information, i.e., within your organization or outside the organization?

3. Who uses this information?

4. How is this information used (in writing reports, preparing newsletters, presentation, etc.)?

5. What use do you make of this information (reference, boiler plates, guidelines, etc.)?

6. What are the effects in terms of time delays or incomplete deliverables, etc. when this information is not available?

7. What process do you use to compensate for the lack of information when it occurs?

8. What systems/mediums do you use to make this information available to others who may find it useful (electronic mail, distribution copies, library references, etc.)?

9. What would be the best way to make environmental information available to you? (i.e. central repository, central directory, shared resources, information summaries)

10. What is your preferred medium for the information that you require? Hard Copy? Electronic? If electronic, what means do you have to access this information?

Resource Assessment Survey

This survey is intended to identify existing resources and missing resources in relation to the three areas of: Sources of Environmental Information; Environmental Training of Special Interest [to PRIDE/NE Bureau staff]; and, Private Sector - Pollution Prevention Technologies.

Sources of Environmental Information

1. What environmental information resources do you have in your office (or in your unit)?

2. What sources of environmental information do you use? (databases, hard-copy, etc.) and how often do you use this source?

3. How much of this information is relevant to what you do for the NE Bureau/PRIDE program?

4. What is the form of this material (electronic, personal, etc.) and can it be accessed readily?

5. Does this information need to be timely? (give time span)

6. What types of environmental information do you need, but find not available?

Environmental Training of Special Interest

1. What environmental training resources do you have in your office (or in your unit)?

2. What types of environmental training courses would be of interest to you (officials of governmental and non-governmental agencies in the NE) in the area of environmental training?

3. List any environmental training courses you are aware of such as:
~ One-time courses _____
~ Course offered repeatedly _____
~ Courses offered on demand _____

4. What types of training are available (video, classroom, etc.)?

5. What form of training do you find most effective (video, etc.)?

6. Are there certain certifications in the environmental field that are important to have? What are they?

7. What are your sources of information to learn about environmental training?

8. What sources of information are missing related to environmental training?

Private Sector - Pollution Prevention Technologies

1. Do you have any information (in your office or unit) related to:
 - ~ companies supplying pollution prevention technologies
 - ~ environmental consultants
 - ~ research data

Do you use this information? How often?

2. What types of information do you use? How often? How recent must the data be?

3. What do you use the information for?

4. What are your sources and what type of information is most helpful for:

- ~ Companies producing pollution prevention equipment and non-polluting raw materials
- ~ Pollution prevention service and supply companies
- ~ Consulting companies
- ~ Training companies
- ~ Technical assistance related companies
- ~ Related associations
- ~ Associate government agencies
- ~ Conferences/meetings
- ~ Journals/publications

ANNEX C

**SAMPLE SOURCE LISTINGS OF
ENVIRONMENTAL INFORMATION**

**SHORT TERM TRAINING
OPPORTUNITIES LISTING**

Short-Term Training Opportunities in Environment and Natural Resources January 1992

Database developed by John Swallow for R&D/AID

John's Phone: (202) 647-8261

- Training Opportunities are grouped into 15 categories
- International organizations, U.S. and International Universities, NGOs, the Smithsonian and other agencies are represented.
- The document is 242 pages with 2 entries per page (20+ pages include an index by type of training, key-word, language and provider.
- 50 sources are listed for training in the Middle-east.
- The database was created in PARADOX.
- Although it was produced under the R&D division, Dr. Swallow is now with another Bureau. In his absences, he does not think efforts have been made (or will be) to update the publication (estimates a cost of \$20,000); however, it is still useful as it lists the addresses and phone numbers for all of the organizations represented (if they offered a course in January 1992, they may offer it again in 1993).
- This publication is available through CDIE (a copy has been obtained).

Additional source to contact:

Economic Development Institute (of the World Bank)
Jose Ferdado (202) 473-6461

There is no cost to participants from developing countries that are considered to be "participating countries". Fourteen courses were listed in the 1992 Directory.

COURSE INFORMATION

AIR QUALITY
BIOLOGICAL DIVERSITY
COASTAL AND MARINE RESOURCES MANAGEMENT
ENVIRONMENTAL EDUCATION
ENVIRONMENTAL MANAGEMENT
FOREST MANAGEMENT
GLOBAL CLIMATE CHANGE
IMPACT ASSESSMENT
MAPPING, GIS, IMAGE PROCESSING
PROTECTED AREA MANAGEMENT
RESOURCE ECONOMICS
SOLID AND HAZARDOUS WASTE MANAGEMENT
WILDLIFE MANAGEMENT
WATER QUALITY
WATER RESOURCES MANAGEMENT

Environ Monit Assess

We offer the following criteria as means to assess the quality and appropriateness of training opportunities included in the directory, or in any update of it

1. Relevance Is the course geared to the educational and professional background of the trainee? The obvious aim of training is to transfer new skills and knowledge which have practical applicability to the trainee. The proper match between trainee and training opportunity, allows for the opportunity of successful skill transfer.

2. Interaction. Some of most effective training utilizes a participatory approach, allowing for interaction among trainees and those "guiding" the course. Ample opportunities for trainees to discuss and investigate issues of relevance to their particular situation generally heighten course quality.

3. Hands-on Application. Does the training program provide for the hands-on use of skill acquired through field study or the preparation of documents? This can help move the information from the realm of pure theory and academe to the trainees' own real-life situations

4. Integration Does the course offer some means of applying this information to the job functions of the trainee? Does leave the training course with a sense of how to integrate these new skills into his or her job duties or a specific project? An emphasis on integration increases the relevance of the materials presented and reinforces the skills acquired upon return from the training opportunity

5. Trainers Are those persons who conduct the training not only skilled technical professionals, but also effective educators, conveying information well and prompting the trainees toward analysis, synthesis and response? Do the educators understand the socio-economic, educational and political backgrounds of the participants?

6. Recurrence and Frequency If the course has been offered repeatedly, it indicates demand over time and implies—one hopes correctly—some degree of merit and quality

C.A.H
J.C.S
J.R.S.

The numbers in parentheses indicate the number of course offerings within each subject category. Because many of the training opportunities cover two or more topic areas, readers are urged to use the key word index. The decision to place a course under a topic heading was based on what was perceived to be its main focus. For example, only one course offering specifically addresses global climate change, but a course listed under "Mapping, Geographic Information Systems, Image Processing", has a component on global change. This course is cross referenced under the keyword "global climate change" in the key word index.

Each of the 15 categories has been assigned a two letter code (as listed above) which precedes the assigned course number (i.e. IA05). Categories are listed alphabetically according to the two letter code. Numbers were assigned based on date of the offering. Offerings which will be given in 1992, but for which no date was specified, are listed first (i.e. 00/00/92), followed chronologically by those courses with known dates, and lastly by a few courses offered on an "on demand" basis (i.e. 00/00/00).

Each listing is designed to provide ten categories of information:

- Course Title
- Provider
- Course Dates and Duration
- Location
- Language
- Targeted Participants
- Course Objective
- Brief Course Overview
- Course Fees
- Contact Information

In some cases, not all of the required information was submitted by the training program organizer or provider, thus the occasional blank spaces. Often, the training opportunity description had to be edited to conform to our space limitations.

In addition to the keyword index, two other indexes are provided to facilitate reader searches. The second index lists training opportunities by provider. The reader can reference a specific institution in a country or region to determine whether it provides ENR training. The third index lists courses in languages other than English.

A number of course offerings which appear to be appropriate for nationals of AID -recipient countries are held in developed countries other than the United States. Before an AID -financed person is sent for training in a developed country, such as the United Kingdom or the Netherlands, AID regulations (Handbook 10 Chapter 8, Section 8-A) require that the USAID mission receive a waiver from the Director of the Office of International Training (OIT).

Some listings in this survey are courses which have been given in the past and can be given again upon demand, usually in a host-country, for a negotiated fee. All training requested by AID missions must first go through a bidding process open to a number of institutions. The OIT has established a process for responding to such "on demand" training. OIT says the process takes approximately six to eight weeks.

We have not been able to ascertain the quality of most of the courses listed. Some of the reviewers of this document have taken a few of these courses or otherwise know a considerable amount about them. Needless to say, only through actual participation in training and/or follow-up with participants can a course's worth begin to be determined. The short time frame which we used to compile this directory prohibited this type of long-term evaluation.

INTRODUCTION

This document distills information obtained from hundreds of organizations and individuals. A cable was also sent to all USAID Missions and posts (STATE 334283 of 10/9/91), prompting responses and contributions by A.I.D. field staff.

This survey of short-term, non-degree training opportunities in environment and natural resources management (ENR) was designed to identify training opportunities that met the following six criteria:

Relevance to practitioners from developing countries.

Relevance to policy formulation and implementation in respect to environment and natural resources management. Training opportunities were not listed if they were oriented solely to science or technology education and did not somehow connect the education to policy making or environmental management applications.

Recurrent and/or proposed in the 1992-1994 period.

Short-term. Defined as any time period between 5 days and 12 months. Generally, the high cost of international travel precludes sending a person to a course that is less than seven days. However, it was felt that courses of short duration (5 - 7 days) could be incorporated as an "add-on" if a participant was already in-country.

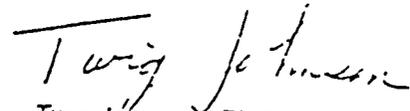
Training and course materials in English, French, Spanish, Portuguese, or Arabic.

Non-degree. The term "non-degree" implies training opportunities which do not lead to a formal degree (such as a masters or baccalaureate). However, programs which offer a certificate were solicited by the survey.

The survey limited its scope to the 15 topics areas within ENR listed below. There are obvious definitional variations and overlap among the categories. The 15 areas were chosen: (1) by USAID field and Washington-based staff as the most important, and (2) because short-term training information in them was deficient, particularly in relation to host country needs. The survey does not include, per se, agriculture, environmental health or energy, readily acknowledging that each is vitally important and directly related to the 15 topic areas. First, some catalogs and reference sources already exist for training in these areas, particularly in agriculture. Second, the 15 topic areas we chose are each comprehensive and significant. Third, we did not wish to make this document any larger or more expensive than it is. The categories are as follows:

- AQ - Air Quality (4)
- BD - Biological Diversity (3)
- CM - Coastal and Marine Resources Management (7)
- EE - Environmental Education (12)
- EM - Environmental and/or Natural Resources Management (60)
- FM - (Natural) Forest Management (23)
- GC - Global Climate Change (1)
- IA - (Environmental) Impact Assessment (13)
- MS - Mapping, Geographic Information Systems, Image Processing (17)
- PA - Protected Areas Management (8)
- RE - (Natural) Resource Economics (9)
- SW - Solid and/or Hazardous Waste Management (4)
- WM - Wildlife Management (18)
- WQ - Water Quality (15)
- WR - Water Resources Management (49)

I express our appreciation to consultants Catherine A. Hoke and Jens C. Sorensen, who conducted much of the research and analysis, and to Margot K. Kerr, who assisted in the research and development of the data base. I thank John R. Swailow, of this office, for leading this effort from inception to completion. We hope this survey is useful to USAID and LDC personnel in our efforts to balance environmental and natural resources management with socio-economic well-being.



Twig Johnson, Ph.D
Director Office of Environment
& Natural Resources
Bureau for Research and Development



U.S. AGENCY FOR
INTERNATIONAL
DEVELOPMENT

January, 1992

Dear Reader,

What tools are available to deal with environmental problems and opportunities? Where can we obtain these tools? What training possibilities exist and how do we best proceed to form the human resource base required?

Solving a growing array of environmental problems, preventing future problems, and taking advantage of development opportunities found in the midst of these dilemmas, will require answers to these questions. This report is a preliminary step at answering some of them. It does not pretend to be complete or authoritative. It represents the information we have been able to pull together in a short time with modest resources.

This survey of short-term, non-degree training opportunities is intended for the immediate, practical use of USAID personnel worldwide and for other organizations and personnel who will benefit from knowing what quality training exists in the broad field of environment and natural resources (ENR). We feel that this survey helps fill a real void. USAID field staff have frequently expressed their frustration about the dearth of information on short-term (one week to twelve months) ENR training. More planning and strategic action are necessary for such training, in part because of the burgeoning significance of environmental issues throughout the planet. The great majority of A.I.D./Washington-based regional bureau staff personnel contacted by R&D/ENR also stressed the need for this information. Thus, we hope this document increases awareness of what training is available, which in turn will strengthen human resource development in the vitally important environmental area.

This document is a selective survey, not an exhaustive inventory, of short-term training in ENR training in 15 topical areas. It is a "key informant" survey in that hundreds of U.S. and international organizations and individuals were contacted for information that they might have on specific training opportunities—conventional or less formal and anywhere in the world—that are suited or could be adapted for nationals of A.I.D.-recipient countries. Once we began our survey, we realized that much of this training is also appropriate for personnel from A.I.D. and other donor entities and countries.

We favor short-term ENR training conducted in the less-developed countries (LDCs) themselves whenever possible, including regional courses involving nationals from several countries. I hope that any future update of this survey includes a higher proportion of quality training that is available in A.I.D.-recipient countries. "On demand" training can be conducted by many institutions, but we have generally not listed such training here—only a few "on demand" courses are mentioned.

We appreciated and attempted to incorporate the information and ideas sent to us by many Mission and regional bureau personnel, as well as the input of the many other individuals from bilateral agencies, universities, consortia and NGOs. My staff and I welcome your comments on this survey, especially on training courses that should be deleted or added, as well as participants' comments on course quality. You can help us identify other relevant, specific ENR training opportunities, conventional or less formal, that are suited or could be adapted for nationals of LDCs. You can address your comments to Environmental Training Officer, R&D/ENR, Room 509, SA-18, Agency for International Development, Washington, D.C. 20523-1812. Our FAX number is (703) 375-4639. If the responses merit, we could attempt updates—for instance, on an annual basis—of this survey.

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PN-ABC-285
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**SHORT-TERM
TRAINING OPPORTUNITIES
IN ENVIRONMENT
AND NATURAL RESOURCES**

Office of Environment and Natural Resources
Bureau for Research and Development
U.S. Agency for International Development

Prepared by
Catherine Hoke
Jens Sorensen
John Swallow, USAID



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Delivery Order No 10

Washington, DC
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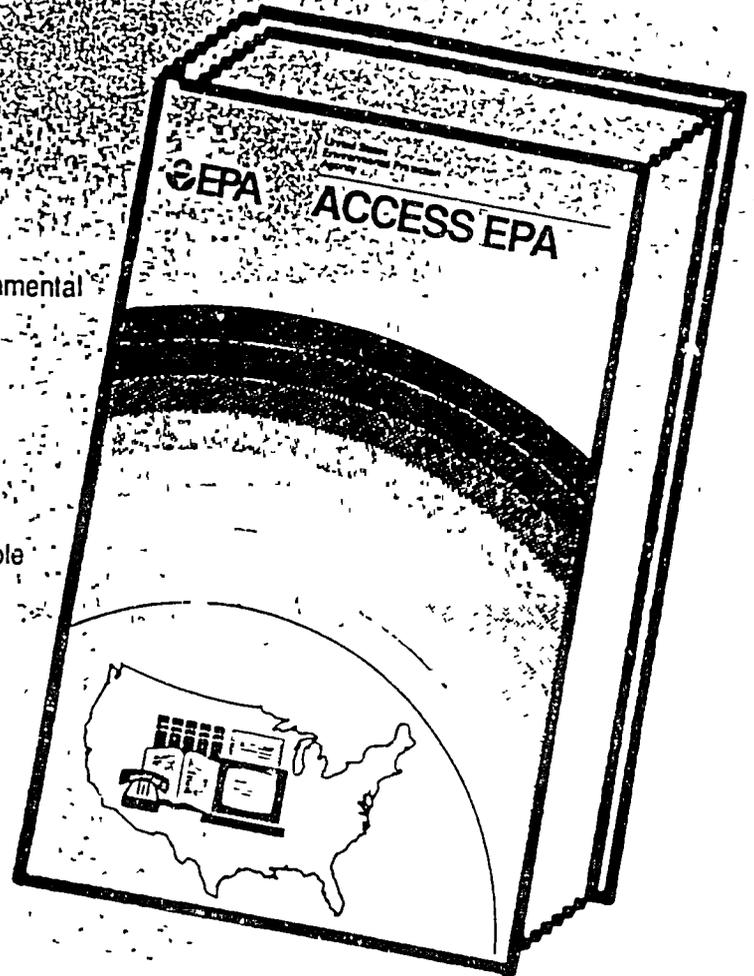
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Wastewater Equipment Manufacturers Association
Water & Sewer Distributors of America
Water Environment Federation
Water Quality Association

International Associations:

International Association for Water Pollution Research & Control
International Society for the Prevention of Water Pollution

ANNEX C.4

**ENVIRONMENTAL CONSULTANTS
AND COMPANIES**

Samples from the
Consultants and Consulting Organizations Directory, 1992

Sample Index (By Topic) Section

Pollution control (See also
Engineering—Chemical; Engineering—
Environmental; Environmental issues
and concerns; Laboratory analysis,
Sanitation)

Adirondack Environmental Services Inc
(Albany, NY) ■ 8475
Affiliated Consultants Engineers (Greensboro
NC) ■ 6660
Agvise, Inc (Northwood, ND) ■ 38
ALGen Analytical Laboratories Inc (Seattle
WA) ■ 8482
Allee King Rosen & Fleming Inc (New York
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Alliance Technologies Corporation (Bedford,
MA) ■ 8489
Ana Lab Corporation (Kilgore, TX) ■ 8501
Analytical Development Corporation (Colorado
Springs CO) ■ 6697
Aqua Tech Environmental Consultants (Marion,
OH) ■ 8519
ARI Technologies, Inc (Palatine IL) ■ 8525
ATC Environmental Inc (Sioux Falls, SD)
■ 8535
Bact Corporation (Willingboro NJ) ■ 8549
Barer Engineering (Lakewood NJ) ■ 8555
Baron Consulting Company (Milford, CT)
■ 8559
BC Laboratories, Inc (Bakersfield, CA) ■ 6785
B C Research Corporation (Vancouver, BC,
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Beak Consultants Limited (Brampton, ON
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Environmental Planning & Training

Saint Joseph College (CT)	M D	Rutgers The State University of New Jersey New Brunswick	M D	University of Maryland Graduate School Baltimore	M D †	Northeast Louisiana University	M
San Francisco State University	M	San Francisco State University	M	University of Michigan (Ann Arbor)	M D	Ohio University (Athens)	M D
Sangamon State University	M	Shippensburg University of Pennsylvania	M	University of Minnesota Twin Cities Campus	M D	Oklahoma State University	D
Shippory Rock University of Pennsylvania	M †	Southern Illinois University at Edwardsville	M †	University of North Carolina at Chapel Hill	M D †	Pennsylvania State University University Park Campus	M D †
Southern Illinois University at Edwardsville	M †	Southern University and Agricultural and Mechanical College	M	University of Oklahoma Health Sciences Center	M D	Queen's University at Kingston	M D
Southwest Missouri State University	M †	State University of New York at Stony Brook	M †	University of Pittsburgh	M D †	Rensselaer Polytechnic Institute	M †
State University of New York College of Environmental Science and Forestry	M, D †	Texas Christian University	M	University of South Carolina (Columbia)	M D †	Roosevelt University	M †
Texas A&M University (College Station)	M D †	Texas Tech University	M D †	University of Southern California	M D †	St. John's University (NY)	M †
Texas Tech University	M	Trent University	M †	University of Virginia	M	Saint Louis University	M D †
Trent University	M †	Tuskegee University	M	University of Western Ontario	M D	San Jose State University	M
Université du Québec à Chicoutimi	M	Université de Sherbrooke	M	University of Wisconsin-Madison	M	Southern Illinois University at Carbondale	M D †
Université du Québec à Rimouski	M	Université du Québec à Montréal	M D	Wake Forest University	M †	Southern Methodist University	M †
University of Alaska Fairbanks	M D †	Rivieres	M	Yale University	M D *	State University of New York at Albany	M D †
University of British Columbia	M D	University of Alabama in Huntsville	D †			State University of New York at Binghamton	M D †
University of California Berkeley	M D	University of Alaska Anchorage	M	EVOLUTIONARY BIOLOGY		State University of New York at Stony Brook	M D †
University of California Riverside	M D †	University of Arizona	D	Boston University	M D †	Syracuse University	M D †
University of Connecticut (Storrs)	M †	University of British Columbia	M D	Brown University	M D	Temple University (Philadelphia)	D †
University of Houston-Clear Lake	M †	University of California at Berkeley	M D	Cornell University	M D †	Texas Tech University	M D †
University of Idaho	M D	University of California Davis	M D *	Duke University	D †	Towson State University	M
University of Maine (Orono)	M	University of California Los Angeles	M D	Florida State University	M D †	University of California Santa Cruz	M
University of Manitoba	M	University of California Riverside	M D †	George Mason University	M †	University of Cincinnati	M D
University of Maryland College Park	M D †	University of Cincinnati	M D †	Harvard University	D †	University of Connecticut (Storrs)	D †
University of Michigan (Ann Arbor)	D C	University of Colorado at Denver	M	Indiana University Bloomington	M D	University of Dayton	M †
University of Minnesota Twin Cities Campus	M D	University of Maine (Orono)	M D	Iowa State University of Science and Technology	M D †	University of Hartford	M †
University of Montana	M *	University of Maryland College Park	M D *	James Madison University	M †	University of Houston	D
University of Nevada Reno	M †	University of Maryland Eastern Shore	M D †	Michigan State University	M D †	University of Louisville	D †
University of New Hampshire (Durham)	M †	University of Massachusetts at Boston	M D †	New York University	D †	University of Maine (Orono)	M D
University of Oregon	M	University of Massachusetts Lowell	M D †	Northwestern University	D *	University of Maryland College Park	D †
University of Pittsburgh	M †	University of Montana	M D *	Purdue University (West Lafayette)	M D *	University of Minnesota Twin Cities Campus	D
University of Rhode Island	M D	University of New Haven	M †	State University of New York at Stony Brook	M D †	University of Mississippi	D †
University of Tennessee Knoxville	M D	University of North Carolina at Chapel Hill	M D †	University of Arizona	M D	University of Missouri-St. Louis	D
University of Toronto	P †	University of North Texas	M D †	University of California at Berkeley	M D *	University of Montana	D
University of Vermont	M †	University of Oklahoma	M D †	University of California Irvine	M D	University of Nevada Reno	M D †
University of Washington	M	University of Tulsa	M D *	University of California Riverside	D †	University of New Mexico	M D *
University of West Virginia College of Graduate Studies	M	University of Virginia	M D *	University of California San Diego	D *	University of North Carolina at Chapel Hill	M D †
University of Wisconsin-Green Bay	M	University of Washington	M D *	University of Chicago	D	University of North Texas	M D †
University of Wisconsin-Madison	M D	University of Waterloo	M D	University of Connecticut (Storrs)	M D †	University of Rhode Island	D
University of Wisconsin-Milwaukee	M †	University of West Virginia College of Graduate Studies	M	University of Houston	M D	University of South Carolina (Columbia)	M C *
University of Wyoming	M †	University of Wisconsin-Madison	M D	University of Illinois at Chicago	M D *	University of Southern Mississippi	D *
York University	M D	Utah State University	M D	University of Indiana	M D *	University of South Florida	M D
		Virginia Polytechnic Institute and State University	M D	University of Iowa	M D *	University of Tennessee at Chattanooga	M
ENVIRONMENTAL SCIENCES		Washington State University	M	University of Illinois at Urbana Champaign	M D †	University of Toledo	M D †
Antioch New England Graduate School	M †	Western Washington University	M	University of Nevada Reno	D †	University of Victoria	M C
Baylor University	M †	Yale University	M D *	University of New Mexico	M D †	University of Waterloo	C
Bemidji State University	M	EPIDEMIOLOGY		University of Oregon	M D *	University of Wisconsin-Madison	D
Brown University	M	Boston University	M D †	University of Rochester	M D †	University of Wisconsin-Oshkosh	M
California State University Fullerton	M	Brown University	D †	University of Southwestern Louisiana	D †	Virginia Polytechnic Institute and State University	D
California State University Hayward	M	California State University Northridge	M	University of Utah	M D	Washington University	M D †
College of Staten Island of the City University of New York	M †	Case Western Reserve University	M D †	Washington University	D †	Western Michigan University	M D
College of William and Mary	M D †	Columbia University	M D †			Wichita State University	M *
Colorado State University	M	Emory University	M D †	EXPERIMENTAL PSYCHOLOGY		Wilfrid Laurier University	M
*Cornell University	M	Georgetown University	M D †	American University	M D †	Xavier University	M
Drexel University	M D †	Harvard University	M D †	Arizona State University	M D †		
Duke University	M D †	Johns Hopkins University	M D †	Baylor University	D †	Adelphi University	M †
Emory University	M †	Loma Linda University	M D	Boston University	D †	American College	M *
Florida Institute of Technology	M D †	McGill University	M D	Bowling Green State University	M D †	American University	M *
George Washington University	M †	McMaster University	M	Bradley University	M †	Armstrong College	M *
Glassboro State College	M	Medical College of Wisconsin	M	Brigham Young University	D	Baruch College of the City University of New York	M C
Goddard College	M	Medical University of South Carolina	M D	Case Western Reserve University	D †	Bentley College	M †
Humoldt State University	M	New York Medical College	M	Catholic University of America	M	Boston College	M D *
Indiana University Bloomington	M D †	New York University	M D †	Central Washington University	D †	Boston University	M D †
Long Island University C W Post Campus	M †	Ohio State University (Columbus)	M D *	Clark University	D †	Brandeis University	M
Louisiana State University and Agricultural and Mechanical College	D †	Purdue University (West Lafayette)	M D	Cleveland State University	M	Bryant College	M O
Loyola Marymount University	M	Queen's University at Kingston	M	College of William and Mary	M †	Bucknell University	M
Mankato State University	M	San Diego State University	M D	Colorado State University	M D	California Lutheran University	M
McNeese State University	M	State University of New York at Albany	M †	Columbia University	M C †	California Polytechnic State University San Luis Obispo	M
Miami University	M †	State University of New York at Buffalo	M D †	Concordia University (Canada)	M D †	California State University Fresno	M
Montana State University	M	Tulane University	M D †	DePaul University	M D †	California State University Fullerton	M
New Jersey Institute of Technology	M D †	University of Alabama at Birmingham	M D	Duke University	D †	California State University Hayward	M
New York Medical College	M	University of British Columbia	M D	Eastern Illinois University	M	California State University Long Beach	M
Ohio University (Athens)	M	University of Calgary	M D	Eastern Washington University	M	California State University Los Angeles	M
Oklahoma State University	M D	University of California at Berkeley	M D	Fairleigh Dickinson University Florham Madison Campus	M	California State University Northridge	M
Old Dominion University	M	University of California Davis	M D	Fordham University	D †	California State University Stanislaus	M
Oregon Graduate Institute of Science and Technology	M D	University of California Los Angeles	M D	Graduate School and University Center of the City University of New York	D †	California State University Stanislaus	M
Pennsylvania State University University Park Campus	M	University of California San Diego	O	Harvard University	M D †	Carnegie Mellon University	D
Polytechnic University Farmingdale Campus	M †	University of Cincinnati	M *	Hollins College	M	Case Western Reserve University	M D †
Portland State University	D *	University of Guelph	M D	Hunter College of the City University of New York	M †	Central Missouri State University	M *
Rensselaer Polytechnic Institute	M D †	University of Hawaii at Manoa	M D *	Illinois State University	M †	Claremont Graduate School	M D
Rice University	M D †	University of Illinois at Chicago	M D †	Johns Hopkins University	M D †	Clark Atlanta University	M †
		University of Iowa	M D	Kent State University	M D	College of Insurance	M *
				Lakeland University	M	Colorado State University	M
				Lehigh University	M D †	Columbia University	M D †
				Long Island University C W Post Campus	M †	Cornell University	D †
				Loyola University Chicago	D †	Dallas Baptist University	M
				McGill University	M D	DePaul University	M †
				Memorial University of Newfoundland	M D	Drexel University	M D †
				Memphis State University	D †	East Carolina University	M †
				Miami University	D †	Eastern College	M *
				Morehead State University	M	Ecole des Hautes Études Commerciales	M *
				Northeastern University	D †	Fielding University	M O *

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Correspondence and Information	<p>SPEA especially encourages applications from members of minority groups.</p> <p>Graduate Programs School of Public and Environmental Affairs SPEA 260 Indiana University Bloomington, Indiana 47405 Telephone 812-855-2840</p>

Indiana University Bloomington

THE FACULTY AND THEIR RESEARCH

- Robert Agranoff, Professor, Ph D , Pittsburgh, 1967 Human services administration, intergovernmental management
- Randall Baker, Professor and Director, International Programs, Ph D , London, 1968 International environmental policy, environmental management in the tropics, development management
- A James Barnes, Professor and Dean, J D , Harvard, 1967 Environmental law and policy, human resource management, ethics and the public official
- William Black, Professor of Public and Environmental Affairs and of Geography, Ph D , Iowa, 1969 Transportation, regional analysis, statistical geography
- Charles F. Bonser, Professor and Founding Dean, Public and Environmental Affairs, and Professor of Business Administration, Ph D Indiana, 1965 Business economics and forecasting, public finance, regional economics, executive leadership
- Lynton K. Caldwell, Professor Emeritus of Public and Environmental Affairs and Arthur E. Bentley Professor Emeritus of Political Science, Ph D , Chicago, 1943 Environmental policy
- Deborah Freund, Professor of Public and Environmental Affairs and Adjunct Professor of Medicine and of Economics, Ph D , Michigan, 1980 Health economics, public finance, applied econometrics, survey research, program evaluation, medical care organization
- David H. Good, Assistant Professor, Ph D , Pennsylvania, 1984 Policy analysis
- Hendrik M. Haitjema, Associate Professor, Ph D , Minnesota, 1982 Groundwater hydrology, groundwater flow modeling, hydrology, soil mechanics
- Ronald A. Hites, Distinguished Professor of Public and Environmental Affairs and Professor (part-time) of Chemistry, Ph D MIT, 1968 Organic environmental chemistry, atmospheric sciences, mass spectrometry
- Jack W. Hopkins, Professor, Ph D , Florida, 1966 Public administration, international administration/development, public policy
- Roy Jumper, Professor, Ph D , Duke, 1955 Personnel management
- Herbert J. Kiesling, Professor of Public and Environmental Affairs and of Economics, Ph D , Harvard, 1966 General methodology of taxation, cost-benefit analysis with poverty applications
- John H. Kragie, Associate Professor Emeritus, Ed D , Indiana, 1981 Criminal justice
- Kerry Krutilla, Assistant Professor, Ph D , Duke, 1988 Environmental policy
- Mike Maxfield, Associate Professor of Public and Environmental Affairs and Associate Professor (part-time) of Criminal Justice, Ph D Northwestern, 1979 Law and public policy, criminal justice and program evaluation
- Eugene McGregor Jr., Professor of Public and Environmental Affairs and Professor (part-time) of Political Science, Ph D , Syracuse, 1969 Public administration, human resource management, policy analysis
- Warren Meinschein, Professor Emeritus of Public and Environmental Affairs and of Geochemistry, Ph D , Texas, 1951
- John L. Mikesell, Professor and Associate Dean, Academic Affairs, Ph D , Illinois at Urbana-Champaign, 1969 Public finance
- Theodore K. Miller, Associate Professor of Public and Environmental Affairs and Associate Professor (part-time) of Geography, Ph D Iowa, 1970 Quantitative analysis, fluvial processes
- Charles A. Moffatt, Associate Professor, Ph D , Tulane, 1968 Biomechanics, quantitative analysis, mechanical engineering
- E. Philip Morgan, Associate Professor and Associate Dean and Director of International Development Institute, Ph D , Syracuse, 1970 Public administration and organizations, development policy and development administration, international development economics
- Daniel Mullins, Assistant Professor, Ph D , Syracuse, 1989 Urban government policy and administration, public finance, budgeting and financial administration, policy analysis
- Karl O'Lessker, Professor, Ph D , Indiana, 1959 Public policy process
- Patrick O'Meara, Professor of Public and Environmental Affairs and of Political Science and Director, African Studies Programs, Ph D Indiana, 1970 Political development, comparative international politics, public policy
- Clinton V. Oster Jr., Professor and Associate Dean, Bloomington Programs, and Professor (part-time) of Business, Ph D , Iowa, 1977 Government regulation, economics, transportation policy
- David E. Parkhurst, Professor of Public and Environmental Affairs and Professor (part-time) of Biology, Ph D , Wisconsin-Madison, 1970 Applied mathematical modeling, physiological plant ecology, risk and decision analysis
- Roger B. Parks, Associate Professor and Director, Undergraduate Programs, Ph D , Indiana, 1979 Policy analysis and public management
- D. Jeanne Patterson, Associate Professor, D B A , Indiana, 1967 Financial management, government accounting
- James L. Perry, Professor and Director, Joint Ph D Program in Public Policy, Ph D , Syracuse, 1974 Public management: public personnel
- Maureen A. Pirog-Good, Associate Professor, Ph D , Pennsylvania, 1982 Public policy analysis
- James C. Randolph, Professor of Public and Environmental Affairs and Professor (part-time) of Biology, Ph D , Carleton (Ottawa), 1972 Applied ecology, physiological ecology, energy policy
- Edward L. Rhodes, Associate Professor and Director, Public Affairs Graduate Programs, Ph D , Carnegie-Mellon, 1978 Natural resources economics, management science
- Barry M. Rubin, Associate Professor and Associate Dean, University Computing, Ph D , Wisconsin-Madison, 1977 Urban and economic development, management information systems, analytical methods
- Richard S. Rubin, Professor, Ph D , Cornell, 1973 Labor relations
- John W. Ryan, Professor of Public and Environmental Affairs and of Political Science, Ph D , Indiana, 1959 Public administration and policy in higher education
- Roy W. Shin, Professor, Ph D , Minnesota, 1969 Public management, public policy
- William J. Siffin, Professor Emeritus of Public and Environmental Affairs and of Political Science, Ph D , Harvard, 1957 Development administration
- Thomas P. Snyder, Assistant Professor, Ph D , Harvard, 1986 Public finance, urban economics and planning
- Frank J. Vilaro, Associate Professor, Dr P H , North Carolina, 1971 Health administration/policy, public safety policy
- Jeffrey R. White, Associate Professor of Public and Environmental Affairs and Associate Professor (part-time) of Geological Sciences, Ph D , Syracuse, 1989 Environmental chemistry, chemical limnology, biogeochemistry
- Daniel E. Willard, Professor of Public and Environmental Affairs, Professor (part-time) of Biology, and Director, Environmental Science Graduate Programs, Ph D , California, Davis, 1966 Wetlands ecology and regulation, vertebrate ecology, environmental decision making
- York Y. Willbern, Professor Emeritus, Ph D , Texas, 1943 Public policy/administration
- Charles R. Wise, Associate Professor, Ph D , Indiana, 1972 Public administration/management, program evaluation
- Lois R. Wise, Assistant Professor, Ph D , Indiana, 1982 Employment policy, human resource management, research management and knowledge utilization
- Paul G. Wyckoff, Assistant Professor, Ph D , Michigan, 1984 Public finance
- C. Kurt Zorn, Associate Professor, Ph D , Syracuse, 1981 Public finance, applied economics, transportation safety

FORTUNE 500 COMPANIES

Selected Fortune 500 Companies

3-M	Minneapolis, MN
Cooper Tire and Rubber	Findlay, OH
Dow*	Midland, MI
Dupont	Wilmington, DE
Eastman Kodak	Rochester, NY
Exxon	Irving, TX
General Electric	Fairfield, CT
Goodyear Tire and Rubber	Akron, OH
Johnson and Johnson	New Brunswick, NJ
Mobil	Fairfax, VA
Pennzoil	Houston, TX
Proctor and Gamble	Cincinnati, OH
Quaker State	Oil City, PA
Quantum Chemical	New York, NY
Reynolds Metal	Richmond, VA
Rubbermaid	Wooster, OH
Standard Products	Cleveland, OH
Total Petroleum	Denver, CO
Union Carbide	Danbury, CT

*Sample Materials Attached



Outstanding Achievement Award

Texas Operations

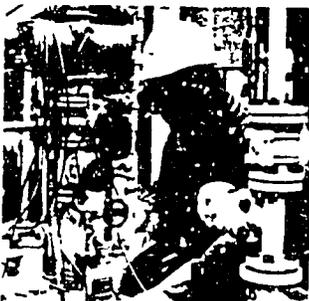
Project: Solvent recovery in Polycarbonate Processing/Polycarbonate Research at Dow's Texas Operations, in Freeport, Texas.

Opportunity: A waste reduction team identified opportunities to recover and recycle methylene chloride, an organic solvent, from the production process for polycarbonate resins. This process contributed a significant amount of organic waste to the division's incineration unit. The plant produces resins used in such products as car parts, computer housings, and appliances

Action: The team brainstormed to determine potential solutions, and implemented numerous process changes and capital projects. New equipment was installed, which improved separation of the solvent from outgoing wastewater, enhancing recycling capabilities. Additional storage capability and process changes were also introduced to reduce polymer breakdown, which would have prevented the reuse of the solvent.

Results: Because of these steps, organic waste from the polycarbonate manufacturing process was reduced by 6 million pounds, for a savings of \$1.2 million a year. Further refinements are currently being made that will soon allow 100 percent recovery of the solvent. These improvements have led to the recovery of more than 360,000 pounds of solvent annually, producing savings of \$112,000

Waste Reduction Team: The project team consisted of the plant technical staff, foreman, operators, and maintenance personnel. Also on the team were personnel from the Research Department, Technical Service and Development, and the Technology Center.



Jeff Reid, technician at the Polycarbonate Research Plant, takes a sample of recycled solvent to see if the quality meets specifications before being returned to the process

"All the team members were able to see the results immediately. Implementing projects that help reduce the amount of waste generated by Dow – and being able to actually see those results – was very rewarding."

Shari Babin, Research Engineer

NEAR EAST EMBASSIES

Near East Embassies

Embassy of Kuwait
2940 Tilden Street, NW
Washington, DC 20007
Abdulhamid Ali
Position Second Secretary, Economic

Embassy of Egypt, Commercial Bureau
2232 Massachusetts Ave., NW
Washington, DC 20008
Abdelwahab Heikal
Minister, Commercial Affairs

Embassy of Saudi Arabia
601 New Hampshire Avenue, NW
Washington, DC 20037
Abdulla al-Athel
Commercial Attache

Embassy of Tunisia
1515 Massachusetts Ave., NW
Washington, DC 20005
Mohamed Mestiri
First Secretary, Economic

Embassy of the Sultante of Oman
2432 Massachusetts Ave., NW
Washington, DC 20008
Awadh Bader al-Shanfari
Ambassador

Embassy of Yemen, Arab Republic
2600 Virginia Ave., NW
Washington, DC 20037
Jamal Numan
Economic/Commercial Counsellor

Embassy of Morocco
1601 21st Street, NW
Washington, DC 20009
Moulay Elhassan Aourid
Counselor, Political Affairs

Embassy of Jordan
3504 International Drive, NW
Washington, DC 20008
Imad Badran
Third Secretary, Economic

Embassy of Morocco
1601 21st Street, NW
Washington, DC 20008
Mohamed Belkhatat
Ambassador of Morocco

Embassy of the Arab Republic of Egypt
2232 Massachusetts Avenue, NW
Washington, DC 20008
Ali Ekbal
Second Secretary, Economic

ENVIRONMENTAL DATABASES

Environmental Databases

Air Pollution Technical Information Center

Engineering Information - Environment Disc

Enviro/Energy Abstracts Plus

National Environmental Satellite, Data, and Information Service

Non Point Source

OAQPS Technology Transfer Network

Pesticide Information Network (PIN)

Solid Waste Information Clearinghouse (SWICH)

Environmental/Energy Abstracts Plus

INTERNET

Environmental and conservation on-line bulletin boards and commercial on-line information services. Including:

-ENVIRO BBS - exchange of information on environmental protection and other topics including solid waste recycling.

-ONE WORLD - conferences - an environmental directory of information resources including organizations and publication listings, hazardous waste disposal, etc.

-Earth Net Environmental Information Service (EEIS) - Operated by BAI Computer Consultants and the Environmental Leaders Network - lists conferences and a large library of environmental technical papers and other files.

-RACHEL (Remote Access Chemical Hazards Electronic Library) - Environmental Research Foundation - computerized database with information about hazardous chemicals.

-EPA CLU-IN (EPA Clean-up Information) - Contains information on Superfund issues and innovative technology assessments.

-USENET Newsgroups - news message bulletin boards including sci.environment, talk.environment, and bionet.sci.resources.

-ECONET - a directory of environmental education resources, contains instructions for global communications and has an on-line phone directory with names and addresses of all of its users. Deer Database is a directory of environmental education resources.

-America On-Line - is MAC based and contains 2 environmental databases - National Geographic and The Environment Club.

-CompuServe - Network Earth Forum - is primarily educational.

DIALOG (On-line information service) 1971 to Present

Business Dateline
Chemical Exposure
D&B - Dun's Market Identifiers
D&B - Dun's Electronic Business Directory
Dialog Name Finder
Dialog Business Connection
Dialog Publications
Enviroline (Over 150K records)
Environmental Bibliog (Over 400K records)
Industry Data Sources
Magazine Index
Moody's Corporate Profiles
National Newspaper Index
Peterson's College Database
Pollution Abstracts (Over 150K records)
PTS New Product Announcements
Registry of Toxic Effects of Chemical Substances
The Educational Directory
Trade & Industry Index
U. S. Copyrights
Waternet
World Patents Index

**POLLUTION PREVENTION
INFORMATION CLEARINGHOUSE MATERIALS**

Pollution Prevention Information Clearinghouse

Distribution List, February 1993

PPIC
Environmental Protection Agency
401 M. St., SW, PM-211A
Washington, D.C. 20460

PPIC Hotline
202-260-1023
PPIC Fax Line
202-260-0178

This list is a compilation of documents distributed by the PPIC. The Clearinghouse is a distribution point for EPA documents and fact sheets dealing with source reduction and recycling. It provides a referral service for pollution prevention questions. Information on waste minimization and the treatment of hazardous waste is available from the RCRA/Superfund Hotline (800-424-9346).

Order documents by checking them on the list below. You can mail this form to the PPIC, call the hotline, or fax requests to the numbers shown above. The following EPA documents or fact sheets are provided at no cost, but **PLEASE LIMIT YOUR REQUEST TO A TOTAL OF 10 ITEMS**. Allow 4 weeks for delivery.

DOCUMENTS OF INTEREST

- ___ Environmental Protection Agency, Environmental Leadership Program; Proposed Establishment, January 15, 1993 58 FR 4802
- ___ Pollution Information Exchange System (PIES) Users Guide, Version 2.1
- ___ Total Cost Assessment: Accelerating Industrial Pollution Prevention Through Innovative Project Financial Analysis, with applications to the pulp and paper industries EPA/741/R-92/002

EPA DOCUMENTS

- ___ Assessing the Environmental Consumer Market
EPA 21P-1003
- ___ Case Studies from the Minnesota Technical Assistance Program and the Hazardous Waste Reduction Program of Oregon. Metal Finishing
- ___ Case Studies from the Pollution Prevention Clearinghouse: Electroplating
- ___ Case Studies from the Pollution Prevention Clearinghouse: Solvent Recovery
- ___ Directory of State and Local Pollution Prevention Programs: National Roundtable of State Pollution Prevention Programs
- ___ The Environmental Challenge of the 1990's Proceedings
EPA/600/9-90/039
- ___ Federal Environmental Statutes Possibly Affecting the Commercial Printing Industry
- ___ Guidelines for Waste Reduction and Recycling. Metal Finishing, Electroplating, Printed Circuit Board Manufacturing
- ___ Guidelines for Waste Reduction and Recycling Solvents
- ___ The Next Environmental Policy: Pollution Prevention

- ___ Pollution Prevention Benefits Manual: Vol I Phase II, The Manual
- ___ Pollution Prevention Case Studies Compendium
EPA/600/R-92/046
- ___ Pollution Prevention Guidance Manual for the Dye Manufacturing Industry
EPA/741/B-92/001
- ___ Pollution Prevention in Metal Manufacturing: Saving Money through Pollution Prevention (October 1989)
EPA/530/SW-89/056
- ___ Pollution Prevention Options in Metal Fabricated Products Industries: A Bibliographic Report
- ___ Pollution Prevention Options in Wood Furniture Manufacturing: A Bibliographic Report
- ___ Pollution Prevention Plan - Report to Congress
EPA/600/9-90/015
- ___ Pollution Prevention Quarterly Progress Report
- ___ Pollution Prevention Research Branch; Current Projects (January, 1991)
- ___ Pollution Prevention Research Plan (March 1990)
EPA/600-90/015
- ___ Pollution Prevention Resources and Training Opportunities in 1992
EPA/560/8-92/002
- ___ Pollution Prevention Through Compliance and Enforcement: A Review of OPTS Accomplishments
22T-1002
- ___ Profiting from Waste Reduction in Your Small Business
- ___ Promoting Source Reduction and Recyclability in the Marketplace
EPA/530/SW-89/066
- ___ Report on the US Environmental Protection Agency Pollution Prevention Program
- ___ Senior Policy Council: Pollution Prevention 1992 Annual Report
- ___ Waste Minimization in Metal Parts Cleaning
EPA/530/SW-89/049
- ___ Waste Minimization Opportunity Assessment Manual
EPA/625/7-88/003

EPA FACT SHEETS

- ___ ACE: Agriculture in Concert with the Environment - 2/91
- ___ Design for the Environment: Chemical Design Project
- ___ Design for the Environment: Cleaner Technology for a Safer Future
- ___ Design for the Environment: Dry Cleaning Project
- ___ Design for the Environment: Printing Project
- ___ EPA's 33/50 Program - 8/91
- ___ EPA's 33/50 Program: Forging and Alliance for Pollution Prevention - 8/91
- ___ EPA's Pollution Prevention Enforcement Settlement Strategy - 8/91
- ___ EPA's Pollution Prevention Incentives for States - Summer '90
- ___ EPA's Pollution Prevention Strategy - 3/91
- ___ Guides to Pollution Prevention - 3/91
- ___ Local Governments and Pollution Prevention - 3/91
- ___ National Pollution Prevention Center for Higher Education - 10/91
- ___ National Pollution Prevention Environmental Education Project - 10/91
- ___ New Form R Reporting Requirements - 8/91
- ___ Pollution Prevention Act of 1990 - 3/91
- ___ Pollution Prevention Grant Programs - 3/91
- ___ Pollution Prevention Information Clearinghouse - 3/91
- ___ Prevention Pollution Through Efficient Water Use - 7/90
- ___ Pollution Prevention Training and Education - 3/91
- ___ Recent Publications - Summer 1990
- ___ Setting up a Pollution Prevention Program - 3/90
- ___ Source Reduction Review Project - 3/92
- ___ You Can Make a Difference - 1/90

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FACT SHEETS

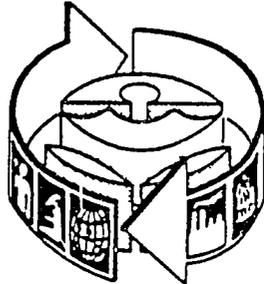
The following are a series of fact sheets written by state and regional organizations concerning relevant industries within their area of expertise. They have not been reviewed or approved by the Agency. Each category listed below contains numerous fact sheets.

- ___ GENERAL POLLUTION PREVENTION INFORMATION
- ___ AUTOMOTIVE REPAIR, MAINTENANCE, SALVAGE YARDS, PAINTING, RADIATORS
- FACILITY AUDIT CHECKLISTS
 - ___ Chemical Manufacturing
 - ___ Cleaning
 - ___ Coating/Painting
 - ___ Dry Cleaning
 - ___ Formulators
 - ___ Machining
 - ___ Metal Industry
 - ___ Operating Procedures
 - ___ Petroleum Industry
 - ___ Photoprocessing
 - ___ Printed Circuit Board
 - ___ Radiator Repair
- ___ CHEMICALS
- ___ CIRCUIT BOARDS
- ___ COAL MINING
- ___ COOLING TOWERS
- ___ DRY CLEANING
- ___ ELECTROPLATING, MACHINE TOOLERS, METAL RECOVERY AND WIRE MILLING
- ___ FOOD AND KINDRED PRODUCTS - POULTRY, DAIRY, AND SHRIMP
- ___ FINANCIAL
- ___ LOCAL GOVERNMENT - POLICIES OF AND GUIDES FOR
- ___ LUMBER, WOOD PRODUCTS AND FURNITURE
- ___ PAINT
- ___ PAPER
- ___ PESTICIDES
- ___ PETROLEUM REFINING, ELECTRIC POWER GENERATION AND OIL CLEANUP
- ___ PLASTICS AND FIBERGLASS
- ___ PRIMARY METAL INDUSTRIES - METAL FINISHING, MANUFACTURING, STEEL, FOUNDRY
- ___ PRINTING, PUBLISHING, AND PHOTOPROCESSING
- ___ RECYCLING AND RECYCLING MARKETS
- ___ SOLVENTS
- ___ TEXTILES - MILLS, MANUFACTURING
- ___ WASTE WATER TREATMENT

**POLLUTION INFORMATION
EXCHANGE SYSTEM**

PIES Quick Reference Guide

Pollution Prevention Information Exchange System



PIES is the computerized information network of EPA's Pollution Prevention Information Clearinghouse. PIES provides on-line interactive access through personal computers to a wide range of pollution prevention information. Open 24 hours a day, and free to all users, PIES represents an entry-point to a worldwide communications network on pollution prevention.

PIES Can Help You:

- Access technical and programmatic information;
- Solve technical and policy questions;
- Find and order documents;
- Locate expert assistance;
- Identify upcoming pollution prevention activities and events;
- Discover grants and project funding opportunities;
- Save money by showing you how to reduce your waste and reduce your liabilities.

For Further Information,

or to order a detailed PIES User Guide, contact the
PPIC Technical Support Hotline (703) 821-4800
FAX (703) 821-4775 or (703) 442-0584

Accessing PIES

You can access PIES if you have a personal computer (IBM or compatible, Apple, or a dumb terminal), a modem, communications software and a telephone line.

PIES is accessible through a regular telephone call, the SprintNet network and the EPA X.25 wide area network (for EPA employees only).

The following communications software settings are required if you are calling the PIES on a regular telephone line:

PHONE NUMBER: 703-506-1025
SPEED: 1200 or 2400 Baud
DATA BITS: 8
PARITY: None
STOP BITS: 1

Additional steps may be needed if you are accessing the PIES through a local area network (LAN) or a port selector. Consult your computer support personnel if you have one of these configurations. Contact the PPIC Technical Support Hotline for information on how to access PIES through the SprintNetSM network or on how government employees can access PIES toll-free.

PIES is one component of a joint EPA-United Nations Environment Programme Pollution Prevention/Cleaner Production computer network. When signing onto the PIES you will see the following menu:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY POLLUTION PREVENTION INFORMATION CLEARINGHOUSE (PPIC)	
Enter: 1	Pollution Prevention Information Exchange System (PIES)
Enter: 2	International Cleaner Production Information Clearinghouse (ICPIC)
Enter: 3	OzonAction Information Clearinghouse (Oaic)
Enter 0 or Q to Quit	

This provides you with the option of accessing the PIES, the ICPIC, or the OAIC. Choose "1" to access the PIES. All of the following commands, with the exception of the Databases and Mini-Exchanges, are applicable to all three bulletin board systems.

Logging Onto PIES

If you are a new user to PIES, you will need to register. After the initial welcome screen, enter your first and last name. PIES will respond that you are not in the USER'S FILE. Type C and hit <Enter> to register, hitting <Enter> a second time when prompted.

In order to register, PIES will ask you for the following information:

Password — Create a unique, one word password that is easy for you to remember. After entering it, PIES will ask you to enter it a second time to verify it. You must remember your password for subsequent calls to PIES.

City and State — Enter your business city and state.

Telephone numbers — Enter both your commercial phone number, with area code, followed by your FAX number with area code. If you do not have a FAX line, enter 0.

Organization Name — Enter the name of your company, agency, or organization. Use abbreviations if more than 24 characters.

Clear Screen — Answer (Y)es or (N)o to the question of whether you wish to have the screen cleared each time a message is read on the Message Center (to reduce screen clutter).

Transfer Protocol — This is required for uploading or downloading files from PIES. If you choose "none" at this time, you will have to choose a protocol when you first try to transfer a file. If you choose a protocol, it must be one that is used by your computer's communications software. A popular protocol is "Xmodem."

Mailing Address — Enter your complete mailing address, using up to three lines. Be sure to include your street, room number, city, state or province, postal code and country if applicable. Enter "done" to continue if your address is less than three lines.

User Category — Enter the appropriate user category from the list given.

How You Heard About The PPIC — Enter the appropriate information, e.g., at a conference, through a newsletter, journal, or through another bulletin board.

This completes your registration. Subsequent times that you enter PIES, you will only be asked for your first and last name and your password

1. MESSAGES (Q)uick messages scan (Y)our personal mail (E)nter a message (R)ead a message (R)EPLY to message (C)omment to Sysop (X)it a message	3. FILES/DIRECTORIES (F)ile directories (D)ownload a file (U)pload a file	SETTINGS & MISC. (NEWS) screen display (X)port On/Off (G)oodbye/Logout
4. BULLETINS (R)ulletin listings	2. DATA BASES (O)PEN for data base menu and literature search functions	2. MSG-EXCHANGES (J)oin a Mini-Exchange

1. Message Center Commands

Look to the Message Center to communicate with other users on all subjects, including answers to your technical questions.

Read Messages - R - displays messages.

Reply to Messages - RE - responds to a message left by another user (enter this command immediately after reading a message).

Enter a Message - E - writes a message to another or all PIES user(s).

Comment to system operator - C - enters a private message to the PIES system operator.

Kill a message - K - deletes an old message you have previously entered.

Quick Scan - Q - displays message header information for all public messages (including reference number, author, and subject).

Read Your Messages - R Y - Displays all messages addressed to you.

Read Your New Messages - R Y S - Displays all messages addressed to you since you last logged on the PIES.

Read All New Messages - R S - Displays all messages left on the PIES since you last logged on.

Read Messages in All Conferences - ALL - Reads messages in all conferences in which you are registered.

Text Scan - TS - Searches messages for specific text.

User Specific Messages - USER - Selects only those messages to or from a specific user.

Entering a Message

After entering E at the Main Menu prompt, the computer will ask who you would like to address the message to and the subject. PLEASE NOTE: All mail is monitored by the PIES system operator

Private and Public Messages. Entering R when replying to a message makes a message private, enabling only you and the addressee to read it. The command N, makes your message public, allowing ALL users to read your message

Line Editor and Full-Screen Editor. PIES offers you the choice of entering text either with a Line Editor or with a Full-Screen Editor. The Line Editor enters text one line at a time. On-line help is available by entering a blank line and the command H. The Full-Screen Editor enters and edits text in the same manner as a word processor allowing you to edit your entire message. On-line help is available by entering <Ctrl-Z>. The Full-Screen Editor requires your communications software to be set to ANSI Emulation.

Saving Your Message. In order to save and send your message with the Line Editor, leave a blank line followed by the command S. With the Full-Screen Editor, enter <Esc> or <Ctrl-U> followed by the command S.

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2. Database Commands

The PIES Databases are your gateway to pollution prevention information, technical information, program descriptions and the pollution prevention calendar.

PIES Data Bases

- (1) - Calendar of Events
- (2) - Federal Program Summaries
- (3) - State Program Summaries
- (4) - Corporate Program Summaries
- (5) - Case Study Abstracts
- (6) - General Publication Abstracts
- (7) - PPIC Contact List
- (8) - Pollution Prevention Grants
- (9) - Pollution Prevention Environmental Education Abstracts Data Base

To access the PIES databases, enter the command OPEN at the main menu prompt. From the next menu, choose 1. This will give you a list of the 9 active databases on the PIES.

Calendar of Events. To access the Calendar of Events:

1. Select "1" from the PIES Database Menu.
2. <Return> for 1992, or enter a different year.
3. <Return> to see the calendar listings closest to the current date. To view a different listing, enter the date you wish to view.
4. To exit the Calendar of Events, enter Q to quit and return to the database list.

Case Study or General Publication Abstracts or the Pollution Prevention Environmental Education Abstracts Database. To access any of these databases:

1. Enter 5, 6, or 9 from the PIES Database Menu
2. To perform a keyword search in these databases, enter E to enter a keyword.
3. Enter your keyword search string. Search strings can be a single word or a combination of words. Words can be combined using "+" for "and" and "I" for "or" (i.e. WASTE+SOLVENTS selects abstracts with both WASTE and SOLVENTS, WASTE|SOLVENTS selects abstracts with either WASTES or SOLVENTS).
4. Display Abstracts. At the database menu, you can select:
 - S - Scan the keywords of all selected abstracts;

- # - select an abstract by number (for use with the Scan command);
- A - display All abstracts;
- E - perform another search;
- Q - Quit and return to the main menu;
- H - Help;
- G - logoff the PIES;

5. To exit the databases enter Q to return to the database list or G to log off of PIES.

Menu Driven Databases. The Federal, State and Corporate Program Summary databases — numbers 3, 4, and 5 — as well as the PPIC Contact List and the Pollution Prevention Grants databases — numbers 7 and 8 — are all menu driven.

- To access any of these databases enter the corresponding number from the PIES Database Menu.
- In each case you will be presented with a series of menu choices.
- To display the information in these databases follow the menu commands.
- In any of these databases, entering Q will exit the database and return you to the PIES Database Menu.

3. Mini-Exchanges

The PIES contains 10 Mini-Exchanges that specialize in different issues of pollution prevention. Operating just like the Main Menu, each Mini-Exchange contains a message center, bulletins and databases particular to the Mini-Exchange. The Mini-Exchanges that are currently available are

- UNEP International Cleaner Production Information Clearinghouse (ICPIC)
- U. S. EPA's 33/50 Program
- EPA Region 9 Information Exchange
- EPA Region 1 Association of States and Interstate Agencies
- Enforcement Information Exchange
- Research Exchange
- Indiana Waste Exchange and Pollution Prevention Program
- National Roundtable of State Pollution Prevention Programs
- EPA Regional Information Exchange
- Lake Superior Information Exchange

1. To access a Mini-Exchange, enter "J" at the Main Menu. This will bring up a list of the available Mini-Exchanges.

2. Choose the number of the Mini-Exchange you wish to access.
3. You will then see a menu that looks similar to the PIES Main Menu. All the features of the Main Menu work in the Mini-Exchanges as well.
4. To exit a Mini-Exchange, enter "A" at any menu prompt.

4. Bulletin Commands

For the latest news in Pollution Prevention, take a look at the PIES Bulletins.

- B** Bulletin Listings - lists bulletins available on the PIES. At the prompt, enter the number listed next to a bulletin to display that bulletin.

5. Files/Directories

File Directories. To list all files available for downloading, enter "F" at the Main Menu.

Downloading Files. In order to download files to your computer from PIES, complete the following steps:

1. At the Main Menu, enter the command D. The PIES will prompt you for the name of the file you wish to transfer. (See command F above to locate file names).
2. Select a transfer protocol. Transferring a file requires that both your computer and PIES use the same transfer protocol. A popular one used by the PIES and many communications packages is Xmodem™. PIES will ask you which transfer protocol to use when transferring the file, unless you designated a transfer protocol when you first registered on PIES. At this point, PIES is ready to transfer the file.
3. Instruct your computer to receive the file. With most communications software you can pass a command to your computer by using the "Ctrl" or "Esc" key. Consult your communications software manual or your computer support personnel to obtain the proper commands.
4. The PIES will inform you when the transfer is complete.

At any time, the command <Ctrl-X> will abort the transfer.

Screen Capture. Information can also be downloaded to your computer by capturing it as it scrolls across the screen. To capture information:

1. Identify the information you wish to capture, such as the results of a Case Study Database search.

2. Instruct your computer to begin a screen capture. Consult your communications software manual or your computer support personnel to obtain the proper commands.
3. Instruct the PIES to display the information. Anything that you view on the screen (including any commands or menus) will be saved to your computer.
4. Instruct your computer to stop screen capture once you have viewed all the information you wish to capture.

Uploading Files. In order to upload files from your computer to PIES, complete the following steps:

1. Instruct PIES to receive a file by entering the command U. PIES will prompt you for a name for your file, followed by a brief description.
2. Select a transfer protocol. (See Step 2 under "Downloading").
3. Instruct your computer to send the file. With most communications software you can pass a command to your computer by using the "Ctrl" or "Esc" key. Consult your communications software manual or your computer support personnel to obtain the proper commands.
4. PIES will inform you when the transfer is complete.

At any time, the command <Ctrl-X> will abort the transfer.

Type "H" for Help anywhere in PIES.

Accessing PIES via SprintNetSM

SprintNetSM is a data network subscription service that enables you to access PIES in most major metropolitan areas using a local telephone call. Users are billed for connect time through U.S. Sprint, thus saving long distance telephone charges. To access PIES through SprintNetSM you must first obtain a SprintNetSM account. For more information about SprintNetSM, contact:

U.S. Sprint/User Support
12490 Sunrise Valley Drive
Reston, Virginia 22096
Tel: 1-800-736-1130
Telex: 7400944 INTL UC
FAX: 703-689-5177

For information about connecting to the PIES from SprintNetSM, contact the PPIC Technical Support Hotline.



Printed on recycled paper

ANNEX C.11

**ENVIRONMENTAL AND
RELATED PUBLICATIONS/JOURNALS**

Publications and Journals

50 top metropolitan newspapers

U.S.A. Today

Associated Press

Select list of newsletters from associations

Other newsletters

Air & Water Pollution Control Newsletter

Air Pollution Control

Air Pollution Titles

Air/Water Pollution Report

Magazines and Journals

Asia Business Journal

Balance

Becoming an Environmental Professional

BNA's National Environmental Watch

Business America

Business Monthly

California Environment Reporter

Canadian Environmental Protection

Clean Air Act Report

Clearing Magazine

Climatic Data for the World

Commercial News USA

Earth Summit Times

E Magazine - The Environmental Magazine

Earth Island Journal: An International Environmental News Magazine

Earth Work

Environment

Environment Today

Environment Action Magazine

Environmental Business Journal

Environment Bulletin

Environment Impact Assessment Review

Environmental Management: Journal of Industrial Sanitation & Facilities Management

Environmental Review

Environmental Science & Engineering

Environmental Technology Export Council

EPA Journal

EPA's Real Needs

The Green Business Letter

Green Market Alert

Hazard Monthly

Hazardous Waste & Hazardous Materials

Hazmat World
International Environmental Affairs: A Journal for Research & Policy
International Journal of Environmental Studies
Journal of Environmental Economics & Management
Journal of Environmental Quality
Journal of the Air & Waste Management Association
Journal of Hazardous Waste and Hazardous Materials
Policy Statement on Hazardous Waste Reduction from Industry
Pollution
Recycling Times: The Newspaper of Recycling Markets
Recycling Today
Research Journal Water Pollution Control Federation
Solid Waste & Power: The Waste to Energy Magazine
Texas Environmental News
Tomorrow - The Global Environment Magazine
U.S. Arab Chamber Gulf Business Report
Waste Age: The Authoritative Voice of Waste Systems and Technology
Waste Management: Nuclear, Chemical, Biological & Municipal
Waste Tech News. The Newspaper for the Waste & Pollution Control Industries
Waste Watchers
Water & Wastes Digest
Water, Environment, and Technology
Water Research. The Journal of the International Association of Water Pollution Research & Control
Water Technology

ANNEX C.12

**INDUSTRY DIRECTORIES
AND BUYER'S GUIDES**

Directories

Pollution Control Directory (American Chemical Society)
1992 Industry Source Book (Solid Waste & Power)
Air Pollution Control Directory
Am. Consulting Engineering Council for Waste Management
American Recycling Market/Directory
Waste Utilization Technologies in Europe & U.S.
Wastes & Their Treatment Information Services
Water Quality Association
Water & Sewer Distributors of America
Water Systems Council
Water & Wastewater Equipment Manufacturers

Industry Directories and Buyer's Guides

Hazardous Materials Control Research Institute

Pollution Equipment News/Rimbach Publishing

Solid Waste and Power Magazine - HCI Publications

GRCDA/SWANA- Solid Waste Association of North America

American Recycling Market Directory

- Lists 20,000 recycling companies

Pollution Control Directory

- American Chemical Society

Air Pollution Control Directory

- Lists 1,032 companies in the air pollution industry.