

PN-ACA-524

**Trade Opportunities
Computer Software**

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PN-ACA-524

US-AEP



Trade Opportunities Computer Software

System Overview and Proposal

*by LTS Corporation
September 30, 1994*

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Background

Under an initiative of the United States-Asia Environmental Partnership (USAEP) and the Center for Trade and Investment Services of the U.S. Agency for International Development, the Environmental Technology Network for Asia (ETNA) provides U.S. firms with timely energy and environmental technology trade leads and market information from nine Asian countries. ETNA is staffed with engineers who qualify each trade lead from Asia, electronically match them with appropriate U.S. environmental technology companies that are registered with ETNA's environmental trade opportunity database, and deliver them to those companies by fax.

ETNA's current computer software system for matching trade leads with U.S. companies is a stand alone personal computer based solution which produces plain text output and that currently functions at maximum capacity. The current system cannot handle the projected growth of the ETNA database of U.S. firms or the increasing number of trade opportunity documents submitted for dissemination by USAEP Environmental Technology Representatives in Asia.

Objective

To provide a new system which maintains the positive features of the existing Expro/Global Export Manager system, while expanding the capabilities of both the Environmental Technology Representatives (Tech Reps) and the Environmental Technology Network for Asia (ETNA) to collect trade opportunity documents and deliver those documents to appropriate U.S. firms. The implementation of any new system should not interrupt the flow of information from Asia to firms in the US.

It is essential that any new system preserve the information collected thus far. The new system must be able to service a client database of up to one hundred thousand firms, collect and process documents from up to 100 sources, be able to deliver those documents to the appropriate group of clients within forty-eight hours, and allow the users to produce and transmit "striking" faxes.

The current system is operating at the maximum capacity for its distribution model. It is critical to find an immediate solution to expand the distribution capability of ETNA as well as to develop a mature system which satisfies all of the requirements listed for a new system. Please refer to **Appendix A** for a discussion of possible solutions to the immediate distribution problem and how they fit into the development of the new system.

USAEP has suggested naming the new system the *Trade Opportunities Computer Software (TOCS)*. The Partnership has also insisted that a new system should expand the capabilities of ETNA by:

- ◆ increasing total number of documents that can be processed ;
- ◆ increasing the number of document sources (up to 100 sources);
- ◆ increasing the number of clients that the documents are matched with and delivered to (up to 100,000);
- ◆ integrating multiple means of delivering documents to clients (fax, email, direct mail);
- ◆ providing a more reliable delivery mechanism;
- allowing the users to produce and distribute highly attractive documents;
- having improved ergonomics for data entry, quality control, querying the database, and running reports.

The capabilities of the Environmental Technology Representatives should be enhanced by:

- providing different options for document formats depending on the type of opportunity (e.g., trade leads, project leads, enterprise leads);
- ◆ allowing the user to edit the document as a word processing document after the initial data entry has been done;
- integrating more complete client management tools (including the ability to create WordPerfect mail merge files);
- having improved ergonomics for data entry, querying, and reporting.

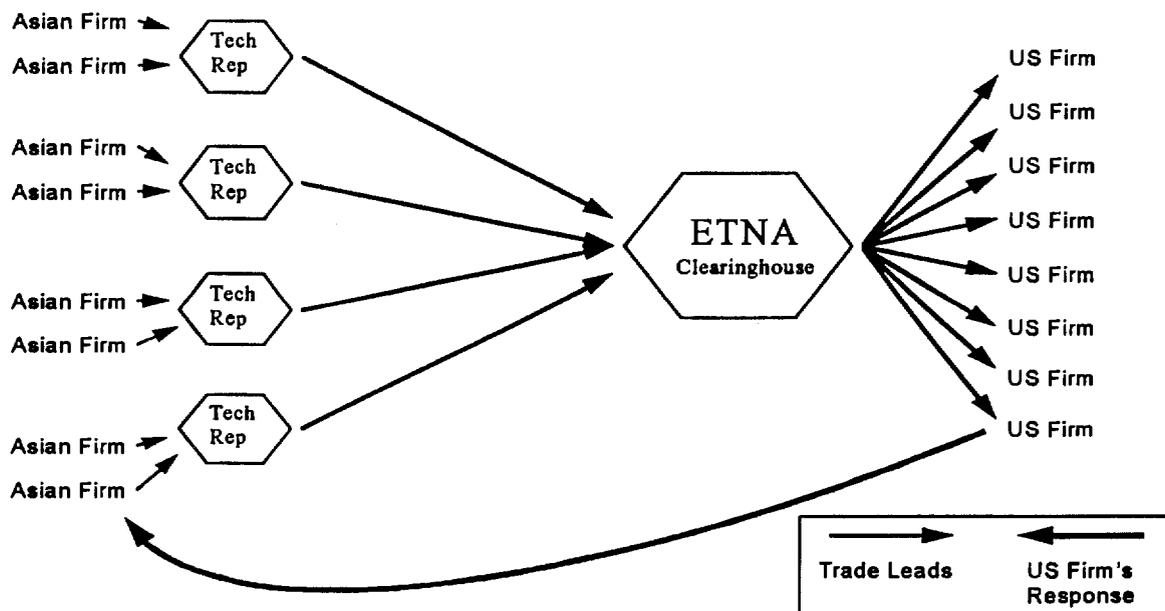
The Current System

The current software/hardware system for disseminating USAEP trade leads is the Expro/Global Export Manager (GEM) system. The Expro system is a personal computer based system written in FoxPro for DOS. USAEP Tech Reps in Asia currently use a companion product, the Foreign Office Trade Opportunities Generator (FOTOGEN), to create and track trade opportunity documents and to maintain their client lists. Both packages were written by Eagle Eye Publishers, Inc. of Vienna, Virginia.

The flow of information through ETNA is as follows:

1. USAEP Tech Reps receive a trade lead or other trade opportunity information from one of their Asian contacts (a company, a government official, etc.)
2. The Tech Rep enters the data about the contact and the trade lead into the FOTOGEN system and assigns one or more interest codes from the USAEP taxonomy. The system extracts the information for the lead from the contact and trade lead databases and posts the trade lead in the USAEP trade lead format into a memo field in FOTOGEN. The trade lead now exists as a text only document within a memo field in FOTOGEN.
3. The Tech Rep transmits a trade lead database containing one or more leads by modem file transfer to the ETNA Clearinghouse computer.
4. ETNA performs quality control on the trade lead (spell checking, completeness of information, etc.)
5. ETNA matches the trade lead with the U.S. firms in its client database by USAEP interest code.
6. ETNA distributes the lead via fax to the appropriate U.S. firms.
7. A U.S. firm receives the trade lead or trade opportunity document and responds directly to the Asian firm if interested.

The Environmental Technology Network for Asia Information Flow



ETNA is now processing an average of six trade lead documents a day, matching them with a database of 1,600 clients and sending out 750 -- 1,000 faxes a day. On busy days, that output must be split between two of the three PCs currently configured to run Expro. One PC with a single fax card can reliably handle a maximum of 750 faxes per day.

The functions of the current system which must be carried over into the new system include:

- Entering and editing trade leads
- Matching and Disseminating Trade Lead Documents
- Tracking past transactions
- Querying/Reporting functions

How each of these functions is carried out in the current system and what must be carried or modified in the new system is discussed below.

Entering and Editing Trade Leads

For most trade leads, the Tech Rep enters the data about the contact and the trade lead into the FOTOGEN system and assigns one or more interest codes from the USAEP taxonomy. FOTOGEN then extracts the information for the lead from the contact and trade lead databases and posts the trade lead in the USAEP trade lead format to a memo field in FOTOGEN. The trade lead then exists as a text only document within a memo field in FOTOGEN.

Expro also allows the entry of trade leads, but it does not contain the USAEP trade lead format. Therefore, trade leads entered in Expro do not contain much of the USAEP specific information which is collected by FOTOGEN. Neither Expro nor FOTOGEN allow the user to actually edit the trade lead text document. The trade leads are limited to simple text and one of two formats (the USAEP trade lead format and the generic Expro trade lead format).

The new system will have to provide both ETNA and the Tech Reps with the same standard document formats. Initially, it will provide three basic formats (Trade Leads, Project Leads, and Enterprise Leads), as well as a blank document format for items which do not fit any of the general formats (announcements from the Secretariat, surveys, etc.). The system will have to allow the addition of more standard formats, should they become necessary.

The new system will also have to allow both ETNA and the Tech Reps to edit and modify the text of a document after it has been created.

Matching and Disseminating Trade Lead Documents

The current system contains a database of USAEP/ETNA clients (U.S. Environmental firms), including their contact information and areas of interest coded by the USAEP taxonomy for each firm. Expro provides the ETNA staff with the ability to match trade opportunities generated by the companion program (FOTOGEN) to these clients using the USAEP interest codes. It then faxes the lead documents to the company which were matched to them.

The current system matches trade leads with U.S. firms and then creates an individual file for each company that matched one or more of the day's trade leads. This file contains the individual fax cover letter and the trade leads for that particular company. The approach allows the system to send a single fax per day to each company, but creates a bottleneck which drastically affects performance. The problem with any system using this model will be the time and disk space required to write the individual files. Using this approach, the best performance that could be achieved by upgrading hardware and software (short of migrating the application to a mainframe computer), would be to double the speed of these actions. If a busy day's leads now require over an hour to create the files and queue them, under the model used by the current system the best that could be expected would be to cut that time in half.

These fax files take up room on the hard disks. Every day's faxes currently requires 20 to 40 Megabytes of disk space. The current fax files are all simple text files. Formatted fax documents would take far more room to store. Archiving past faxes is not done with the current system.

At ten times the current number of clients, the computer used would still be creating and writing files for over five hours and filling 200 to 400 MB of disk space *every day*. Ten times the current number of clients is only *one sixth* the requested capacity of the new system. Unfortunately, reading and writing files to disk is the one activity that affects the operations of any other software in any multitasking environment. Even if the activity were happening in the background, it would drastically affect performance. There is no easy way to avoid this bottleneck other than to change the model of individualized faxes to each client.

The other model which could be applied would be to have a single file containing the trade lead and creating a phone book of all the companies which should receive that particular lead. Cover pages could still be individualized, pulling client specific information from the phone book. Unlike the current approach, a client would receive each lead as a separate fax. However, this model will work at the volume of traffic the new system needs to be capable of handling. If the

faxes are delivered overnight, the effect is the same (i.e., a client comes into the office in the morning and the day's trade leads have been delivered).

The new system should maintain the current database of clients and their interest codes and be able to match trade opportunity documents with the appropriate clients by interest codes. It should also support the addition of additional taxonomies and matching by custom search criteria (for example, all California firms, only email recipients, etc.).

Tracking Past Transactions

The current system tracks what documents have been sent to which ETNA clients and the date a document was scheduled for transmission.

The new system will also have to track this information, as well as the date and time a document was sent, if it was successfully transmitted, and, if there were any problems in delivering the document, what type of problems (wrong number, line disconnected, etc.). The new system will also provide mechanisms for the ETNA staff to resend past transmissions upon client request and to send updates to the original recipients of a broadcast document.

Querying/Reporting Functions

There are currently approximately 30 reports in the Expro system. The reports can be printed to screen, fax, file or printer. The current system provides the user with a complete report generator to allow the creation of new reports and substantial modification of existing reports. There is also query function which allows for simple database searches. Expro does not allow formatting reports with different font types, sizes or styles. Output for faxing and mail is limited to ASCII text.

The ETNA staff also uses FoxPro for Windows 2.5 to create external queries and reports to pull information from the system. Both these external queries and reports and those within Expro will be recreated within the new system. A report generator and full functioned query engine should be included in the new system.

Document Distribution

The new system will be capable of distributing documents by fax and email, and will be open to the addition of other means should the need arise. There are a couple of major options for each means of disseminating documents.

Fax

When faxing documents to ETNA clients, the system can either route the faxes to a hardware fax system (a network fax server or some other multi-fax machine) or route them to a broadcast fax vendor (such as MCI or Cable and Wireless, Inc.).

The first option is to develop the new distribution engine so that it feeds into a hardware-based fax solution. This engine would perform the client management / document matching and dissemination activity and then route the output through fax servers or multiple fax cards in PC. Additional equipment and phone lines would have to be acquired as volume increased. At current levels, ETNA would need at least six additional outgoing lines, with an additional six lines for every three thousand faxes a day.

If ETNA grows as projected, it could soon need a row of fax servers and banks of modem lines to deliver its trade leads. The current offices do not have sufficient space to house these machines. These servers would require additional technical personnel to maintain, and ETNA would also need staff to follow up on undelivered faxes in order to maintain reliable delivery. This option also makes the system far less portable than it currently is. Any new location would require space for the fax servers and would need the fax lines in place before any move could take place. Another risk is that network problems unrelated to the ETNA system could shut down delivery of faxes. And a hardware solution would be less attractive to entities interested in running ETNA as a commercial venture, because it would require an investment in technical personnel and require far more technical preparation to successfully adopt and use the system.

The second option, using a broadcast vendor, would be far more portable and would allow for a much easier transition to large volumes of traffic. The large broadcast fax service vendors can also provide a level of reliability which would be very hard to match in-house. Also, since the major vendors can deliver thousands of faxes within minutes, this option will provide much quicker dissemination. The average turnaround time for faxes could easily drop to twelve hours or less.

At lower traffic levels, using a vendor might be more expensive than using Agency phone lines and faxing directly. However, both MCI and Cable and Wireless quote phone rates cheaper than CTIS's current 800 line cost per minute based on current volume.

Email

There are several possible solutions for delivering trade leads by email to ETNA clients, The system could route the email through the USAID LAN's email and out the Internet gateway, it could route the email via a commercial provider, such as MCI or CompuServe, or it could post the messages using the Agency's or the USAEP's Internet servers.

The most expensive method of the three would be to use a commercial vendor who charges by the message (such as MCI). However, this option would be portable, and easily scaleable. The clearinghouse could be moved to any office with a single modem line and remain in operation. If the vendor was also the broadcast fax vendor, the process of routing the messages would be simplified, because the vendor would accept a single address book for a given message and sort out the email's from the faxes instead of the ETNA system having to make the division.

Routing the email through the Agency LAN would tie the system into the Agency's Banyan VINES environment and would make it less portable. If the system requested confirmation of receipt, which would be a desirable option, it would also easily exceed the Agency's guidelines for maximum number of email's in a mailbox, and could conceivably exceed Banyan's maximum of 9,999 messages for one mailbox. Also, network management might not agree to allow this level of traffic to be routed through the agency network.

The third option would be to have the new system feed its email output into either USAID's or USAEP's Internet servers and have their mailing list software distribute the email messages. This option combines low cost with portability. As long as ETNA has some type of Internet access, via email, TELNET, or FTP, the system could remain in operation. This solution is also scaleable. Traffic could rise very quickly to very high volume without any distribution problems. This option would leave ETNA with a higher level of responsibility for addressing technical problems than using a commercial vendor, but it should lead to a stable distribution mechanism which will not require adjustments if email volume increases or trade lead document formats change.

Database Software

The current system, Expro, is written in FoxPro for DOS. Based on the current size of the databases and number of trade opportunity documents, a variety of personal computer database managers could be used to develop the new system. However, if the system is to be capable of handling 100,000 companies and matching leads from 100 sources for distribution, most if not all PC based solutions would not provide a stable and workable solution. If the average client selected ten codes to identify its interests, the database would have 1,000,000 records for USAEP codes alone. Matching a trade lead with twenty codes selected or trying to target all of the Waste Water firms, would require a very powerful database engine. Databases of this size are generally maintained either on a minicomputer or on a workstation designated as a database server and running client/server database software. These environments provide much better performance and rock solid data integrity.

Of the above two options, the client/server database software solution is less expensive, easier to integrate into the current ETNA configuration, and provides a much smoother upgrade path. Several database management softwares and computer languages will allow a developer to design and build a system using standard PC database formats (such as FoxPro and Dbase's dbf format), and after the front end has been developed, to transfer the data to a client/server database and plug the front end on top of it. This would allow U.S. to build the new system as a PC based system and, after the rest of the new system was developed and in place, to implement the transition to a client/server database engine.

There is also a great deal of flexibility in choosing the type of machine to be used as a database server. Initially, an IBM compatible 486 or Pentium would probably be sufficient as a server (most 386 or better PCs can run the necessary operating systems and softwares).

The system can be designed so that when the database become large enough that it is reaching the current database servers potential, only hardware need be changed. Once the clearinghouse databases are converted to a client/server database engine, the system can be scaled upward without modifying the software application. It will be scaleable up to 100,000 clients and more.

USAID's standard for client/server software is Oracle 7 running on UNIX workstations, using TCP/IP for a communications protocol. Adhering to this standard will allow ETNA to benefit from IRM's experience in installing database servers onto the USAID network and configuring workstations to access them.

If the matching engine and dissemination is supposed to be able to run in background while the operators use their computers for other tasks, the front end should be developed for a graphical, multitasking user environment such as Microsoft Windows. Various softwares could serve well as the development tool for the application. Among them are DBase for Windows, Paradox for Windows, Visual Basic, Access and Delphi.

Recommendations

The analysis team's recommendation is to design and field a system which utilizes a broadcast fax service vendor for fax dissemination and either the USAID or the USAEP Internet servers for email dissemination. At this point, we recommend that the clearinghouse databases should be maintained on an Oracle 7 database server, while the clearinghouse front end and the field application will both be written in DBase for Windows 5.0. This will allow the USAEP to maintain a scaleable, flexible, reliable system which can be transferred easily to a commercial concern, should ETNA become a commercial venture.

Because of the current system's distribution limitations, a prototype of the matching and dissemination module should be built immediately and installed at ETNA. This action will provide an immediate solution to overcome ETNA's most pressing technical limitation. Utilizing this module immediately will also allow for extensive real world testing of what will be the foundation of the TOCS system prior to constructing the rest of the system. Detailed system specifications for the TOCS system can be developed based on these tests and further input from the ETNA staff and the USAEP Tech Reps.

These recommendations are based upon the premise that the current distribution model is one that the USAEP wishes to maintain. However, prior to building the mature TOCS system, we recommend evaluating the whole model of information distribution, especially in light of making ETNA a commercially viable entity. TOCS will enable ETNA to increase its faxing output almost exponentially, with the resulting increase in overall delivery cost. Faxing is not the cheapest delivery mechanism available, but it is the most widespread means of delivering information instantaneously. If targeted fax is the delivery mechanism desired, the following system will provide the capability necessary to process and delivery USAEP information.

Overview of Proposed System

The *Trade Opportunities Computer Software (TOCS)* will be an automated document distribution system, capable of distributing to a targeted group any document by broadcast fax and email. It will allow for the later inclusion of other delivery mechanisms such as telex and mail as well. The targeted groups will be defined on the fly according to various interest coding systems (including the USAEP taxonomy). The system will also allow the operator to add and removed individual clients to the distribution lists, as well as to automatically send updates of past broadcasts to the original list of recipients. TOCS will be able to distribute documents matched against a database of 100,000 clients, be able to process documents from 100 sources, and deliver the documents to all the matched clients within 48 hours.

The system will consist of two separate but related applications. The *Field Application* will include trade lead/document generator and client management tools for use by USAEP *Technology Cooperative Representatives* and the *Infrastructure Advisory Service (IFAS)*. The *Clearinghouse Application* will be a client management/document distribution system used by the *Environmental Technology Network for Asia* to distribute the trade opportunity documents to their clientele (U.S. environmental firms).

The system will be modular and open. It will not be tied to any proprietary software or hardware for which no commercial alternative is available. Certain modules will be components of both applications (for example, the trade lead/document generator will be in both the *Field Application* and the *Clearinghouse Application*). The modules will include a trade lead/document generator, a matching/dissemination engine, a client database module, a document/trade lead database/quality control module, a document distribution/tracking module, and a query and reporting module, . The document distribution/tracking module and client management tools will be designed to allow for the future inclusion of an accounting module.

The general system design will allow for the inclusion of other modules as needed in the future (e.g., an Internet module to allow online registration on USAID's Internet servers). TOCS will also be a network application, allowing multiple users to access and work in the system at one time.

Given the number of clients and sources of leads the system will have to be capable of handling, as well as the large number of interest codes possible for each client, the current generation of PC database softwares are not appropriate as a foundation for the current system. For a system

capable of handling 100,000 clients and leads from 100 sources, a client/server database is the most cost effective solution.

The most efficient means to distribute the projected number of documents is to utilize broadcast fax vendors, such as MCI or Cable and Wireless, Inc. (see **Appendix D**). For email distribution, it will be more cost-effective to use USAID's Internet servers to distribute email. The system will be able to route outgoing documents via multiple vendors and/or an agency Internet server. To route both faxes and email, the system will generate an ASCII text address books for each lead and forward the address book and lead document file to the fax vendor and Internet email server. The system will also allow adding additional delivery routes (such as using CompuServe to delivery mail to clients on CompuServe) and to changing the existing distribution vendors and media.

Overview of the Clearinghouse Application

The clearinghouse application will allow the staff of the Environmental Technology Network for Asia to manage their client information, maintain a comprehensive record of all USAEP trade, project and enterprise leads, and allow ETNA to match the leads to their client database and deliver the leads within 48 hours.

In its final form, the clearinghouse databases will be maintained on a database server running Oracle 7 database software (USAID's standard for client server software). While the application is in development, the data will be maintained in DBase tables. The conversion to client server and installation will be the last step in the building the system. The interface which will function as a front end for the clearinghouse application will be written in DBase for Windows 5.0.

The system will initially consist of six modules. Additional modules can be added in the future as new functions and data structures are required. Three of the initial modules will be defined as *database modules*; that is each consists of a clearly defined data structure, the information within in that structure and the tools necessary to manage that information (data entry screens, quality control procedures, etc.). These three modules are:

- the client database
- the document database
- the tracking database

The other three modules will be defined by the function they perform. They are:

- matching/dissemination module
- trade lead/document generator
- query and reporting module

The **client database** will maintain the company information currently maintained by the Expro system. It will allow for multiple taxonomies, with interest codes of up to twelve digits.

The **document database** will contain the full text of the trade leads as well as the coded information from the current trade lead database. This will allow for the easy resending of trade leads to ETNA clients. If hard disk storage space becomes an issue, the trade lead text can be automatically archived once they have been on the system a given period of time (for example, only trade leads less than six months old would be in the active database).

The **tracking database** will maintain a record of which leads were matched with which ETNA clients, how they were distributed (by fax or email), if they were successfully transmitted, what date and time they were received by the client, and other information necessary to assure reliable delivery. Information on successful and unsuccessful delivery of faxes will be posted into this database from the electronic transmission logs provided by the broadcast vendor.

The **matching and dissemination module** will match the trade lead documents with the client database, create electronic email and fax address books for each lead, and queue the leads with their address books to be sent to the broadcast fax vendor and USAID internet email server. The user will have the option of matching and disseminating a group of leads automatically by USAEP taxonomy or by matching each lead individually. When matching a single lead the user will be able to match by USAEP taxonomy or by other search criteria (for example, all California firms, all firms that do both project management and air purification, etc.) She will have the options of adding and removing individual companies from a broadcast list, or returning to the query to modify its terms, then rerunning the search.

The **document generator module** will serve as a "super data entry" module for the document database. The module will prompt the user to enter the necessary information for a trade lead, post the various sections to the appropriate fields, and then create a formatted trade lead document from the information entered. Once the document has been created, the users will be able to edit it as they could any word processing document. Initially there will be four document templates: trade leads, project leads, enterprise leads, and a blank format to allow for documents which do not fit one of the preset formats. Additional formats can added as needed.

The **query and reporting module** will provide a complete Windows report writer and a query screen capable of complex Boolean searches. The current Expro and FoxPro for Windows queries and reports will be recreated and accessible as menu options. The user will be able to modify these existing queries and reports as needed, as well to create new queries and reports as needed.

Data Structure for Clearinghouse Application

Client database

Main table

Unique ID for Company
Company name
Company address fields
Company phone
Company fax
Company email
Company materials (T/F) .
Date entered
Date last modified

Contact table

Company ID (link to Main)
Unique ID for Contact
Contact last name
Contact first name
Contact salutation
Contact title
Contact address fields *
Contact phone *
Contact fax *
Contact email *
Delivery pref. (fax / email)
Active / Inactive
Account number (future use)
Notes (memo field) ?
Date entered
Date last modified

* defaults to company address, phone, fax, etc.

Interest codes

Contact ID (link to Contact)
Interest code

Document database

Main table

Unique ID for Document/Trade Lead
Parent Document/Trade Lead ID (for updates of previous leads)
Lead Source (Asian company or gov.)
USAEP Source (Tech Rep, IFAS, etc.)
Date received by ETNA
Date matched & transmitted
Time matched
Pages
Number of matches (?)
Grade fields (ETNA quality control includes assigning 3 grades to each leads, plus. a memo field for comments).
Trade Lead (memo or binary field containing actual document file)

Interest code tables

Document/Trade Lead ID (link to Main)
Interest code

The system will allow for multiple related tables containing interest codes of various taxonomies. Initially, only the USAEP taxonomy will be used to match leads, but additional coding systems can be added to the system. Each interest code table will accept codes of up to 12 digits.

Dissemination Tracking database

Main table

Unique ID for Document/Trade Lead
Unique ID for Client
Delivery mode (fax, email, telex, mail, other)
Date sent *
Time received *
Transmission time *
Status ("Received", "Busy", error messages) *
Retries *
Updates (wants to received updates on this document) T/F
Account Number (future use)
Feedback (memo field for follow-up notes and feedback from clients)

* posted from transmission log provided by vendor

Overview of the Field Application

The field application will allow the entities outside of ETNA to manage their client information, maintain a record of all USAEP trade, project and enterprise leads originating in offices, and track when those documents were successfully transmitted to ETNA.

The system will initially consist of six modules. Additional modules can be added as new functions and data structures are required. Three of the initial modules will be defined as *database modules*; that is they consisted of a clearly defined data structure, the information within in that structure and the tools necessary to manage that information (data entry screens, quality control procedures, etc.). These three modules are:

- ♦ the document database;
- ♦ the client database;
- the tracking database

The other three modules will be defined by the functions they perform. They are:

- document generator
- document router
- query and reporting module

The **document database** maintains all of the trade lead documents and related information.

The **client database** contains the Tech Reps local clients. Client information can be entered directly or pulled automatically from the document generator when a lead from a new client is entered.

The field application's **tracking database** records which documents originated from which clients, when they were transmitted to ETNA, and what feedback the technical representative has received.

The **document generator** module is the same as its counterpart in the clearinghouse application except that it also accesses and can post information from the Tech Rep's local client database. The module leads the user through the creation of standard format trade opportunity documents (e.g., trade leads, infrastructure leads, etc.) and posts specific information to the document

database. It also provides the user the capability of modifying the lead after the basic information has been entered.

The **document router** prepares trade leads for transmission and send them to ETNA, either via email or modem transfer. It also reports back whether the document was successfully received.

The **query and reporting module** will provide a complete Windows report writer with a query screen that allows complex Boolean searches. It will also allow the user to export all or part of the client database to a variety of formats, including Wordperfect mail merge files.

Data Structure for Field Application

Document database

Main table

Unique ID for Document/Trade Lead

Parent Document/Trade Lead ID (only for updates of previous leads)

Unique Source ID (link to client database)

Date received by ETNA

Date matched and transmitted

Pages

Number of matches (?)

Memo or binary field containing actual document file

Interest code tables

Document/Trade Lead ID

Interest code

The system will allow for multiple related tables containing interest codes of various taxonomies. Initially, only the USAEP taxonomy will be used to match leads, but additional coding systems can be added to the system. Each interest code table will accept codes of up to 12 digits.

Client database

Main table

Unique ID for Company
Company name
Company address fields
Company phone / fax / email address fields
Date entered
Date last modified

Contact table

Company ID (link to Main Client table)
Unique ID for Contact
Contact name fields (last name, first name, etc.)
Contact title
Contact address fields *
Contact phone / fax / email address fields *
Notes (memo field) ?
Date entered
Date last modified

* defaults to company address, phone, fax, etc.

Document Tracking database

Main table

Unique ID for Document/Trade Lead
Unique ID for Source
Delivery mode to ETNA Clearinghouse (fax, email, telex, mail, other)
Date sent *
Confirmation of receipt (Y/N) *
Date/time received *
Status ("Received", "Busy", error messages) *
Feedback (memo field for kudos, success stories, follow-up notes on specific lead)

* posted from ETNA receipt transmission

Appendix A

The Immediate Problem & Possible Solutions

Currently, ETNA is approaching the limits of the Expro system's distribution capabilities. Using all four PCs available capable of running Expro and accepting its fax instructions, the current trade lead documents are still being delivered within forty eight hours to ETNA's clients. However, any significant increase in either new clients or number of trade leads from the field would cause ETNA to fall behind its mandate to deliver these documents within forty-eight hours.

The database of clients *is* growing rapidly, more leads *are* coming in from the field, so ETNA has an immediate problem. Besides developing a comprehensive new system for the long term, an answer to ETNA's immediate distribution needs must be found. There are three basic courses of action which would allow ETNA to meet the demand of delivering more leads to more clients in the near future. These are:

- use the current software with a fax server
- fast track the development of the distribution engine for the new system and route the faxes through either a fax server or multiple fax card configuration
- fast track the development of the distribution engine and have it feed into a broadcast fax service

These options are discussed individually below:

Current Software with Fax Server

The first option would be to retain the current software and purchase a fax server to increase dissemination capability. The only fax server solution that would interact with the current software is the Intel Net SatisFAXion product. This is a Novell NetWare only solution. Currently, USAID (and ETNA) are networked in a Banyan VINES environment. Installing a Net SatisFAXion server would require the implementation of a small Novell LAN within ETNA to connect the production Expro PC to the fax server.

Installing the mini LAN and the fax server can be done fairly quickly. The Center has modem lines available for use by ETNA in the short term. Within a week to ten days the immediate delivery problem facing ETNA could be solved.

Since Expro requires a specific hardware and network software, this solution would either leave ETNA with hardware and software which would not fit into the final, comprehensive TOCS system or the system would have to be designed to utilize what may be less than the best hardware and software configuration.

Because this option keeps the proprietary Expro software, it does not move ETNA toward the new system. Instead, it focuses time and effort on a quick fix which will not have any effect on the new system. The effort to fix the short term problem would be a dead end when the new system is put in place.

New Software with Fax Hardware

The second option is to develop the new distribution engine and have it feed into a hardware-based fax solution. This engine would perform the client management / document matching and dissemination activity and then route the output through fax servers or multiple fax cards in a PC.

As with the previous option, this course of action requires additional equipment and phone lines. Because both the fax server/hardware and software have to be developed, this option would require the most work and would take longer to implement than either of the other two options.

A hardware solution also is contrary to the recommendations of the design team for a long term solution to fax distribution with the TOCS system. An investment in hardware for a short term fix would be costly if the final application did not utilize that equipment.

New Software with Broadcast Fax Vendor

The third option would be to fast track the development and deployment of the matching engine with the distribution model proposed in the overall system design. Using a broadcast fax vendor would solve the immediate distribution problem and allow the design team to implement the foundation of the new system immediately.

Obviously, the prototype matching and distribution engine installed immediately might be quite different from the mature software module of the finished system. But the prototype matching

engine will serve as the model for the new system whether installed at ETNA or merely tested by the design team. Using it would allow the design team to evaluate the engine in a real world setting and provide clear data on the prime software candidate for both the Clearinghouse front end and the Field Application.

The design team can import the client databases into the prototype matching engine's table format (Dbase tables) and modify the matching application to will accept FOTOGEN leads. Then ETNA will be able to match them against the existing ETNA client data, and pipe the lead and a fax number phonebook to the broadcast vendor. The design team could then evaluate how well the interim matching engine works, redesign it if necessary, and then use it as the foundation for the Clearinghouse Application as a whole.

From this point on, the application could be built and installed module by module and tested by both the users and the design team throughout the development process. The following plan is a multi-phased approach which seeks to leverage the existing investment in hardware and labor, provide near-term relief from the major problems associated with Expro, and provide a long-term solution which will satisfy USAEP's anticipated needs.

Recommend Course of Action

We recommend the following steps/actions to address USAEP concerns and the immediate problems with the current system while developing the *Trade Opportunities Computer Software* system in a logical and consistent manner.

1. Immediate action. To fix the bottle neck in the clearinghouse and begin to expand its capability, set up account with broadcast fax vendor and write program/database application to match current FOTOGEN leads to clients by USAEP taxonomy. Distribute the leads via broadcast fax vendor. Use this "quick fix" to test most likely model for the complete system's matching and faxing. Begin to add functionality to system (ability to transmit for more "graphic" leads, ability to transmit by email, etc.). Establish the basic ETNA functionality proposed under new system.
2. Complete the in-depth system design for all modules and establish an action plan for building and implementing the mature TOCS system, including installation of the Field Application and training of personnel currently overseas.
3. Build client management, matching / dissemination, and tracking modules based on interim fix and experience gained from it. Install these modules at ETNA. Initially, use the new system still to match FOTOGEN generated leads.
4. Build query and reporting and Document Management modules, install and test at ETNA.
5. Build Document Management and Lead Generator modules, install and test at ETNA. Build the Field Application, install at IFAS.
6. Install Field Application overseas, train users.
7. Convert Clearinghouse Application to Client/Server (install database server, TCP/IP connections, convert client data to Oracle 7, adjust Clearinghouse Application to access Oracle files).
8. Deliver complete system (code, specifications, hardware, software, documentation).

Appendix B

Notes from System Requirements and Capacities Meeting

UNITED STATES - ASIA ENVIRONMENTAL PARTNERSHIP
ENVIRONMENTAL TECHNOLOGY NETWORK FOR ASIA
USAID/CTIS/SA-2 : ROOM 100
WASHINGTON, D.C. 20523-0229

TO: L.P. Reade
THRU: Deborah Diaz
Peter Gourlay
FROM: ETNA
DATE: September 7, 1994
RE: Notes from September 6, 1994 Meeting

On September 6, 1994 at 2:15 a meeting was held in L.P. Reade's office to discuss the system requirement and capacities for the new trade lead management and dissemination system. In attendance were L.P. Reade, Cindy Sayers, Deborah Diaz, Joe Duncan, Brendan Walsh and James Darling. The following is a summary of the issues discussed.

Name

The new USAEP system may be called TOCS, for the *Technology Opportunities Computer System*.

System Capacities

- i. Input -- The software/hardware system should be able to handle current volumes (10-15 leads per office per month) from an estimated 100 sources (e.g., Tech Reps, IFAS, ADB, World Bank, Ex-Im, Latin America offices, etc.).
- ii. Output -- The software/hardware system should be able to handle up to 100,000 clients for dissemination (i.e., U.S. environmental firms, U.S. trade associations, U.S. telecommunications firms, etc.).
- iii. Response time -- ETNA should be able to reliably deliver the leads within 48 hours of receiving them from the field.

iv. Matching by expanded taxonomy and additional coding schemes -- The system should be able to handle a revision of the US-AEP Taxonomy and/or the inclusion of other coding scheme up to the level of International Bar Codes (12 or 13 digits).

v. Data Entry -- The input screens for the Tech Reps must be more user-friendly and flexible. The input screens should guide the data entry of a trade lead so as to create a consistent look to all leads, yet be flexible enough to suppress output that is not applicable or not available (e.g., "ABC, Inc. has no employees and no sales").

vi. Output -- Fax and Printed output should be "Striking". Leena the designer can be consulted on the format/look issues.

vii. Dissemination Media -- The system should be able to manage the dissemination of a trade lead by choosing the most efficient method available to the individual U.S. firm (i.e., E-Mail, then Fax, (direct mail?) etc., if all are possible). In the future some means of allowing companies to browse past leads on-line may be developed (for example a form driven search of past leads on the agency's Internet World Wide Web server).

viii. Edit/QC Ability -- The system should be able to:

- i. compile and sort leads form different regions into separate files
- ii. store incomplete leads in the background
- iii. allow editing in the foreground while matching/disseminating in the background.

ix. Lead Types -- The system should be designed to handle the individual needs and specific information found in:

- i. Trade Leads,
- ii. Project Leads (i.e., Infrastructure Leads) and;
- iii. Enterprise Leads.
- iv. Other types of announcements as needed.

IFAS will be contacted to review their 3-page outline for Infrastructure Leads and their needs for infrastructure lead dissemination, tracking, reporting, etc.

Commercial Viability

The system should be designed so as to allow the trade lead program services to be packaged. The computer software/hardware package should be flexible and capable enough to apply to other regions and sectors (e.g., Central American telecommunications industry, or the Eastern Europe health industry, etc.) The system should also have the ability to track the use of its services by each recipient, and produce basic accounting statistics. The system must also be able to track errors in the dissemination of trade leads.

Appendix C

Trade Lead Formats

Current Trade Lead Document Example

The following Trade Lead from Philippines, trade lead number 940920M133, is in reference to the following products/services: ENVIRONMENTAL SERVICES - Environmental Analyses - Water Pollution Management / Treatment.

COMPANY BACKGROUND INFORMATION:

J.E. CALLOS & ASSOCIATES is a Consulting Firm established in 1981. It has 30 employees with annual sales of 400,000 \$US.

COMPANY NAME:

Name: J.E. CALLOS & ASSOCIATES

Address: 17 - Maya Arcade Building
678 EDSA, Cubao
Quezon City, Philippines

Telephone: (from U.S. dial) 011-(632) 912-3601

Fax: (from U.S. dial) 011-(632) 912-3592

Telex: None

CONTACT:

Contact Person: Jesus E. Callos
Title: Civil/Sanitary Engineer

Speaks English Well, Writes English Well, Reads English Well

BANK REFERENCE:

Bank of the Philippine Islands

ENVIRONMENTAL CONCERN:

The company is engaged in the installation and construction of new wastewater treatment facilities for a car manufacturing firm in CALABARZON Area. The treatment facilities include primary, secondary and chemical processes. Local capability can handle the primary and secondary stages, while the company is looking for U.S. firm which can supply the chemical treatment technology to specifically remove or reduce Zinc and Copper to acceptable level. Wastewater flowrate is 2,400 L/hr. Heavy metals come from coat transformation washing

(concentration: Zn= 50 mg/L; Ni= 40 mg/L; Fe= 50 mg/L) and end washing (Zinc= 50 mg/L).

This opportunity results from Government Regulation. The Government Regulation is: DENR Administrative Order 34 & 35.

This opportunity does not result from Industry Requirement.

PROPOSED ENVIRONMENTAL SOLUTION:

Precipitation and removal/recovery of heavy metals preferably with water recycling feature.

TECHNICAL DATA:

Product/Technology/Service: ENVIRONMENTAL SERVICES - Environmental Analyses - Water Pollution Management / Treatment (US-AEP Product Code: Q01.35).

Technology Type & Description: Heavy metal removal/recovery facility.-- Chemical treatment which includes precipitation and electrolytic removal/recovery of heavy metals.

Other Technical Data: Please see product description.

FURTHER PRODUCT INFORMATION:

Skid-mounted system which is easy to install and combine with locally-made primary and secondary treatment units. System capacity is 2,500 L/hr which can reduce Zinc and Copper levels to 10 mg/L and 1.0 mg/L, respectively. Preferably with metal recovery (electrolytic process or other processes) and water recycling features to eliminate sludge disposal problem and save on water consumption. Currently, the Philippines does not have proper system to dispose of heavy metal sludges.

FACTORS INFLUENCING PURCHASE:

Service Contract not needed.

Quantity: 1

Purchase needed by: October 15, 1994

Payment Terms: Letter of Credit

Shipping Terms: Other

Type of commitment: One-time buy only

Time Frame: Immediate Purchase, Delivery/Investment (1-2 months)

Other Factors: Price & delivery.

MARKET INFORMATION:

Competition: Singapore & Japan.

Funding: Available

RESPONSE REQUESTED:

Respond in English via Fax. Only U.S. Manufacturers should respond with:
Technical features of technology, picture or design & price quotation.

Respond by: 10/01/94

Send copy of response to: Rene C. Saludes, Director, Technolo
US-AEP Philippines - U.S. Embassy
2/F 395 Sen. Gil J. Puyat Avenue
Makati
Metro Manila PHILIPPINES
Phone: 63 2 855128 or 63 2 852877
Fax: 63 2 8182676

Draft TOCS Trade Lead Format

USAEP Trade Lead -- 940920M133

The following Trade Lead from Philippines, trade lead number 940920M133, is in reference to the following products/services: ENVIRONMENTAL SERVICES - Environmental Analyses - Water Pollution Management / Treatment.

J.E. CALLOS & ASSOCIATES is engaged in the installation and construction of new wastewater treatment facilities for a car manufacturing firm in CALABARZON Area. The treatment facilities include primary, secondary and chemical processes. Local capability can handle the primary and secondary stages, while the company is looking for U.S. firm which can supply the chemical treatment technology to specifically remove or reduce Zinc and Copper to acceptable level. Wastewater flowrate is 2,400 L/hr. Heavy metals come from coat transformation washing (concentration: Zn= 50 mg/L; Ni= 40 mg/L; Fe= 50 mg/L) and end washing (Zinc= 50 mg/L).

This opportunity results from Government Regulation. The Government Regulation is: DENR Administrative Order 34 & 35.

COMPANY INFORMATION:

J.E. CALLOS & ASSOCIATES is a Consulting Firm established in 1981. It has 30 employees with annual sales of 400,000 \$US.

J.E. CALLOS & ASSOCIATES

17 - Maya Arcade Building
678 EDSA, Cubao
Quezon City, Philippines

Telephone: (from U.S. dial) 011-(632) 912-3601
Fax: (from U.S. dial) 011-(632) 912-3592

CONTACT:

Jesus E. Callos
Civil/Sanitary Engineer

Speaks English Well, Writes English Well, Reads English Well

BANK REFERENCE:

Bank of the Philippine Islands

PROPOSED ENVIRONMENTAL SOLUTION:

Precipitation and removal/recovery of heavy metals preferably with water recycling feature.

TECHNICAL DATA:

Product/Technology/Service: ENVIRONMENTAL SERVICES - Environmental Analyses - Water Pollution Management / Treatment (US-AEP Product Code: Q01.35).

Technology Type & Description: Heavy metal removal/recovery facility.--Chemical treatment which includes precipitation and electrolytic removal/recovery of heavy metals. Skid-mounted system which is easy to install and combine with locally-made primary and secondary treatment units. System capacity is

USAEP Trade Lead -- 940920M133

TECHNICAL DATA (continued):

2,500 L/hr which can reduce Zinc and Copper levels to 10 mg/L and 1.0 mg/L, respectively. Preferably with metal recovery (electrolytic process or other processes) and water recycling features to eliminate sludge disposal problem and save on water consumption. Currently, the Philippines does not have proper system to dispose of heavy metal sludges.

Other Technical Data: Please see product description.

FACTORS INFLUENCING PURCHASE:

Service Contract not needed.

Quantity: 1

Purchase needed by: October 15, 1994

Payment Terms: Letter of Credit

Shipping Terms: Other

Type of commitment: One-time buy only

Time Frame: Immediate Purchase, Delivery/Investment (1-2 months)

Other Factors: Price & delivery.

MARKET INFORMATION:

Competition: Singapore & Japan.

Funding: Available

RESPONSE REQUESTED:

Respond in English via Fax. Only U.S. Manufacturers should respond with: Technical features of technology, picture or design & price quotation.

Respond by: 10/01/94

Send copy of response to:

Rene C. Saludes, Director, Technology Cooperative
US-AEP Philippines - U.S. Embassy
2/F 395 Sen. Gil J. Puyat Avenue
Makati
Metro Manila PHILIPPINES

Phone: 63 2 855128 or 63 2 852877

Fax: 63 2 8182676

Appendix D

Broadcast Fax Vendor Information

| Current Monthly Trade Lead Statistics | | | |
|---|---------------------------|--|-------------------------------------|
| Trade Leads/Day | 5 | | |
| Contacts/Lead | 300 | | |
| Num. Faxes/Day | 1500 | | |
| Num. Pages/Fax | 3 | | |
| Faxes/Month | 33000 | | |
| Pages/Month | 99000 | | |
| Minutes/Page (ave.) | 0.73 | (CWI test of 3-page sample trade lead) | |
| Minutes/Month | 72600 | | |
| Commercial Broadcast Fax Cost Proposals | | | |
| | MCI | CWI | |
| per Minute | \$0.45 | \$0.29 | |
| Raw Cost | \$32,670 | \$21,054 | |
| Discount Rate | 48.89% | 21% | |
| Bulk Cost | \$16,698 | \$16,698 | |
| Offpeak Discount (MCI-estimated) | 4% | 0% | |
| Monthly Cost | \$15,972 | \$16,698 | |
| Cost/Fax | \$0.48 | \$0.51 | |
| Individual Broadcast Provider Cost Breakdowns | | | |
| MCI | Product : Safefax | | (Domestic) |
| | Base Peak Rate = \$.45 | | |
| Gross Revenue | \$/Minute | Discount | |
| \$0 - \$1000 | \$0.45 | 0% | |
| \$1001-\$5K | \$0.40 | 12% | |
| \$5001-10K | \$0.35 | 23% | |
| \$10K-\$15K | \$0.29 | 35% | |
| \$15,000 + | \$0.23 | 48% | |
| Cable & Wireless Inc. | Product: SureFax | | (Domestic and International) |
| | Express Base Rate = \$.49 | | Overnight Base Rate = \$.29 |
| Gross Revenue | \$ / Minute | Discount | \$ / Minute Discount |
| | (approx.) | | (approx.) |
| \$0 - \$500 | \$0.49 | 0.00% | \$0.29 0.00% |
| \$501-\$1500 | \$0.44 | 10.20% | \$0.28 3.45% |
| \$1501-\$3000 | \$0.42 | 14.29% | \$0.27 6.90% |
| \$3001-\$5000 | \$0.39 | 20.41% | \$0.26 10.34% |
| \$5001-\$7500 | \$0.37 | 24.49% | \$0.25 13.79% |
| \$7501-\$15000 | \$0.34 | 30.61% | \$0.24 17.24% |
| \$15001+ | \$0.31 | 36.73% | \$0.23 20.89% |

Unfortunately, the design team was unable to attain reliable figures for ETNA's current phone costs. The phone reports that the ETNA staff have received do not correspond with the level of activity known to have occurred via the Expro system. There is information available about the Center for Trade and Investment Service's phone rate, however. CTIS 1(800) line cost an average of \$0.24 per minute in July, 1994.