National Rural Electric
Cooperative Association
El Salvador

RURAL ELECTRIFICATION PROJECT
PROYECTO DE ELECTRIFICACION RURAL
519 - 0358
SAN SALVADOR - EL SALVADOR

National Rural Electric Cooperative Association

Rural Electrification Project • El Salvador

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MID-TERM EVALUATION
EL SALVADOR
RURAL ELECTRIFICATION PROGRAM
(AID PROJECT Nº 519-0358)

FINAL REPORT

Mid-Term Evaluation

El Salvador

Rural Electrification Program

(AID Project No. 519-0358)

FINAL REPORT

Evaluation Team

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National Rural Electrification Cooperative Association
(NRECA)

February 1992

(draft prepared May 17, 1991)

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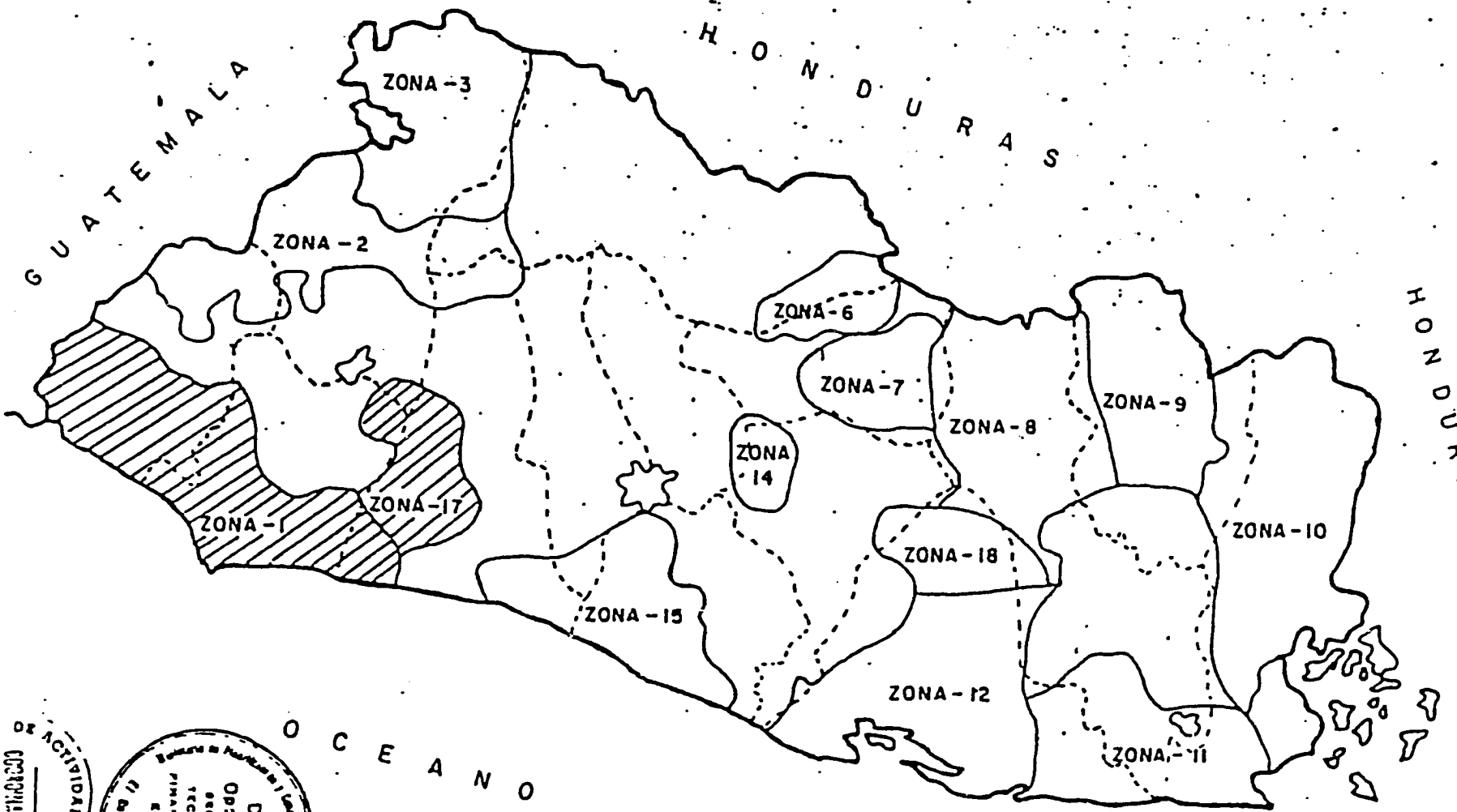
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GLOSSARY

AID	Agency for International Development (Agencia para Desarrollo Internacional de los Estatos Unidos).
ANDA	El Salvador Water Department
ANSI	American National Standards Institute
ANTEL	El Salvador Telephone Company
BFA	Agriculture Development Bank (Banco de Formento Agropecuario).
CAESS	Electric Light Company of San Salvador (Compania de Alumbrado Electrico de San Salvador)
CARES	Central America Rural Electrification Study (Estudio de Electrificacion Rural en America Central)
CCSA	Electric Company of Cucumagaya (Compania Electrica de Cucumagaya)
CEL	Lempa River Hydroelectric Commission (Comision Ejecutiva Hidroelectrica del Rio Lempa)
CENCADE	CEL's Training Center (Centro de Capacitación y Desarrollo).
CLEA	Electric Company of Ahuachapan (Compania de Luz Electrica de Ahuachapan)
CLES	Electric Company of Sonsonate (Compania de Luz Electrica de Sonsonate)
CLESA	Electric Company of Santa Ana (Compania de Luz Electrica de Santa Ana)
CONARA	Consejo Nacional de Reconstrucción de Area
DAM	Demand Assessment Model
DESSEM	Distribution Company of Sensuntepeque (Distribuidora Electrica de Sensuntepeque)
DEUSEM	Distribution Company of Usulutan (Distribuidora Electrica de Usulutan)

DISCEL	CEL's Electricity Distribution Division
ELECTROCEL	Electricity Department (CEL)
FY	Fiscal Year (used by AID and NRECA, Starting October 1)
GOES	Government of El Salvador
IBRD	International Bank for Reconstruction and Development, The World Bank (Banco Internacional de Reconstruccion y Fomento, Banco Mundial)
IDB	Inter-American Development Bank (Banco inter-Americano de Desarrollo)
IFB	Invitation for Bids
INSAFOCOOP	The Salvadoran Coop Development Institute Instituto Salvadoreaño de Fomento Cooperativo)
IPD	International Programs Division, NRECA (Division de Programas Internacionales)
IPM	Investigaciónes de Población y Mercado, Sociedad Anonima de Capital Variable
IRD/MID	Infrastructure and Rural Development/Major Infrastructure Division of USAID.
KV	Kilo-volt (measurement of energy
KWh	Kilowatt hour (measurement of power used)
MIPLAN	Ministry of Planning and Coordintion of Socio-Economic Development (Ministerio de Planificacion y Coordinacion del Desarrollo Economico y Social)
MW	Megawatt (measurement of power)
NRECA/DC	National Rural Electric Cooperative Association, Headquarters in Washington, D.C.
NRECA	National Rural Electric Cooperative Association (Asociacion National de Cooperativas de Electrificacion)

NRECA-ES	NRECA-El Salvador office for Project 519-0358)
SETEFE	External Technical and Financial Secretariat
PLANICEL	Strategic Planning Department (CEL)
PU	Productive Use
RA	Resident Advisor
RDO	Rural Development Office (Agriculture), USAID
RE	Rural Electrification
RFQ	Request for Quotations
UCA	University of Central America (Universidad Centroamericana Jose Simon Canas)
USAID	United States Agency for International Development in El Salvador (Agencia pra Desarrollo Internacional de los Estados Unidos en El Salvador)

EXECUTIVE SUMMARY

Background

In 1985, the National Rural Electrification Cooperative Association (NRECA) conducted a major survey for the Agency for International Development (AID) on the status of rural electrification in the Central America region. They found a great economic and social need to increase rural electrification in the region. They then recommended a strategy for improving the overall capacities of the individual countries to finance and implement rural electrification investments.

In May 1987, AID and NRECA executed a Cooperative Agreement creating the Central American Rural Electrification Support (CARES) program. The Program consisted of various regional and country-specific activities aimed at carrying out the basic recommendations of the earlier study. This was followed in early 1988 by AID and NRECA agreeing to establish a parallel bilateral assistance project in El Salvador. The El Salvador program incorporates a combination of technical assistance, training, and construction support to implement a new rural electrification program. This new program was linked to another USAID/El Salvador activity: the rural power distribution construction work carried out by the Public Services Restoration Project (519-0279). Since the start of this rural electrification program the Public Services Restoration Project phased out and was replaced with the Public Services Improvement Project (519-0320).

This evaluation is the first of three proposed studies of the El Salvador Rural Electrification Project being implemented by NRECA under Cooperative Agreement No. 519-0358-A-00-8499-00 dated August 12, 1988. With the doubling of the program funds during the second year, the life of project was extended from four to seven years. A second evaluation now is scheduled in the fifth year and a final evaluation is scheduled upon completion of the project in 1995.

Progress Status

The overall assessment of program status is that the project is well implemented although the main part of the program, the construction component, is falling behind schedule. The NRECA Resident Advisor organized his office well, documents were readily available and easy to find. His approach in identifying problems and then planning technical assistance to overcome deficiencies is praiseworthy. The project is subdivided into two major components:

- A multi-faceted technical assistance component, and
- A rural electrification construction program.

The technical assistance component, overall, can be considered to be ahead of schedule. Training, in all categories, has gone well. The training subject matter was chosen well to rectify major deficiencies, trainers were knowledgeable and equipment fully met expectations. That is not to say that no more training is needed. The fact is, the amount of training needed for this project was greatly underestimated at the start.

One area where substantial training still may be needed is with the accounting department. Not only will this group require extensive training, but long-term advisory services is recommended. The advisory services may require an adjustment in the funding level or reprogramming of line items. Whichever is the case, additional technical support for the Accounting Department is recommended.

Regarding the construction component, substantial delays in the proposed program have occurred. The most substantial delay was caused by a shift from a locally used "lottery system" of contractor selection to the introduction of the internationally accepted "competitive bidding" procedures. The team believe that the decision to shift to the traditional competitive bid procedure was a correct decision. Following acceptance of a new bidding procedure, time was needed to develop new bid documents. Once the new procedure is ready for implementation, the new approach should help reduce construction costs and lead to an accelerated construction program.

The Supplemental Grant Agreement stipulated that an evaluation team should review construction progress to determine whether construction could be accelerated and the Life of Project (LOP) reduced. If the goal of the project is solely to construct lines and make service connections, it is possible to accelerate construction by shifting to a direct USAID contracting mode. The Team, however, does not see such a change practical or acceptable to the GOES. More important than reduction of project life is the fact that a major goal of the project is to infuse NRECA's institutional development talents into the El Salvador structure. Technical assistance activities takes time, therefore making it inadvisable to reduce the LOP.

Recommendations

We found the El Salvador rural electrification program conceptually well developed; however, the team has several recommendations that should augment project goals. Two of the recommendations, a program enhancement suggestion and the elimination of a requirement for consumers to pay for service drops, are issues that need CEL's concurrence. The other two, deletion of the small hydro power component and a change in the productive uses credit program, are within the control of NRECA and USAID to modify.

Program Enhancement. The NRECA original and supplemental proposals only considered service connections from distribution lines constructed under this project. Many of these new lines are only short extensions to older lines. Because there was no credit program available for house wiring when the original distribution lines were constructed, many potential consumers originally could not

afford to connect. Now many people under the old distribution system have expressed a desire to connect. Connections to the existing rural distribution system will bring in new consumers rapidly and be very cost effective in social, economic and financial terms. The proportional cost per person served would be much lower than for connections only to new lines. Also, these additional connections should improve the load factor for the total distribution system.

The Team recommends that NRECA be authorized to prepare an in-house analysis showing the cost for including connections to existing distribution lines. If the study is positive, then CEL, NRECA and USAID should add these services to the program.

Productive Uses and a Credit Program. Great emphasis is being placed on the establishment of a "Productive Use" program to improve the distribution system financial viability (improved load factor) and, on the social-economic side, to improve the standard of living in the rural areas. It has been documented in other countries that the three critical parts of a productive use program are awareness, technical assistance and credit availability. NRECA appears to have developed a cost effective and highly visible approach to awareness program using mobile demonstrations. What is missing at this time is the technical assistance and credit elements needed for a successful program. NRECA first proposed that DISCEL provide the technical assistance and credit through a special technical unit and include the loan servicing as part of their normal billing process. USAID vetoed this idea and required the credit program be run through a recognized financial institution. The credit program was delayed for almost two years while CEL and NRECA searched for a suitable financial institution interested in offering credits to small electric business consumers. In May 1991 the Banco de Formento Agropecuario (BFA) signed an agreement with CEL to provide credit and offer technical assistance but real interest on their part in this program lacked substance.

We believe DISCEL is a better conduit to offer technical assistance and a credit program to their consumers. DISCEL may not have all the expertise needed but what they have, as a utility, is a desire to sell electricity. This means they have a vested interest in making a Productive Uses program work. They have continual contact with the consumers and they can, and appear willing, to establish a technical assistance unit.

We recommend that if the BFA credit process is not functioning well by April 1992, then USAID should reconsider its stand and allow DISCEL to serve as a lending agent for their rural consumers.

Small Scale Generation. The original proposal included a component for the design and construction of a small hydro electric demonstration project. This element was included in the original Grant Agreement. Subsequently, the proposal for supplemental funds eliminated the pilot plant and said that NRECA would concentrate on technical assistance only. USAID, however, put the following language in the Project Authorization, Amendment No. 1, "....and to select, design, and construct a pilot project. Technologies other than hydroelectric may also be studied."

The Team does not believe there is a need to demonstrate small hydro technology since there are many small plants in existence throughout El Salvador. Most of these old plants are in a state of disrepair. The real issue is lack of maintenance; therefore, NRECA's talents could best be used to develop maintenance awareness. It is recommended that design and construction of a pilot small hydroelectric plant be deleted from the project.

Consumer Costs for Connections. It has been found that the greatest hindrance to the rural population making a connection is the initial cost involved. CEL's policy is for the individual to pay for the line drop and meter (which then becomes the property of the utility company). In the U.S. and in many AID supported rural electrification programs, the utility company owns the system up to and including the meter. The cost to the consumer is the internal wiring, which in itself can be substantial. The financial burden on the consumer is substantial in El Salvador and deters many potential consumers from making connections.

The financial success of a utility company (or cooperative) increases with the number of service connections. The load factor improves and revenue increases. Also, it is more fair to distribute the system cost among all consumers. This can be done with the distribution utility paying for and owning the entire system, including the service drop and meter.

It is realized that a recommendation to include service drops and meters in system development cost is a radical departure from El Salvador practice but we believe that it is critical change necessary to bring electricity to the rural poor.

Findings

We identified several issues that need special attention to improve overall program development. Both NRECA and USAID are aware of these items, although USAID has taken exception to our comments on the approval process.

Many project delays can be attributed to the lack of timely and resolute decisions by DISCEL management. One of the problems appear to be the turn-over rate in DISCEL staff assignments and the lack of available experienced managers. Most senior staff are dedicated but lack seasoning and management background that comes with years of administration assignments. This type of problem is complex and solutions are equally complex. We believe that NRECA should consider offering an intensive management training course for DISCEL top managers with special emphasis on decision-making. Regarding the turn-over rate, NRECA/USAID should obtain a written understanding from DISCEL on key staff assignments and their agreement not to make changes without first consulting NRECA/USAID. Any violation to this agreement would be elevated to higher GOES officials for resolution. In any event it is quite clear than management improvements are required to assure timely implementation of the proposed program.

USAID and SETEFE approval procedures need an overhaul. To start, the SETEFE procedures are too restrictive and do not provide sufficient flexibility for an implementing authority to use good judgement during implementation. For instance, DISCEL is required to specify, one year in advance, the areas they plan to construct new lines -- down to a tenth of a kilometer. If a contractor is working in an area, and DISCEL sees the need for additional lines (due to receipt of new applications), they now do not have the flexibility of amending the contract to added this work. It must be programmed in the next annual workplan, necessitating the contractor to de-mobilize and re-mobilize a year later. Whether or not this is a SETEFE requirement, it is a practice. Also, annual workplans take an abnormally long period of time for review by SETEFE and USAID before being approved. It is recommended that both USAID and SETEFE examine their approval criteria and procedures to assure that annual workplans and other documents are approved in a reasonable length of time. Further, these approvals should provide sufficient latitude for DISCEL to make worthwhile mid-year adjustments (within the limits of their approved budget) and not be micro-controlled by SETEFE. USAID has taken except to the finding of abnormal long delays in the approval process.

Disaggregation of data by gender could improve the value of information collected. Much of the information being gathered fails to disaggregate by gender. Disaggregation, where practical, should be done to satisfy AID's requirements as well as providing a valuable resource for future DISCEL planning. Baseline socio-economic studies should disaggregate data by gender where relevant. This issue was discussed with the NRECA Resident Advisor and he is aware of the finding.

The evaluation team did not find that participants had prepared individual course evaluations following each training session. If this process is not in place, we recommend that it be done. Feed-back is needed to guide in curriculum improvements and development of other training programs.

The Productive Uses demonstration observed by the evaluation team ran smoothly and appeared to be of great interest to the crowd who attended. NRECA is planning on putting together another Productive Uses Mobile Unit. It is too early to judge how field demonstrations will impact on Productive Uses of electricity. It may be wise to closely monitored impact with a field evaluation prior to expanding this activity. Demonstrations were successfully used in the United States, and they may be of value in El Salvador -- but on the other hand the actual purchases of productive uses equipment may not justify the cost of expanding this program. To complete an evaluation, NRECA may have to develop some means of tracking equipment purchases made as a result of the demonstrations.

Dialogue Issues.

The Team found two major issues that need to be elevated to a government to government dialogue level. We are sure that these same issues concern other and multi-national lending agencies. The first is the need for El Salvador to create a Public Utility Commission. The second issue is the need to re-privatize the distribution system.

Regarding the need to create a Public Utility Commission, the present procedure to invoke tariff changes rests with the Ministry of Economy. A Ministry is not set up to continually track and act upon regulation and control issues of public utilities. Consequently, political concerns more often tend to delay tariff decisions. Furthermore, requests for review and adjustments in tariffs usually are delayed for long periods of time. Obviously, approving increases in utility tariffs and taxes are never a popular action for a politician. And because of this, tariff increases are postponed for long periods of time. There is a need for the GOES to create a Public Utility Commission headed by a fixed-term appointed Commissioner. NRECA and USAID should encourage the GOES to create this Commission as a condition to any additional assistance, especially to the energy sector.

Re-privatization of the Distribution System is a generally recognized requirement to put this industry back into a growth mode. Presently the government owns and operates all electrical generation, transmission and distribution systems in the country. The government ownership of the electrical distribution system is inefficient and not cost-effective in its operations.

There is general agreement within the GOES that privatization is necessary to shift the burden of development to the private sector and as a means of improving efficiency of operations. Even so, little real action is being taken by the government to make this happen. Several options are available to achieve a return to private ownership of distribution utilities. The first is to transfer (sell) ownership to cooperatives. The second is to sell the system to private operators. USAID and other multinational donors should make re-privatization a major issue in any energy dialogue held with the GOES.

Lessons Learned

The Team found three paradigms worth mention here for application in this and other similar programs. The first relates to the use of an NRECA developed computer application, the "Demand Assessment Model" (DAM) used for site selection. The DAM incorporates a large number of socio and economic parameters as well as geographic and technical parameters. Consequently, it provides the opportunity to conduct sensitive analysis of changing parameters and to do "what if" types of calculations. What is of especial interest is that it can be used to temper political pressures for site selections by establishing a system based upon technical, financial and economic indicators with everyone being treated equally.

Another lesson relates to factors effecting a rural consumer's ability to electrify their homes. Rural electrification project developers should not assume that consumers will connect their homes to electrical lines just because a line has been constructed overhead. Connections are a function of cost of the service connection, awareness and availability of credit. In the Philippines almost every villager made connections because the cost of the line drop was absorbed by the cooperative and credit was made available for house wiring. In El Salvador the individual home owner must pay for the cost of the line drop and meter. Consequently, connections to the old system was relatively sparse. One way to reduce the service connection cost is for the electric company to absorb the service drop and meter

installation as part of their system assets. In the long run, by adding more customers, the load factor should improve along with its financial viability.

As the El Salvador program grows and CARES's involvement in other Central American projects expands, there should be more cross-over benefits available in the field of training. Observers have found that the introduction of participants coming together from several countries provides an atmosphere less defensive of "their own" established practices. When a trainer works with only one group, there tends to be a defensiveness to change old practices; whereas, with commingling of participants, no one group feels picked upon.

II. Introduction and Overview of the El Salvador Rural Electrification Program.

A. Introduction

AID's Program Evaluation Report No. 11, Power to the People, starts with, "Development without electricity is difficult to imagine. The widespread use of electric power symbolizes a developed country; its absence is a sign of less-developed areas. Yet the question of how and when electricity fits into the process of development remains unanswered. At what stage of development should electricity be introduced? How should an electric system be organized and managed? What other resources are needed to maximize its benefits? Who should get it, and how should it be paid for?"

NRECA's rationale for proposing this rural electrification project (AID No. 519-0358) was to gain answers to some of the above questions. The majority of Salvadorans do not have access to modern means of production. El Salvador is a country of limited land, water, and capital resources, relative to its population and the demand for these resources. Its urgent need, therefore, is to increase resource productivity by making productive factors such as electric energy more widely available.

NRECA points out that the extension of electric service to rural areas of El Salvador was constrained, not only by guerrilla sabotage, but also by financial and institutional limitations of the country's electric power sector as represented by the national utility, CEL. (Note: At final preparation time of this Report, peace accords had been signed by the guerrilla groups and the government. This should paving the way to alleviate the concern of sabotage and allow CEL to concentrate on the management of rural electrification.)

CEL's financial position has been seriously eroded in recent years by rampant inflation and increasing fuel costs. At the same time, revenue shortages have resulted from frozen tariff rates. Correspondingly, CEL's capacity for new investment is squeezed by its inability to raise significant internal resources. Simultaneously, devaluation effectively doubled its long-term debt. By 1986, CEL's interest payments exceeded its total operating costs.

Probably the most damaging determinant in El Salvador's energy producing capability was the nationalization of all private firms with the expiration of their concessions in 1986. Foreseeing their takeover by the government, most of the private electric utility companies refrained from making new investments during the decade leading up to the takeover. Consequently CEL acquired systems badly in need of maintenance and new improvements. Additionally, CEL was faced with the problem of installing new management in the utilities operated formerly by private utilities. To acerbate the problem, the private utility owners are still awaiting settlement of terms and legal disputes from the take-over. Until there is a full settlement, it will be difficult to restructure the distribution system to a new form of management.

AID and multilateral donors are pressing for re-privatization of government owned enterprises. This includes the utilities. But privatization will take time, and this service sector of the economy of El Salvador may not have the luxury to wait that long if it is to financially survive.

One solution to the problem of improving service and financial viability, would be the creation of two or three cooperatives to service all but the San Salvador area. The San Salvador service area should be returned to a private sector operator. For the rest of the country, cooperatives offers an excellent solution. They can be formed without the need of new legislation or Constitutional changes. In this regard, NRECA can help make many improvements in rural electrification, but solutions to the major problems will not be resolved until the operations of distribution is removed from the government (DISCEL) and placed in the hands of private operators, which include cooperatives.

Some at USAID believe that a revision of the Constitution is required to eliminate the 50 year maximum on concessions. That undoubtedly would be helpful, but may not be necessary. Foreign investors probably will make decisions to invest based upon a 15 to 25 year financial analysis. Local investors, on the other hand, undoubtedly will look to unlimited ownership before investing in new activities in the power sector.

B. Points of Reference for Evaluation

This is the first of three proposed evaluation studies of the El Salvador Rural Electrification Project being implemented by NRECA under Cooperative Agreement No. 519-0358-A-00-8499-00 dated August 12, 1988. With the doubling of the program funds during the second year, the life of project was extended from four to seven years. A second evaluation now is scheduled in the fifth year and a final evaluation is scheduled upon completion of the project in 1995.

The NRECA's original and amended proposals and the Cooperative Agreement served as the Team's point of reference for this evaluation. The Project support activities in two basic areas: institutional development and technical support, and rural electric system construction. Included in the first component is a significant multiple-agency initiative in productive use promotion. The technical assistance and system construction activities are supported by special studies and training programs.

From the proposal, and its logframe, we derived several general issues which served to guide the evaluation. The Project Goal was stated: To increase the availability and economic utilization of affordable electric service in El Salvador in order to increase the productivity and standard of living of its rural population. To reach this goal, the specific objectives of the project are:

1. Strengthening rural electrification site selection, design, and planning in El Salvador.

2. Increasing the economic impacts of rural electrification through end-use planning, promotion, demonstration, training, credit programs, and management.

3. Increasing the reach of investment resources made available for rural electrification through the selection of economically efficient designs and construction standards.

4. Developing organizational structures and management policies for rural electrification that promote improved coordination and operational efficiency.

5. Enhancing technical and managerial skills among personnel in El Salvador's rural electric utilities.

6. Increasing the supply of power to rural electrification systems by alternative, decentralized methods.

7. Complete inputs as stated in the logframe.

C. Overview in Meeting Specific Objectives

1. Considerable progress has been achieved in institutionalizing site selection with the introduction of the "Demand Assessment Model" (DAM). The DAM, first developed by CARES, was enhanced by NRECA-ES and provide site selection through a computer application. The advantage of the DAM is the ability to correct parameters as new information or changed conditions are uncovered. The computer approach also enables DISCEL (or any distribution utility) to investigate many more sites than could be done using manual calculations. It is too soon to evaluate the accuracy of the original input data, but it would be prudent for NRECA-ES to develop immediately a monitoring program to track actual values against input parameters to verify the accuracy of the DAM.

Another important element of the first objective is the preparation of new design standards. New standards were developed and put into a field manual. By May 1991 training in staking (line design) of over 100 person-days already have been given; however, trainees continue to be reassigned to other jobs and DISCEL management has not fully adopted these new design methods to practical operations.

2. The second objective is to increase the economic impact of rural electrification. To meet this objective DISCEL reorganized to include a commercial department to handle productive uses of electricity. This was a good start toward the management of "increasing economic impacts..." The planning, organization and assembly of the productive uses demonstration trailer is designed to further this objective. It is too early to judge how field demonstrations will impact on Productive Uses of electricity. This should be closely monitored with field evaluation prior to expanding this activity.

The Team believes that AID's specific instructions not to use DISCEL as a conduit for funding Productive Uses may have been an unwise decision. More is involved in establishing a productive uses

program than merely giving out loans. An equally important part is the "hand-holding" and institutional development required by end-users. Users may not have the educational background necessary to locate technical assistance, complete installations of equipment, and establish business operations. They need someone to help with design, selection, pricing, installation and operations. In most cases the banks do not have the expertise nor interest to take on this role. Also the banks do not have a vested interest in increasing electric sales. In the El Salvador case, DISCEL already has a built-in loan program established to sell house wiring packages. It would take very little adjustment to their existing loan program to assist their consumers purchase productive use equipment. DISCEL has a knowledge of the customer's ability to pay and they have a billing mechanism established. Further, they have a means to collect -- pay or be disconnected. Forcing a second loan path with a bank not only duplicates an established procedure, but takes the control of the productive uses program away from one of the interested party.

The reluctance of banks to get involved is evidenced by FEDICREDITO's rejection of the financing program and the one year negotiations it has taken to get BFA to sign up for the program. Since the BFA did sign a "convenio" in early May, it probably is unwise to reverse the decision at this time. However, AID, NRECA and DISCEL should monitor BFA's performance for the first year of operations. If the BFA fails to perform to an accepted standard, AID should reconsider its opposition to DISCEL financing productive use equipment for its consumers. Since USAID directed DISCEL to use established financial institutes, it should be USAID's responsibility to establish the indicators used to determine success. These indicators need to be established now.

3. The third objective is to develop more economically efficient design and construction methods. NRECA has made some progress in reducing construction costs and improving system design. Foremost in this area is the development of the "Staking Manual" and associated computer applications. While NRECA conducted training courses, DISCEL management unfortunately did not moved ahead on full implementation of the recommended design standards. Short of holding the entire project "hostage" to the promulgation of new design standards as a condition to purchase of additional equipment and materials, the Team has no recommendation accept to continue day-to-day persuasion tactics.

4. Another objective is operational efficiency through improved management. The ability to improve an organizational structure and establish new policies is difficult to achieve since it relates to personal inter-actions and individual opinions. Fortunately the NRECA Project Advisor has an excellent rapport with CEL management. They listen to his advice but it still will take time to introduce new management styles and policies. The most significant factor hindering acceptance of improved management is the high turnover of top level staff. This in turn leads to the lack of decisions making ability, particularly within DISCEL. The evaluation team recommends that CEL make a commitment to limit changes in top management for a period of time, say one year. Following a commitment, CEL should provide intensive management training for the designated Manager.

All is not daunting, progress is being made. As a result of discussions between DISCEL and NRECA, there have been encouraging changes in DISCEL's management structure. The first was the creation of a "Produce Uses Department" (Servicios al Usuario). The second was to moved the PUD under the Distribution Superintendent's management responsibility.

5. Enhancing technical and managerial skills is another objective. NRECA is doing quite well on the enhancement of technical skills, only delayed by the 1989 offensive and the U.S. Gulf War travel ban in early 1991. The real measure of an organization's capacity is in its management abilities. Some management skills can be improved through training. But, training alone cannot overcome social or cultural differences in management style. About the only recommendation that can be suggested here is, again, to subject the continuance of the project to a commitment to assign a leader acceptable to both USAID and NRECA. This person must recognize the need to make timely decisions, with the assurance that his or her job will not be in jeopardy if the administration disagrees with a particular decision. NRECA can then concentration on initiating management training skills to improve decision making ability among the other top level staff as a means to improve administrative practices. The abandonment of the project if critical management changes are not instituted will not be an easy decision for NRECA or AID, but the only alternative is to continue stumbling along at the present rate.

6. The objective to decentralize methods of power supply may distract from the main purpose of the El Salvador Rural Electrification Project. The primary objective is to improve distribution. The evaluation team does not disagree with the notion of decentralized power supply, nor the fact that NRECA has the expertise to play an advisory role. However, there are other donors and other programs that can address this problem thereby not detracting from the main project purpose of this project.

7. The overall program objectives, as reflected in the program inputs -- principally the construction phase -- are falling behind schedule. Construction activities have been on the critical path since the start. The RE program demand the cooperation of all concerned if it is to be completed on schedule. This means USAID and SETEFE as well as CEL and NRECA. The problem of slow construction can be traced to several obstacles. Most serious is turnover in DISCEL top management and the lack of timely decisions. Also, delays by both USAID and SETEFE approvals for the El Salvador Rural Electrification Workplan for 1990 and 1991 had an adverse affect on the program.

During the startup phase of this project NRECA was able to move ahead with off-shore procurement, but DISCEL was hampered with delays in construction starts due to a lack of approved PL-480 counterpart funds. However, the slowness in 1991 construction progress cannot be blamed solely upon the lack of an approved workplan since DISCEL has not utilized previously approved funds. It is SETEFE's policy not to approve additional funds until at least 85% of the previous year funds have been used. It still remains that it took over eight months for USAID and SETEFE to approve a workplan and this had an adverse affect on the program. SETEFE may wish to consider

provisional or partial approvals in the future so as not hold up an entire program while concerns are worked out on a small piece of the plan.

III. Overall Program Background

A. Project description

In 1985, the National Rural Electrification Cooperative Association (NRECA) conducted a major survey for the Agency for International Development (AID) on the status of rural electrification in the Central America region. They found a great economic and social need to increase rural electrification in the region. They then recommended a strategy for improving the overall capacities of the individual countries to finance and implement rural electrification investments.

In May 1987, AID and NRECA executed a Cooperative Agreement creating the Central American Rural Electrification Support (CARES) program. The Program consisted of various regional and country-specific activities aimed at carrying out the basic recommendations of the earlier study.

In early 1988, AID and NRECA agreed on the value of establishing a parallel bilateral assistance project in El Salvador. The El Salvador program aims at following up the CARES activities with a combination of technical assistance, training, and construction support to implement a new rural electrification program. The program demonstrates the value of adopting new policies based upon initial CARES efforts. This new program also was linked to another USAID/El Salvador activity: the rural power distribution construction work carried out by the Public Services Restoration Project (519-0279). Since the start of this RE program the Public Services Restoration Project has phased out and been replaced with the Public Services Improvement Project (519-0320).

The NRECA El Salvador project is intended to develop the institutional proficiency for carrying out successful rural electrification through five basic propositions:

- The promotion of policy and institutional development to strengthen planning and project development.
- To raise and maintain adequate levels of technical and managerial skills for system operations and maintenance.
- The establishment of standardized, appropriate, and least-cost options and specifications for rural electric systems.
- To increase the productive and economic use of electricity through programs of promotion and demonstration.
- To promote a policy framework conducive to efficient organizational approaches to rural electrification management.

B. Project Plan and Schedule

1. Overview

NRECA's Proposal included a logical framework (logframe) setting forth the project goals and purposes (Appendix 1 of the Amended Proposal). The goal and purpose indicators were not quantified which makes it difficult to evaluate progress at the goal level. Some care should be given to modifying the logical framework to quantify these indicators to assist in future evaluations. Once modified, the monthly reports should be tied into the logframe indicators.

The indicators for the component outputs for both the original cooperative agreement ('88) and the first amendment ('89) are found in table 1 below. The first amendment increased the life of project from four to seven years and increased the budget from five million U.S. dollars and seven million equivalent in local currency to 10 million U.S. dollars and 10 million equivalent in local currency.

Of the two main components of the project, RE construction and technical assistance for institutional development and support, the second is divided into six subcomponents:

a. Productive Use Activities
b. Technical Studies
c. Rural Electrification Sector Management
d. Training
e. Small Generation
f. Construction Technical Assistance.

The RE construction component and the subcomponents of technical assistance are addressed in Section VI, review of project components.

In Table 1 below, dashes "--" indicate no output quantities were listed in the logframe. The 1991 workplan lists milestones for various activities. It is now appropriate for NRECA to refine their logframe for the remainder of the project. The evaluation team found the project goal, purpose, and objectives of the project still to be appropriate. At this time the entire logical framework should be reviewed by NRECA, CEL and A.I.D. and revised where appropriate. Indicators not only need to be quantified but reflect quality (ie., persons trained could be for one hour or for one year -- a better indicator is person-days).

TABLE 1
OUTPUTS
(as of May 1991)

	LOP	Number Accomplished	% Acc.
1. Productive Use Activities			
a.Est Prod Uses Program	1	1	100%
b.Set up farm PU demo	20	5	20%
c.Est.Credit assist prgm	--	-	---
1.applications rec	--	-	---
2.loans provided	--	-	---
2. Technical Studies			
a.Studies to improve RE management structure	4	3	75%
b.Studies to improve RE oper. systems/procedures	3	3	100%
3. RE Sector Management			
a.Reduce RE Constr. costs	5%	9%	180%
b.Reduce peak demand	2%	0%	0%
c.Reduce power losses	5%	0%	0%
d.New maintenance procedures	3		
e.Work order procedures est	---	--	---
4. Training			
a.Utility staff trained	90	92	102%
b.Training center est	1	1	100%
c.Rural electric PU consumers trained	--	--	---
5. Small Generation			
a.small hydro inventory	1	1	100%
b.pilot project	1	0	0%
6. RE construction			
a.Construct new substations	4	0	0%
b.Construct rural distribution lines	1000 km	114 km	11.4%
c.Distribution Improvements	210 km	0	0%
d.Subtransmission Line	190 km	0	0%
e.Increase number of consumers of electricity	26,000	1900	7.3%

2. Plan and Schedule by Component

a. Productive Uses. NRECA's current plan is to have a productive use demonstration each week or about 40 each year. At this rate, the number of demonstrations will soon exceed the total EOPS. The quantity should be revised to portray a more realistic expectation. The credit program, although appearing in the logframe, is not listed on the SAR outputs, nor does it have any quantity of

loans targeted. The FY91 workplan of 300 loans was overly optimistic, especially considering BFA's total portfolio and poor track record.

b. Technical Studies. Technical studies are on schedule, generally they have been well prepared and well integrated into the overall program.

c. RE Sector Management. The reduction of construction cost target should be revised to be more realistic.

d. Training. Training targets should be revised to be more specific to type and duration of training.

e. Small generation. The inventory of potential sites was completed and should serve as a useful reference for others. The Team recommends that the pilot project proposed be dropped. (see section IV E.2 for details)

f. RE Construction. This portion of the project is behind schedule. As a side issue, if a decision were made to hook up consumers on existing lines (see Chapter V), the number of consumers (26,000) could be expanded significantly. Such a decision would impact the inputs as well as the outputs.

C. Overview of Program Status.

The overall evaluation of program status is that the project is well implemented although the main part of the program, the construction component, is falling behind schedule. The NRECA Resident Advisor organized his office well, documents are readily available and easy to find. His approach in identifying problems and then planning technical assistance to overcome deficiencies is praiseworthy. The project is subdivided into two components:

- A multi-faceted technical assistance component,
- A rural electrification construction program.

The technical assistance, overall, can be considered to be ahead of schedule. Training, in all categories, has gone well. The training subject matter was chosen well to rectify major deficiencies, trainers were knowledgeable and equipment fully met expectations. That is not to say that no more training is needed. The fact is, the amount of training needed for this project was greatly underestimated at the start. NRECA recognize continuing training needs and is planning new sessions to address identified deficiencies. There may not be the requirement for additional training funds to be programmed at this time, but addition funding should be considered when the time comes to re-evaluate the status of training some time in the future.

One area where substantial training still may be needed is with the accounting department. Not only will this group require extensive training, but long-term advisory services is recommended. The advisory services may require an adjustment in the funding level or reprogramming of line items. Whichever is the case, additional technical support for the Accounting Department is recommended.

Regarding the construction component, substantial delays in the proposed program have occurred. The most substantial delay was caused by a shift from a commonly used "lottery system" of contractor selection to the introduction of the internationally accepted "competitive bidding" procedures. The "lottery system" is a form of contractor selection common to Central America; however, this practice relies upon the client engineer's infallibility to set prices, opens the door for improprieties, and does not provide for the best competitive price. The team believe that the decision to shift to the traditional competitive bid procedure was a correct decision. Following acceptance by USAID and CEL of a new bidding procedure, time was needed to develop new bid documents. In May 1991 new bidding documents and implementing procedures were still pending CEL and AID final approval. Once approved, the new procedures should help reduce construction costs and lead to an accelerated construction program.

The Supplemental Grant Agreement stipulated that an evaluation team should review construction progress to determine whether construction could be accelerated and the Life of Project (LOP) be reduced. If the goal of the project is solely to construct lines and make connections, it is possible to accelerate construction by shifting to a direct USAID or NRECA contracting mode. The Team, however, does not see such a change practical or acceptable to the GOES. But more important than reduction of project life is the fact that a major goal of the project is to infuse NRECA's institutional development talents into the El Salvador structure. Technical assistance activities takes time, therefore making it inadvisable to reduce the LOP.

The GOES needs to make a long term commitment to rural electrification if substantial changes are to be realized in the country side. The USAID Country Development Strategy Statement (CDSS) has no provision for any major energy sector investments; therefore, the GOES should encourage other donors to take a longer term commitment to assist electrification in El Salvador. Already this program has affected improvements in rural electrification in the short time the project has been authorized. It is necessary to obtain a much longer commitment if lessons learned can be continued into the future developments. Successful rural electrification programs in other countries are those where long term commitment by donors were maintained, like in the Philippines where NRECA has provided assistance for over 25 years.

D. Important Overall Operational Assumptions, Constraints and Issues.

1. Assumptions

Evaluation studies elsewhere have shown that a critical factor in determining the extent to which electricity is used productively relates to the ability of users to gain an easy access to credit. The basic assumption is that electricity is not a basic need. If the poor are to be included, the project must include a financing arrangements for inside underwriting for the cost of wiring, metering and the purchase of electrical appliances and equipment. The very poor probably will not be able to afford the hook up expenses, in any event, with the present DISCEL policy that require clients to bare the direct cost of meters and line drops. The Team believe that this policy should be reviewed with the presumption that these costs be borne by the utility, as is the normal case in the United States and other Developing Countries. This issue is discussed later in the report under Section V, Recommendations.

Studies have also shown that "electricity must be introduced after and/or in conjunction with a variety of other public and priva. ; investments and programs in order to have a significant impact on economic development." (AID Project Evaluation Report No. 15, p.6.)

2. Constraints

The civil war was a constraint to a smoothly planned and run operation in El Salvador over the past ten years. Now, with peace accords signed between the government and dissidents, this constraint is lifted. The travel ban as a result of the Gulf War in early 1991 also was a short term constraint on NRECA's technical assistance and training tasks. This too, is past history.

There is one constraint that continues to hamper productive progress. That is, there is still a high staff turn-over at CEL that constrains project planning, implementation and training benefits.

3. Issues

The NRECA project is receiving excellent backstopping from the RDO office and at the same time they maintain good communication with the IRD technical office. The Team looked into the advisability of moving this project back to the technical office monitoring the project, but rejected such a move. The Team's decision was based upon the fact that NRECA/USAID project coordination seem to be working well and therefore the current arrangement with the Rural Development Office should be maintained. This is particularly true since so much of the upcoming productive uses efforts will be with the agricultural bank.

NRECA should cooperate with any privatization effort but should not lead these efforts. In turn, if there is an opportunity to move the distribution system assets of DISCEL into cooperative arrangements, NRECA should use their special expertise to help with such a movement to the maximum extent possible.

IV. Review of Project Components.

A. Productive uses activities

1. Scope and content

The two main areas of the Productive Uses (PU) task are the demonstration program of productive uses of electricity and the credit program to provide loans to finance these productive uses. Work on this task began with PU strategy formulation under the CARES project. This strategy was refined and implementation began with the NRECA bilateral project team's arrival. The NRECA project helped to establish and train the CEL Office of Consumer services. The productive use activities take place under this department.

Amendment No. 1, Attachment II to project 519-0358, dated June 30, 1989, states: "The goal of the Productive Uses Program is to improve electricity efficiency, bringing the load factor of the rural population to that of the non-rural, without necessarily increasing power supply."

"To this end, the Project has established a CEL Office of Services to the Consumer that will carry out the following activities:

a. Identify areas of ongoing productive projects (agriculture, micro-enterprises, etc.) and coordinate with the implementing agencies the demonstration of equipment and ways of utilizing electricity to increase productivity.

b. Assist the potential buyer to assess his/her installed power capacity and/or to determine the necessary modifications required to install the desired equipment.

c. Provide information on equipment, prices, commercial houses, and sources for obtaining assistance. (Note: more technical as well as financial assistance is needed by end-users.)

d. Provide information on available credit sources."

The Amendment also states: "New credit windows will not be opened under this Project." The Team does not know the history behind this statement but believe that it is too dogmatic. In other parts of this report it is recommended that DISCEL be considered as a credit source for pass through of financing for productive use equipment.

2. Output levels and schedule

As part of activity item "a" above -- identify areas of ongoing productive projects and coordinate with the implementing agencies -- NRECA used R. G. Associates to help developed a data

base. USAID provided CEL with the equipment and computer programs to keep the data base current. The data base was comprehensive up to the time NRECA ceased funding its update in 1990. Since then the data base is falling into a state of disrepair. The data base can serve as a valuable tool to help avoid duplication of projects, therefore, more effort should be placed upon updating the information and then maintaining and sharing it. For example, recently CONARA constructed a line that was scheduled in DISCEL's plans. A check of the data base could have prevented this duplication of effort. CONARA hopefully would not have built electrical lines in three rural areas which were in CEL's workplan. NRECA's Project Manager stated that CONARA tends to build lines of lower quality but cost more than the CEL constructed lines.

The development of the data base partially fulfills the requirement of activity item "a". Also NRECA continues to coordinate with other implementing agencies. Some of their on farm demonstrations are planned for operation on World Vision farms.

Activity item "b," "assisting the buyers to assess his/her installed power capacity and/or to determine the necessary modifications required to install the desired equipment," was delayed due to obstacles encountered in getting the credit agreement signed by both CEL and the BFA. A provision for obtaining technical and financial help is critical to success of any productive uses program. At the present time the program looks to the BFA to provide these inputs. If BFA fails to provide these inputs the chances of success will diminish rapidly. See recommendation V.A.2.

Regarding activity item "c," providing information on location, pricing and identification of assistance sources, NRECA contracted with R.G. Associates to provide this information. This activity is an ongoing effort and information sheets are passed out at each productive use trailer demonstration. These sheets do not include pricing due to frequent price changes caused by inflation and other market factors. Still, orders of magnitude of prices for some of the equipment would be helpful information to disseminate. In order to bring information to the community level, a demonstration trailer was assembled that includes a mill to process corn, a corn husker, hay chopper, feed mixer, both submersible and centrifugal water pumps, metal working equipment, carpentry tools, refrigerator, freezer, and a sewing machine. (See Figure VA2).

Initially NRECA suggested a target date of early January, 1990 for the first field demonstration of the trailer and equipment. The first demonstration occurred a year later in February, 1991. The evaluation team observed field demonstration #5 and counted over one hundred participants in attendance, about 40 percent of whom were women.

The creation of a commercial department in DISCEL apparently was arrived at under some duress. NRECA consider the establishment of a commercial department necessary to meet projects objects and threatened to cut off funding to parts of the program unless this reorganization occurred. According to the former manager of DISCEL, CEL now is beginning to realize that providing rural electricity is something which can create country side development. This is as opposed to previously

views that saw RE distribution activities as a liability when compared to their generation and transmission work.

The department developed a good Productive Uses workplan for 1990. They stated that a current workplan was not completed because they were still waiting for the CEL workplan to be approved by SETEFE for calendar 1991. As previously mentioned, SETEFE should improve its review and approval process but this in itself is not an excuse for DISCEL not preparing provisional workplans.

The fourth activity is to provide information on available credit sources. There was a substantial credit study carried out by IPM. While the IPM report generally covered the need, it could have better covered the sources. However, it does not seem realistic to assume that the private sector lending agencies would be interested in the small loans to finance the many productive use appliances needed. Lending institutions in El Salvador frequently require a deposit of 80% of the loan. This requirement is counter productive to developing a financial program for small producers. R.G. Associates did a follow-on study that pointed toward FEDICREDITO as a possible credit alternative. After further discussions, it turned out that FEDICREDITO also was not interested in lending money for small productive use to persons who did not have adequate collateral. Attempts to interest FINCA, another financial source, also were not successful. After many months of negotiation, an agreement was finally signed early May of 1991 between CEL and BFA for a credit program consisting of technical assistance to borrowers and credit assistance for productive use purchases. CEL will guarantee the loans.

The quality of NRECA's workplans improved, especially with the 1991 workplan listing targets (milestones) for each activity. These targets, however, are somewhat dependent on CEL operations, not just NRECA operations. The 1991 milestones for the Productive Use department are as follows:

a. Establish 4 permanent productive use demonstrations at a farm;

b. Establish a permanent cold storage productive use demonstration;

c. Give 40 productive use field demonstrations;

d. Equip a second productive use trailer;

e. Disburse 300 productive use loans through BFA;

f. Establish a monthly customer informative bulletin by year's end;

g. Publish 10 new productive use equipment pamphlets;

h. Train 2 productive use staff in desktop publishing.

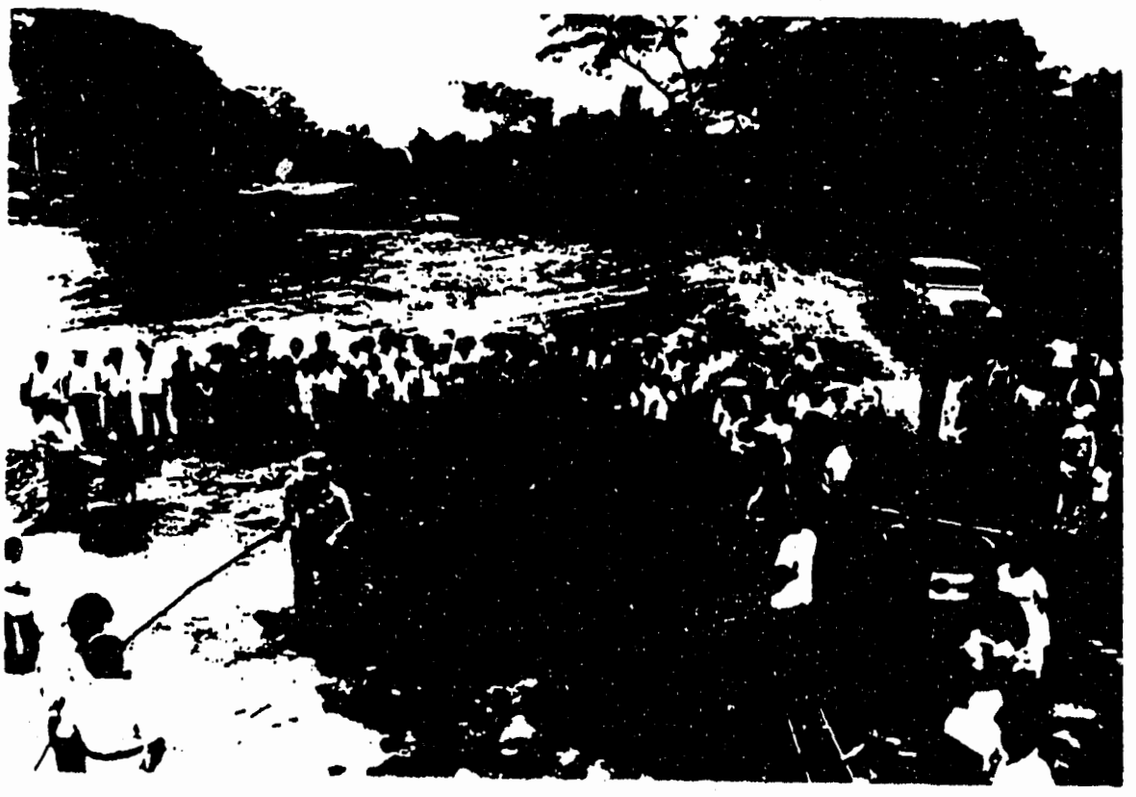
FIGURE V.A.2

PRODUCTIVE USES
DEMONSTRATION
PROVINCE OF LA LIBERTAD
EL SALVADOR

MAY 3, 1991

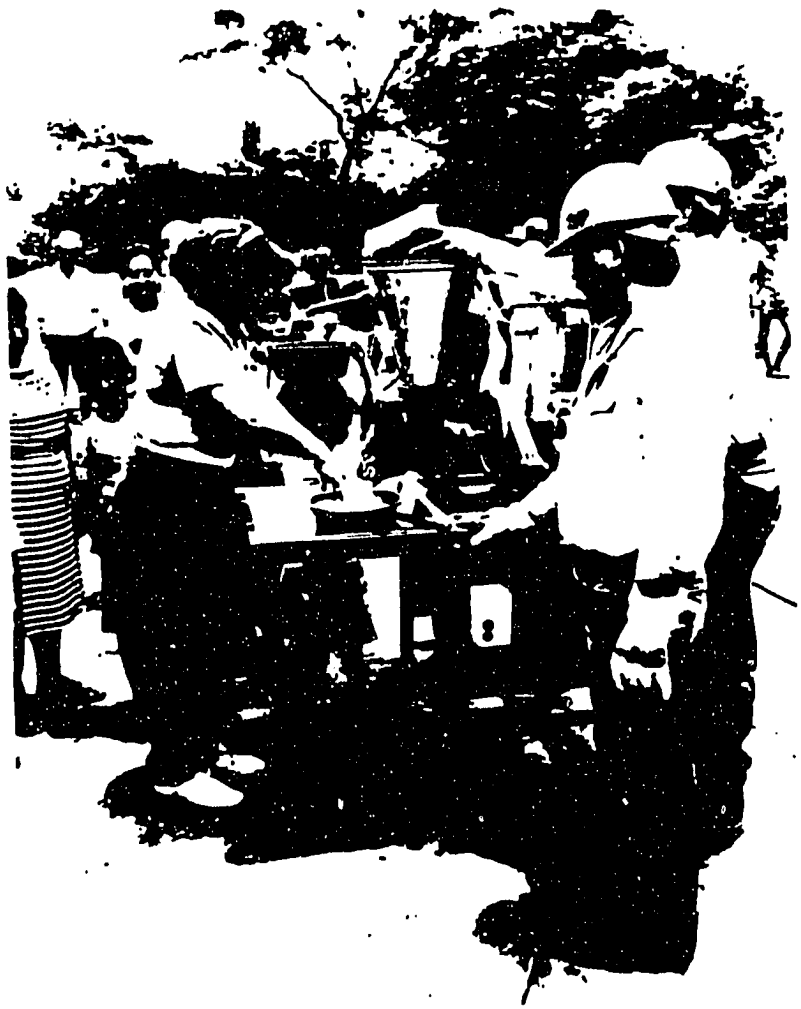
EARLY MORNING DEMONSTRATION SET UP

IRRIGATION PUMP IN LOWER RIGHT CORNER



IRRIGATION PUMP DEMONSTRATION

ANIMAL FEED MIXER



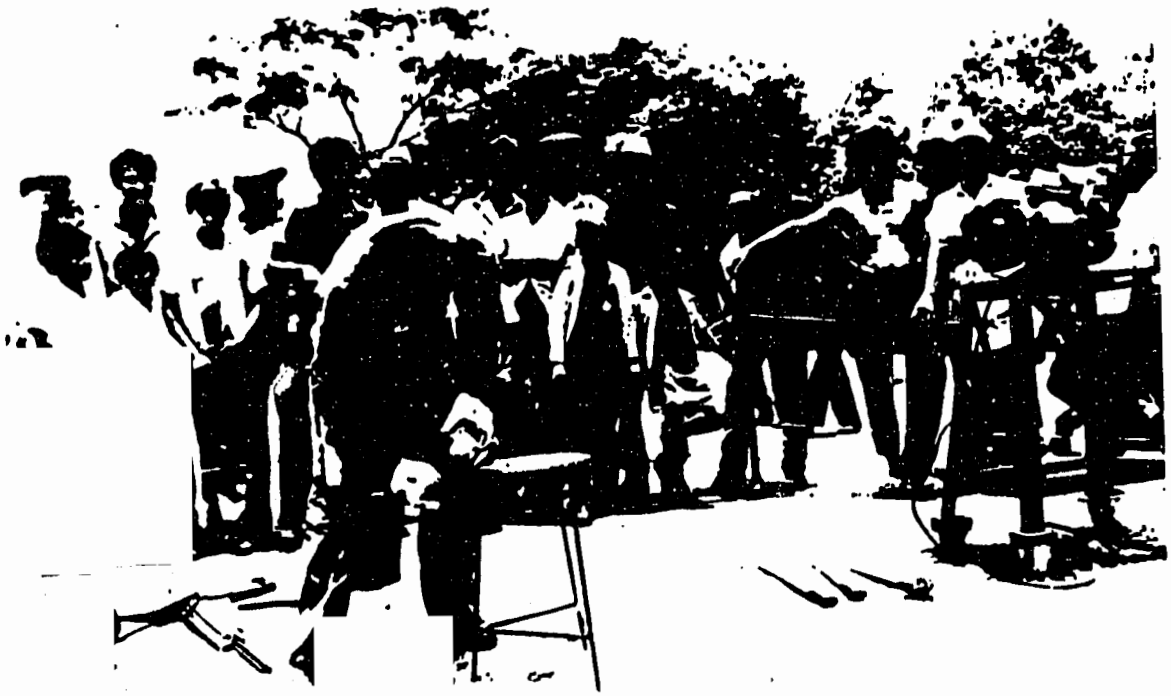
CORN MILL USING PARTICIPANTS' CORN

WHICH WAS RETURNED TO THEM AS MASA
(MIXTURE FOR TORTILLAS)

SEWING MACHINE DEMONSTRATION

SILAGE CHOPPER

METAL WORKING EQUIPMENT DEMONSTRATION



It is possible to achieve items a, b, c, d, f, g, and h by the end of fiscal year 1991 but given the late start, the loan program will need to be rescheduled.

The monthly reports have been continuous since August, 1989. The monthly reporting on outputs should be gender disaggregated where possible and in particular in terms of head of household for wiring hook-ups. General location of wiring hook-ups should also be indicated on a semi-annual basis. Numbers of people attending field demonstrations should be gender disaggregated.

3. Technical quality of work

Given the restrictions placed on the project by USAID, namely the credit placement, the balance of NRECA's work is considered very good to date. It is noted that the socio-economic base line data report by IPM would have served as a better planning tool if the data could be disaggregated by gender. NRECA should assure, wherever possible, that statistics be disaggregated gender. It would be helpful to know for marketing purposes if the people indicating a desire to buy electrical appliances and machines were men or women. It may not be practical, but if possible applications for electrical hook-ups should indicate whether the head of household is male or female. Frequently female headed households are denied credit from lending institutions. For instance, if there is a good re-payment record for a woman, this data could be used to convince lenders to advance credit. The information would need to be coded in a manner that CEL can easily retrieve the data. This type of information collection will better serve the needs of the project and the needs of USAID reporting requirements.

4. CEL comments and perceptions

Comments of CEL staff were very complementary on the work done by NRECA. CEL staff mentioned that the way the technical assistance has been handled was well received. The staff interviewed considered the method NRECA applied of seeking mutual discussions on the possible development of new policies rather than the delivery of isolated recommendations is one reason that many of the changes were implemented. Still, one of the constraints to project implementation is the lack of continuity in personnel. There have been many CEL personnel changes adversely affecting smooth operations.

Another comment received related to the way that the project had been planned jointly. The planning was done <u>with</u> CEL as opposed to <u>for</u> CEL. Consequently there was greater acceptance of advise. The consultants brought in by NRECA were seen as both well qualified and providing needed services. CEL interviewee comments were very favorable about the training provided and indicated that much more training is desired. The current head of the commercial department of CAESS attended NRECA training and spoke very favorably about it.

CEL personnel felt that CEL could manage the credit program for productive uses but that it might need a change in the structure in order for CEL to be able to offer credit financing and collect

money for other than electrical services. Note: There was not sufficient time for the Team to analyze CEL's current program of offering credit for installation of house wiring packages but DISCEL does have one that apparently works quite well. If after the first year, CEL, USAID and NRECA considers the BFA program not as effective as hoped, then it is recommended that CEL's current house wiring credit procedures be examined and devise a means to adapt it to productive use equipment financing.

5. Institutional development and training

In the first year of the program a productive uses component of CEL was formed. Constraints to an effectively running program is both the frequent change of CEL personnel as well as personnel assigned to the department who are not really interested in the activity.

The productive use activities depend on and are inter-related to many other parts of the NRECA project. Site selection for PU demonstrations depends on sites selected for new line construction which depends on the DAM. This coordination appears to be going smoothly.

To get at the problem of high staff turn-over, NRECA plans to establish a personnel positions manual. It is hoped that a positions manual will ease some of the problems caused by high staff turn-over by matching personal qualifications with position needs in a more systematic manner. DISCEL should facilitate the transfer of persons interested in productive uses into the department rather than making arbitrary assignments.

Other disciplines have been provided as part of the in-house training on desktop publishing. Especial software and related training was given for the Productive Use Department in the preparation of educational bulletins and handouts for field demonstrations.

NRECA has met their training targets (92 people trained) for the whole project and there are still many CEL staff to train. For instance the Credit program is just beginning and many people will need to be trained in that part of the program. NRECA believes that a greater emphasis should have been put on the training area. The evaluation team concurs.

The credit part of PU has suffered due to the lack of progress on both the part of the agriculture bank and CEL. It took over a year to reach an agreement between CEL and the Banco de Fomento Agropecuario (BFA). The agreement was finally signed on May 2, 1991. However, at the first PU demonstration following the agreement, bank personnel appeared to be rather lack-luster and not very aggressive in outreach.

6. Home office and CARES support

The RA stated that recruiting, or identification, efforts are carried out by the NRECA/ES office more often than by the home office. Home office support has had difficulty recruiting consultants for this project.

CARES continues to provide support to NRECA-ES's activities when requested. On the other hand, now that the NRECA El Salvador operations are into full gear, there is an adequate staff is in place, and there is a well defined program, the team found that NRECA-ES shares information with CARES as much as CARES shares with NRECA-ES. Consequently NRECA-ES does not call upon their support as heavily as they did at startup. For example, NRECA-ES developed several manuals useful to others in the area and the DAM has been improved. Since NRECA-ES does assist CARES at times, attention is taken to keep accounts separate.

7. Issues and needed actions

Currently the PU field demonstration trailer is utilized once a week. It would seem to make sense to evaluate the relationship between these demonstrations and productive use loan applications prior to the equipping of a second trailer.

The credit part of the PU program is crucial to the success of this project. The Team did not find any indication that BFA is geared up to provide promised technical assistance. To the contrary, it has been reported that a group of campesinos took out a full newspaper advertisement criticizing BFA for not providing the technical assistance and expertise promised. The Team has its doubt whether BFA will perform as plan, therefore, if the loan program is not operating smoothly by April 1992, USAID should seriously reconsider its stand against CEL handling the PU credit program.

There appears to be a breakdown in planning of new distribution lines between CONARA operations and that of CEL's construction. All concerned officials should be aware of the other's program and establish practices that avoid duplication as much as possible.

B. Technical Studies

1. Design Standard Studies.

The purpose of the design standard activity is to review the existing CEL Distribution Design Criteria and adapt and expand its contents. The final result of one study completed was the development of a Design Manual. Adherence to the design principles would assure compliance with accepted standards of public safety and service reliability. Also this activity resulted in a mechanical design guide for use in the field by the line staking crew.

Dave Metz, of Stanley Consultants, Inc. (SCI), completed most of the study work for design improvements. Dave Metz is a well known electrical engineer with extensive experience in rural electrification. As he stated, the design of an overhead distribution line requires the solution of many engineering and practical problems. The actual line design is usually performed in the field by the person staking the line. Therefore, to assure a complete understanding of design problems, NRECA contracted with SCI to prepare a "Staking Manual," including the development of a computerized

staking program. NRECA followed up this initial work by conducting extensive training courses on staking design. These training courses were held at the CEL training center, CENCADE. Unfortunately, CEL management has not moved head with adopting these new methods as rapidly as one would hope. In addition, high staff turnover requires new groups to be trained. But more important, DISCEL is losing out on the opportunity of improving their distribution system and saving money.

NRECA is to be commended for doing a thorough job on the preparation of the "Staking Program." The manual, if properly followed, should result in lines that are safer, easier to maintain, and more economical. Typically, line staking computations include all requirements and clearances of the adopted National Electric Safety Code, determination of maximum spans, stringing sags and tensions and other construction configurations. The engineering computations are done before field staking and compiled into a guide used by the field crew. Each guide is specific to a given line to be constructed.

In this case, a software package supplements the Staking Manual. The computer program does many required computations and produce tables that can be used directly by the staking crew. The program is menu driven and provides the user with editing screens to create, interactively, or change input data files and control execution. Using the Manual and the software program, NRECA established an excellent training program.

The only the Evaluation Team suggestion is to continue the training program and to invite senior DISCEL management to as many sessions as they have time to attend. Their participation should make them more aware of the value of this method of design. For CEL, we can only hope that they take a greater interest in this program, a program that should lead to safer and more economical systems.

2. Material Specifications

Material specifications normally would not be classified as a study, but it is included under this topic because of the significant research required to produce new bid documentation. The impact it made on the project development is significant. Previously CEL procurement was based upon specifying "equivalent" to some known brand named commodity. In most cases, CEL lacked adequate catalogs of specified commodities and was unable to judge whether supplied material met the "equivalent" specifications or not.

NRECA took on the task of rewriting specifications for all equipment and material purchased from dollar sources. The new documents specify the quality (including packaging) of the commodity by reference to recognized standards, such as ANSI (American National Standards Institute), etc.

It is now easier to determine whether shipped material meet all of the specifications. As an outgrowth of better specifications, better inspection practices and proper warehousing techniques,

NRECA has discovered several cases where inferior material was shipmented and rectified the situation. The Resident Advisor is commended for his work in this area.

3. Voltage Supply Study:

NRECA contracted with Stanley Consultants, Inc. (SCI) to help CEL resolve a problem in selecting supply voltage. Traditionally CEL supplied bulk energy to subtransmission systems at 46 Kv delta. A few areas are served at 23 Kv delta. Distribution to consumers is at 13.2 kv within CEL's service area. CEL also serves two adjacent rural electrification zones, La Libertad and Sonsonate, serviced by two private firms recently taken over by the government. These two companies, CLESA and CLES, historically have been served at 34.5 kv delta. Recently, in both CLES and CLESA areas, CEL has had to introduce 46 kv delta due to a lack of 34.5 kv equipment to meet a growing industrial demand.

CEL believes that only one supply voltage should be used in the country but could not decide which voltage to use. They stated that the capacity of existing equipment is limited, voltage and energy losses are high, and CEL, CLES and CLESA all have many requests for electrical service upgrades and new services that they cannot meet.

The SCI study was well prepared and documented and provides CEL with sufficient information to resolve the supply voltage question. The study concentrated upon the "subtransmission" system, but also included comments on transmission and distribution. CEL, through NRECA's assistance, is carrying out several SCI primary recommendations.

The principal recommendations are:

- Recommendation 1. SCI recommended that CEL use a 46 kv subtransmission supply connected wye-grounded to provide line-to-ground fault sensing capability. This practice allows circuit breakers to disconnect circuits with ground faults from the rest of the system. Disconnects are not easily or economically obtainable in delta systems presently in use.

  CEL Response. CEL management is aware of this recommendation but has taken little action to implement the suggestion. The second evaluation under this program should investigate whether CEL implements this change for new construction. It may take many years to retro-fit the old system as the change from the 34.5 kv to 46 kv transmission is costly and not within the foreseeable budgets.

- Recommendation 2. SCI strongly recommended that voltage regulators be used in distribution substations. The report shows that the use of regulators will

provide the maximum benefit with minimum cost to improve service to the greatest number of consumers.

Response. CEL is aware of this recommendation but has taken no active action for implementation. It is recognized that the installation of voltage regulators is expensive. At present no funds are budgeted in the latest CEL workplan for voltage regulators. On the other hand, the NRECA/DISCEL project has 53 voltage regulators planned and over 20 are ready to be installed. Often the existing substation structure is physically too small to accommodate the regulators without rebuilding of the substation. Further, there appears to be a difference in technical opinion between NRECA and USAID as to the necessity of voltage regulators. USAID and NRECA should meet and settle this issue.

- Recommendation 3. SCI recommended that CEL use a two year work plan for continually updating construction and system improvement needs.

Response. CEL does not use advance planning techniques and, under the present circumstances, it would be difficult for them to start without a better understanding of their system. Before they can do a proper job of long term planning, CEL must have a better understanding of their system -- inventory, loads, losses, etc. In addition, long delays in the SETEFE approval process hampers CEL's execution of their annual program. For instance, it has taking over six months for SETEFE to approve CEL's current annual workplan. One solution to this problem could be the adoption of a two year rolling workplan. This would give SETEFE time to review a more extensive plan, then only review modifications presented for the current year's plan. Essentially base plans would be approved in advance, subject only to review of modifications or additions. This would mean that SETEFE would need to keep their review to major areas and not micro-analyse plans as is the present case. The burden is not just on SETEFE. DISCEL would have to give more thought to their program and do a better job of planning. In essence the GOES agencies all need to speed up the planning and approval process.

Meanwhile, CEL should adopt the recommendations of NRECA and gather data for long term planning. DISCEL, with the assistance of NRECA, should do the same for the distribution system maintenance and improvements.

4. Load Study

Load studies are a part of systems improvements. To assure an adequate understanding of what load studies are, how to use the studies and how to conduct one, NRECA prepared an Implementation Guide for a Load Study. For instance, some uses of a load study are:

a. Use of billing analysis to forecast sales and revenue. This is especially useful to justify tariff changes.

b. Rural versus urban feeder analysis may pinpoint areas that are candidates for demand-control programs.

c. Information from a Load Study can be used to improve customer relations with a better understanding of when peak loads occur and what can be done to change load profiles.

d. Distributors can better manage and operate their systems.

Based upon the NRECA developed guidelines, DISCEL has started some load studies. Load studies are not a one-shot exercise, but form a continuing process of system evaluation. Only recently have NRECA and DISCEL started initial load studies; therefore sufficient data have not been collected that would have much meaning for a start of a system analysis. The data collection work already done seems well accepted by DISCEL. They are following the NRECA prepared Guideline but it will be at least another year before an initial analysis will be completed. Even during this short initial phase of data collection, NRECA identified several anomalies in system operations and had DISCEL take action to correct these situations. The Evaluation Team finds that the introduction of "load studies" was a valuable input and CEL is pleased with the advice and is implementing the program.

C. Rural Electrification Sector Management

1. Scope and Content

Prior to drafting the Project Proposal Supplement, NRECA conducted a preliminary management audit of CEL. This study indicated a general lack of technical knowledge needed to improve the overall operational and management control of the distribution entities. Essentially it was determined that there are requirements for organizational reform, operations strengthening, and management, technical and operations training.

NRECA proposes to address these issues through day-to-day operations, providing additional technical assistance and to introduce new efficiency-enhancing equipment to CEL's operations. These improvements will be introduced throughout the duration of the project. In the task of defining future organizational arrangements, NRECA will provide technical assistance and training to overcome structural deficiencies within CEL. At the same time they will assist in regionalizing the distribution management system.

The scope of services in this area is broad and intended to address management problems as they arise. The extent of NRECA's proposed activities in sector management is based upon a sound

premise and should be sufficient to make substantial improvements in CEL operations before project completion.

2. Output Levels and Schedule.

The logframe does not provide targeted (quantity, quality and time) indicators, therefore it is not possible to judge the output levels against project plans. The 1991 workplan does, however, provide Milestones for one year outputs. Some management needs were identified by the preliminary audit. Information is available now for NRECA to develop a good set of targeted (quantity, quality and time) output indicators that could be used as a guide for project management and the follow-on evaluations.

3. Annual Objectives and Quality of Work.

For the workplan fiscal year 1990, NRECA planned to provide technical assistance in three areas. All milestones were met. These were:

a. Demand Assessment. This activity applied the CARES developed Demand Assessment Model (DAM) for El Salvador rural electrification site selection. NRECA-ES modified the model to fit local conditions. The model went through several shakedown runs to determine it's validity. Following verification, the DAM was put into full operation to assess and prioritize sites covered by applications that were received by CEL over the past decade. Over 400 applications out of 2000 have been processed and the economic viability determined.

NRECA's original proposal anticipated CARES assistance in program support to be scheduled on an as-needed basis. As it turned out, NRECA-ES was able to make most modifications to the DAM on their own.

The model was well received by DISCEL. One of the model's primary attractions for site selection is that it provides a means to reject sites on economic or technical grounds that were proposed strictly on political grounds.

b. Management Structure. Presently, El Salvador's entire distribution system is government owned and operating at less than normal efficiency. A resolution regarding future ownership of the previously owned private systems is urgently needed to enable these systems to once again function in a sound manner. As a start in resolving this problem, NRECA was instrumental in sending an executive level group of managers to a privatization seminar. The CARES regional program coordinated the seminar. Attendance at this seminar gave the El

Salvador team an opportunity to interact with their counterparts from neighboring countries. They were able to hold discussions, not only on the privatization issue, but on questions of mutual concern regarding operations and management issues as well.

In addition, NRECA contracted with Gaither Consultants for a study on re-privatization of rural electrification. On the surface CEL has accepted the concept of privatization and the Gaither report provides suggestions for addressing the problem. USAID/IRD considers that the Gaither study provides excellent alternative means of accomplishing re-privatization. There is a general consensus that privatization is needed to put rural electrification back on a financially viable path. But this movement to privatize should not be used as a means to postpone crucial management decisions on system improvements.

c. Operations Strengthening. Considerable progress was made to strengthen operations during FY1990 with the completion of a new Supply Voltage Study. One of the recommendations coming out of that study was the need to place voltage regulators in existing and new substations to cost effectively improve distribution system efficiency. NRECA helped CEL begin implementation of this recommendation. More details are given under the Technical Studies section of this report. It should be noted that USAID takes exception to NRECA's recommendation to install voltage regulators. USAID apparently believe that the potential savings in an improve distribution system does not justify the cost of the regulators.

Over $4.0 million of material and equipment are on order with deliveries starting to arrive in El Salvador in May 1991. Early in 1991 an NRECA warehouse specialist worked with the DISCEL warehouse personnel. He gave instructions on computer applications of material control and end-use accounting. During his visit, NRECA evaluated DISCEL's procedures and controls and helped with a physical storage assessment. As a result of the technical assistance, CEL now is re-evaluating its entire inventory control system. However, a lot of work remains to be done to convince DISCEL management of the value of restructuring warehouse operations. It was not possible to assess the degree of DISCEL management understanding of the warehousing problem, but with the May 1991 acquisition of 2000 square meters of additional warehouse space DISCEL at least took positive steps to correct some warehouse deficiencies.

NRECA also developed a Load Study evaluation manual and an implementation guide. After DISCEL completes some load studies and data is gathered, they will be closer to understanding some of their system faults.

Another NRECA operation, aimed at strengthening CEL's capacity to design and operate a system, is the establishment of a Geographical Information System (GIS). NRECA should be commended for initiating a GIS. CEL has assigned staff to start verification of the mapping and to start physical inventory for inclusion into a map database. The CEL computer group is moving very rapidly in vector mapping the base maps into computer storage. (Note: NRECA may wish to investigate other means to input map data, such as a combination of raster and vector technology.) As an added note, once the GIS map information has been put on disk, it will become an extremely valuable resource for all other government agencies to locate and map their own inventory. The GOES should strive to include all government agencies develop an inventory of their assets for inclusion into a database. Once this is done, conflicts between development plans and actual physical improvements (i.e., ANDA water mains, ANTEL telephone lines, hospital and school locations, etc.) can be identified during their planning phase.

In CEL's 1991 workplan, NRECA proposes to continue activities initiated in the previous plan. The objective of the Sector Management component is to maximize the institutional capability of DISCEL to deliver electricity to consumers at the most cost effective means possible. To reach this objective, NRECA sees that their primary technical assistance must be focused on computerized mapping, warehouse assistance, coordinating with DISCEL's commercial department in identifying serious problems in the meter reading and billing system, demand-side management and improvements in customer service assistance. Milestones are set in the 1991 Workplan and should be used by the next evaluation team to judge progress. Simultaneously, and with two of the seven years behind them, NRECA should develop a long-term set of measurable milestones. USAID and SETEFE should exert more effort to approve workplans in a more expeditious manner.

4. Home Office and CARES Support.

The level of home office and CARES support seems to be sufficient. Truly, the El Salvador project has grown from a "child" of CARES' to one of equal status. Consequently, the emphasis of support from CARES has shifted from a one-way street where El Salvador was the recipient of technical assistance to one of equal partners supporting each other. The consultation services for the Meanguera Cooperative is provided by CARES funds and supervised by NRECA-ES.

D. Training

1. Scope and Content

Training is part of a multi-faceted technical assistance component. The outputs for this activity is the establishment of a training support center to provide programs in the areas of management, operations and technical training. In the initial years of operations, the major training

effort was in the area of "improving operational efficiency". This included training for warehouse management, line staking, computer desktop publishing and DAM model application. Training also supported the Productive Uses department. Ninety managers and technicians were trained.

2. Output Levels and Schedule

Work on the training task began the first month the Resident Advisor (RA) arrived in country in December, 1988. The first task was an assessment of the DISCEL operation's workshop to see what training and or technical assessment existed. The following month a consultant (James Morriss) completed a human resources study to determine the training needs of CEL's management and operations. As of March, 1991, 92 people completed 419 person hours of training. The training center (CENCADE) was built at the new CEL office complex in Santa Tecla. There were some training delays caused by the Gulf War travel ban and the local guerrilla offensive but there was no other noticeable constraints. Despite the delays, training is ahead of schedule but many more people need training than was originally contemplated. Future training should include computer training, the full range of accounting department needs, as well as electrical line design and construction practices. A training specialist will evaluate CEL's in house deficiencies in order to recommend additional course material for the CENCADE training curriculum.

3. Technical Quality of Work

Although it is too early to determine the impact of DAM training, the model has been well used and the technicians appear well trained. Another effort to improve operational efficiency is adoption of a GIS (geographical information system). The technicians operating the GIS demonstrated an excellent understanding of this product and is indicative of the educational training they received.

The evaluation team did not find that participants had prepared individual course evaluations following each training session. If this process is not in place, we recommend that it be done with each training activity. The Productive Uses demonstration observed by the evaluation team ran smoothly and was of great interest to the crowd who attended. Also, a fairly large number of trainees have been reassigned to other duties. More care should be exercised by CEL in selection of trainees to assign only those expected to return to their previous assignment.

4. Cel comments and Perceptions

CEL requested additional training from NRECA. The CEL officials interviewed stated they would like help in the areas of billing and finance. Throughout this evaluation period the Team found evidence of weaknesses in the accounting department and strongly endorse more training in this area. The warehouse training appears to have been well received. Partially as a result of this training, and the associated awareness developed, CEL re-evaluated their whole inventory control system.

5. Institutional Development and Training

Training is crucial to institutional development and, as such, NRECA coordinated these inputs well with the other tasks of this project. For example, the computers and software purchased for the operations division of DISCEL required a substantial training component. The existing computers have been networked to a file server and a larger storage device provides a more efficient computer operation within DISCEL. Currently these computers are productively utilized. There has been training offered in conjunction with the computer-assisted meter testing facilities. A procedure that link the operation's computer network to the on-going load studies. Training is carried out with good utilization of CEL's training center. There is a need for additional training especially in the areas of financial accounting procedures and management training for top managers. A resident specialist in accounts, billing and financial management could be well utilized by the project for six months to a year.

6. Home Office and CARES Support

Training is primarily handled by the El Salvador office. There is adequate coordination with the CARES project so that much of the training takes place on a regional basis. For example training in a specific area will be available to all the CARES' countries. In this way there is an opportunity for cross fertilization among the electrical power personnel in Central America. Trainees are found to be much more willing to share experiences and comments in an international setting as opposed to a situation where all comments would just pertain to their own group.

E. Small Generation

1. Background

NRECA's role for this activity is defined in their June 1988 Proposal. Under the Rural Electrification System Construction Component, "Small Decentralized Pilot Projects," NRECA is to provide technical support to help complete the inventory and site ranking, assist in specialized small hydro design techniques, and to select, design, and construct a pilot project. The first task has been completed, the inventory and site ranking. While the inventory study meets the scope as defined by CEL, it would be advantageous for CEL to expand the inventory by identifying sites between 10 MW to 20 MW generation potential. This latest inventory identifies small hydroelectric potentials (those below 4 MW) while other studies identified large sites (over 20 MW). It would be worthwhile to fill in the inventory gap with a study of intermediate size sites. The 10 MW to 20 MW sites are those that should interest private investors more than the very small or the expensive large developments.

In the workplan for 1991 (not yet approved), it is stated that, "As mentioned in last year's workplan, the project remains focused on the question of small decentralized generation technology, but primarily from the standpoint of interconnected distribution network." The workplan goes on to state that, "As follow up to the first study, NRECA plans to assist in developing designs for optimizing

the small plants integration into the overall power network and in packaging these small project designs for financing." The Evaluation Team believes that NRECA should not pursue the design tasks proposed under this sub-component until the GOES develops a medium or long term generation strategy and other donor inputs are better defined. This recommendation is not intended to eliminate NRECA's role in helping CEL but inputs should be limited to those cases when CEL makes specific requests.

Clearly, El Salvador can benefit from additional hydroelectric power to supplement the base load and reduce the dependency for fossil fuel generation. CEL expressed an interest in a decentralized generation supply, especially as it applies to rural electrification. Studies show that such an approach will provide a least-cost means of supplying electricity to the more isolated electricity demand centers. Also an extensive small hydro generation system will augment the national power supply grid with less expensive base load. Realizing the benefits from more hydro power development, CEL, in 1987, contracted with the Universidad Centroamericana Jose Simon Canas (UCA) to study small hydroelectric generation possibilities in El Salvador.

The UCA research study completed in 1990 was under the direction of Ing. Axel Soderberg, project coordinator at the University and an owner of an independent hydro power plant. The joint UCA/CEL research team developed an inventory for new small hydro sites throughout the country. The identification of sites first relied upon topographic studies from available maps, followed by field visits in areas free from guerilla activities. Based upon this site information and basic hydrologic data, the data was analyzed using a complex computer model. The model produced a plant design for each site, developed construction and operating costs, and predicted power production. An apparent weaknesses with the financial analysis section is the application of "unreal" pricing factors. The study assumed that power would be sold to CEL at the low price of 18 centavos ($0.02 USD) per Kwh. This price does not represent true market rates nor does the study consider least-cost methods of development. Construction cost input data also is questionable. Consequently, the study shows only a few sites to be financially viable. Better costing should yield a more diverse list of potential sites and eventually attract private investors.

In October 1990, Robert A. Chronowski prepared a comprehensive report for NRECA on the subject titled Small Hydro Resources and Private Power Potential in El Salvador. His report provides a more detailed critique of the subject and gives excellent recommendations on the program.

Mr. Chronowski discovered at the time of his visit in September 1990 that the Japanese Government had initiated a small hydroelectric rehabilitation program in the Latin American region. Their program allocated $3.0 to $4.0 million to El Salvador. Given the interest in development by other donors, NRECA-ES should limit its technical support until the role of both CEL and private sector investment opportunities are better defined. When called upon, NRECA should provide CEL with assistance in developing privatization policies (including the use of cooperatives) but should not take the lead.

2. Recommendation.

Considering the hindrances to private sector operations and the involvement of the Japanese in rehabilitation sites, we recommend that NRECA not design and construct a pilot small hydroelectric project as presented in their proposal. We realize that design and construction of a hydroelectric plant would be interesting, and it could serve as another demonstration project. But this is not necessary since CEL is aware of the advantages of small generation and they already know how to develop this power source. There are many small hydroelectric plants in El Salvador, albeit out of commission, so they do not need an engineering example. NRECA can better utilize its time and resources in providing technical assistance for management, maintenance and operations.

F. Rural Electrification Construction

1. Scope and content

The original Cooperative Agreement dated August 12, 1988 provided for construction of approximately 580 km of new lines serving up to 15,000 new consumers, 150 km of upgraded distribution lines, 150 km of subtransmission lines and three new substations. With the additional five million US dollars plus five million equivalent in local currency provided by an amendment, bringing the total program to $20.0 million, these target figures were revised. The Program now calls for 1,000 km of new distribution lines, 210 km of distribution upgrades and 190 km of sub-transmission line construction. In addition, one new substation construction was added bring the total to four new substations. The expanded program is to serve 26,000 new consumers.

The distribution component is defined as "construction of all new distribution lines which originate from substations or which are extensions from existing lines." The improvements component involves renovation of deteriorated or incompatible systems so that these may be incorporated into the rural network. The subtransmission line component is the construction of source (supply) lines for new proposed substations or alternate feeds to existing substations which are part of this project. The substation component involves construction of new distribution substations.

Site selection for the distribution line construction is determined mainly by the Demand Assessment Model (DAM) developed by CARES as refined by NRECA-ES. This model, which is driven by a series of standard selection criteria (such as geographical, political, and socio-economic factors) identify priority end-users of electricity and site-specific net economic benefits.

2. Output Levels and Schedules

The output schedule is seriously behind schedule at this time. The construction component of the rural electrification program has, from the start, been the critical scheduling element. It is possible to make up these construction delays, but it will require the cooperation of more than just CEL management. The lengthy delays by USAID and SETEFE in approving workplans in the first

years to the project produced a direct negative response in construction schedules. NRECA was able to initiate off-shore procurement of materials and equipment, but CEL was unable to enter into construction contracts due to lack of project local currency. However, now that CEL has money the problem of slow progress is back with CEL. They have the money but they are not moving into construction contracts fast enough to keep pace with their workplan proposal. Granted, bidding practice was changed this past semester from a "lottery" system to the more conventional "competitive bidding" system. This change in bidding methods (definitely an improvement) created a hiatus in construction activities for several months while approvals of the new procedures were being obtained from AID, SETEFE, and within CEL. It also took time to prepare new bidding documents. Most of that work is done and but activities still have not moved swift enough to match planned outputs. DISCEL must improve their review, approval and decision process in constructing subprojects if they are to complete this program anywhere near on schedule. Figure IVF2 shows the relationships between the original and amended planned schedule and actual construction. At the present rate of construction the overall project will be at least two years delayed. Again, it is possible to accelerate construction, but only if DISCEL improves it construction management practices.

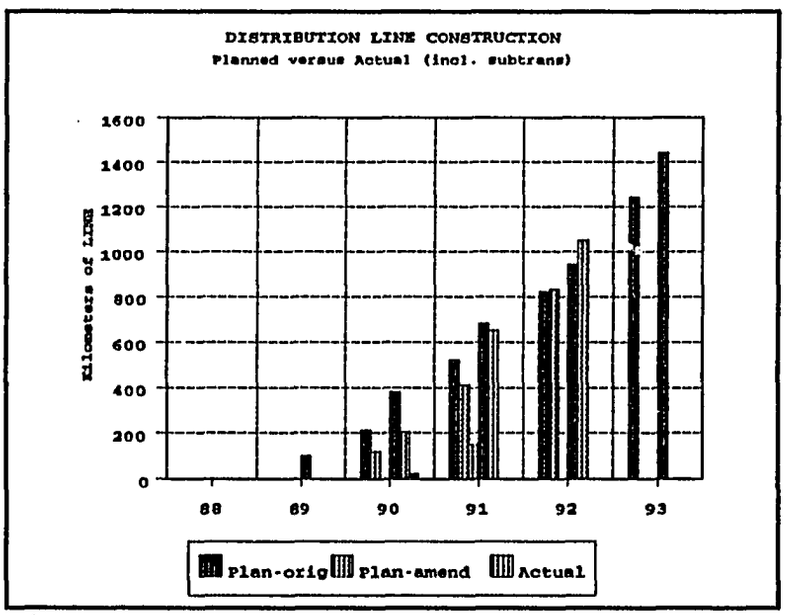


Figure IVF2

The U.S. procurement of materials and equipment by NRECA using dollar funds is keeping pace with the proposed schedule. Over $4.0 million of contracts have been awarded. Materials are being received at a rate faster than DISCEL can handle the inventorying and warehousing of the new material. NRECA staff is staying on top of the situation, therefore the lost of materials should be minimal. While NRECA will keep track of material for now, this problem can lead only to costly inefficiencies for DISCEL if they do not improve their performance on material control.

NRECA identified warehousing as a problem early in the program. At that time CEL gave assurances that the warehousing problem would be solved. But, it was not until May 1991 that CEL finally procured additional warehouse space.

Another problem is the lack of permanent warehouse staff. Warehouse training was given in December 1990 for five persons; however, the turnover of staff makes it difficult to install an adequate control system. CEL must solve this staff deficiency dilemma soon or additional construction delays will result because of inefficiencies in delivery of materials to the field.

3. Technical quality of work including consultants.

NRECA's handling of the technical aspect of the RE program is excellent. In most cases the consultants have delivered quality work. Presently the Distribution Line Design manual is finalized and ready for CEL approval and printing. DISCEL implemented the Load Study program with participation from PLANICEL, ELECTROCEL and CAESS. A Marginal Cost of Rural Electrification in El Salvador study, a needed input to the DAM, is of good quality but was extremely late in delivery by one consultant. Nevertheless, it was completed and is in use.

NRECA on the other hand completed substantial in-house work, some with the assistance of CARES. Principal among these achievements are the meter placement program, material specification standards, development of a outage reporting procedure, development of procedures and training manuals for a Uniform System of Accounts and the setting of warehousing standards for material identification.

The meter placement program offers time payments for connection and creates a rotating fund within CEL to purchase meters in the future. The outage reporting procedures evaluate and improve the quality of service on distribution system -- although implementation of this program is pending a DISCEL management decision. The improvement in a Uniform System of Accounts probably represents one of the more critical technical assistance areas for additional training. From a cursory review, NRECA may need to bring in a specialist to work with the accounting department for six months to a year. This would be an addition to their present planned program. As previously mentioned, DISCEL management needs to offer more support for the warehousing program. Once this is done, established training courses by NRECA-ES or CARES can be accelerated.

4. Comisión Ejecutiva Hidroeléctrica del Rio Lempa (CEL) comments and perceptions

Conversations with senior DISCEL staff indicate they are very pleased with NRECA help. Personal relationships are friendly and cordial. We believe that this is the case, but even so, DISCEL staff did seem to be reluctance to criticize NRECA or program content and to honestly reflect their disagreement on issues. Obviously DISCEL has concerns regarding some of the suggested system improvements or they would have instituted recommended changes. However, there is not much that can be done except wait for the excellent personal relationships between the NRECA Resident Advisor

and his counterparts to bear fruit. We have no suggestion for improvement in the manner the RA is handling the situation.

5. Institutional Development and Training.

The U.S. government "travel ban" early in 1991 delayed those training activities that required consultant travel. The training programs in construction most affected by the travel ban were:

- Line installation training
- Automated meter reader training
- Electronic meter computer program training

NRECA had a good start on technical training before the ban, far more than envisioned in the program proposal. We assume that training soon will be back on schedule.

6. Home Office and CARES support.

CARES support is adequate. As the El Salvador program grows and CARES's involvement in other Central American projects expends, there should be more cross-over benefits available in the field of training. Observers have found that the introduction of participants coming together from several countries provides an atmosphere less defensive of "their own" established practices. When a trainer works with only one group, there tends to be a defensiveness to change old practices; whereas, with commingling of participants, no one group feels picked upon.

Home office support generally is adequate but a better understanding of the need to identify consultants more rapidly will improve project effectiveness. The field staff understands the difficulties that their headquarter faces in trying to finding adequate and available personnel. Better communications possibly would keep the other party aware of progress being made, or problems encounter, and reduce minor negative feelings.

7. Issues, needed actions or changes.

The biggest issue hindering acceleration of construction is DISCEL's lack of timely decisions on construction contracting. Also, it is critical for DISCEL to assign trained permanent warehousing staff and keep them on the job for a reasonable period of time.

AID and SETEFE should examine their approval criteria and procedures to assure that Annual Workplans are approved in a reasonable length of time.

G. Review of Project Management and USAID Oversight and Cooperation.

1. Project Management.

a. Project Coverage. A major concern was expressed by USAID regarding the apparent exclusion, from the NRECA program, of areas previously served by the private sector. As background, following the expiration of their 50 year concessions in 1986, four firms were put under the administration of CEL. CAESS, the largest company serving San Salvador, was put directly under the administration of the CEL Board of Directors. The smaller companies from Santa Ana (CLESA), Chuachapan (CLEA) and Sonsonate (CLES) were put directly under the administration of DISCEL. The concern expressed by USAID was that NRECA, working directly with DISCEL, was excluding these other areas in favor of the DISCEL distribution region.

Investigations indicate that the USAID concern is not entirely true. DISCEL does receive most of NRECA's assistance; however, all distribution areas are eligible to receive technical advise and construction services from the project. In fact, over 20 kilometers of the 114 kms total distribution lines constructed so far under this project, were constructed in the CAESS area. Proportionally, CAESS when judged against the size of its rural system, has received the greatest percentage of new rural line construction. Further, DISCEL initiated a public awareness program using newspaper, radio and television advertisement country wide, inviting applications for service. So far, since the start of the CEL awareness program, the submission of applications received has been limited. In the meantime, DISCEL is working on evaluating over 2000 applications for service that dates back many years.

CEL is processing, both old and new, applications as rapidly as they can with the limited staff assigned to this task. The review method being used is quite reasonable. A senior official makes a first cut of the applications. The application is reviewed to determine whether the area has received service since the application was filed. Then applications are reviewed for completeness and the need for additional information. For those applications that are complete, or made complete, the application is put through the DAM for a technical-economic analysis. Since the process is proceeding on a first-come first-serve basis, the older applications (primarily from the DISCEL area) do receive first review. DISCEL and NRECA may wish to look into a procedure that sandwiches in new applications, especially from areas previously served by the private sector. The fact remains, that whether applications come from the DISCEL area or from one of the former private areas, the profile of the consumer is similar and meets the target group of this program.

b. Home for the NRECA Program. USAID questioned whether DISCEL is the best place from which NRECA should operate. Officially CEL is the counterpart to NRECA. Within CEL, DISCEL is responsible for all distribution systems in the country except for the former CAESS operations which function directly under the CEL board. Given this organizational arrangement, DISCEL appears to be the proper place for NRECA to operate. However, in practice NRECA has been given a free hand to work directly with the staff of CEL or any of the former private utilities.

Further, the new Commercial Manager of CAESS is the former Manager of DISCEL. He is aware of the NRECA project and, during an interview with him, he stated that he is very supportive of NRECA's efforts and believe that CAESS also will benefit with new line construction.

c. Current Organization and Re-Privatization. On the subject of organizational arrangements, Gaither Consultants prepared a paper titled, Salvadoran Power Sector Re-Privatization Program, which suggested several approaches to privatization. Gaither presented two organizational charts, one showing the present situations and a second recommending a proposed interim organization. These two charts follow as "Charts IVG1-1 and IVG1-2" The concept is acceptable, except it may take more time to achieve results than suggested in the Gaither report. In the meantime, if the project is to continue, NRECA must find the best means to satisfy rural electrification development under the present conditions -- while looking to system improvement that will fit best the future privatization endeavor.

The GOES's stated policy is to sell the distribution system to private operators. This change could come soon, but considering efforts needed to overcome the status quo, it may be several years before the transition is completed -- or even started. Gaither's suggestion looks to an interim "authority" being created, under which all distribution groups will be placed, including DISCEL and CAESS. The short term problem with this notion is that management of this new Authority, to be created within CEL, most probably would come from CEL. While CEL could obtain staff from CAESS, in all probability management would come from DISCEL -- and DISCEL does not have the depth of expertise to fill their own management requirements, let alone form a new layer of management. In the meantime, and until the government takes the first step towards privatization, NRECA should be aware of USAID's desire for "even-handedness" and develop procedures that will support this concern.

The Evaluation Team found that NRECA was aware of the need to serve all rural areas, not just the DISCEL distribution system. They are doing what they can to bring rural electrification to all areas as expeditiously as practical while serving areas having the highest economic viability. The NRECA project basically is with CEL, not just DISCEL, and should remain so until the disposition of the distribution systems move to the next step of privatization.

2. USAID Oversight and Cooperation.

The evaluation team found that the cooperation between USAID and NRECA-CEL is excellent. CEL officials unanimously expressed their satisfaction with the USAID monitoring role. The NRECA Resident Advisor also expressed satisfaction with the assistance he receives from the USAID Project Office in RDO. Within USAID, IRD plays a key role regarding technical issues and appears to work in a collaborative style with RDO. NRECA monthly progress reports are sent both to RDO and IRD.

PRESENT ORGANIZATION OF THE POWER SECTOR
(AS OF JANUARY 20, 1990)

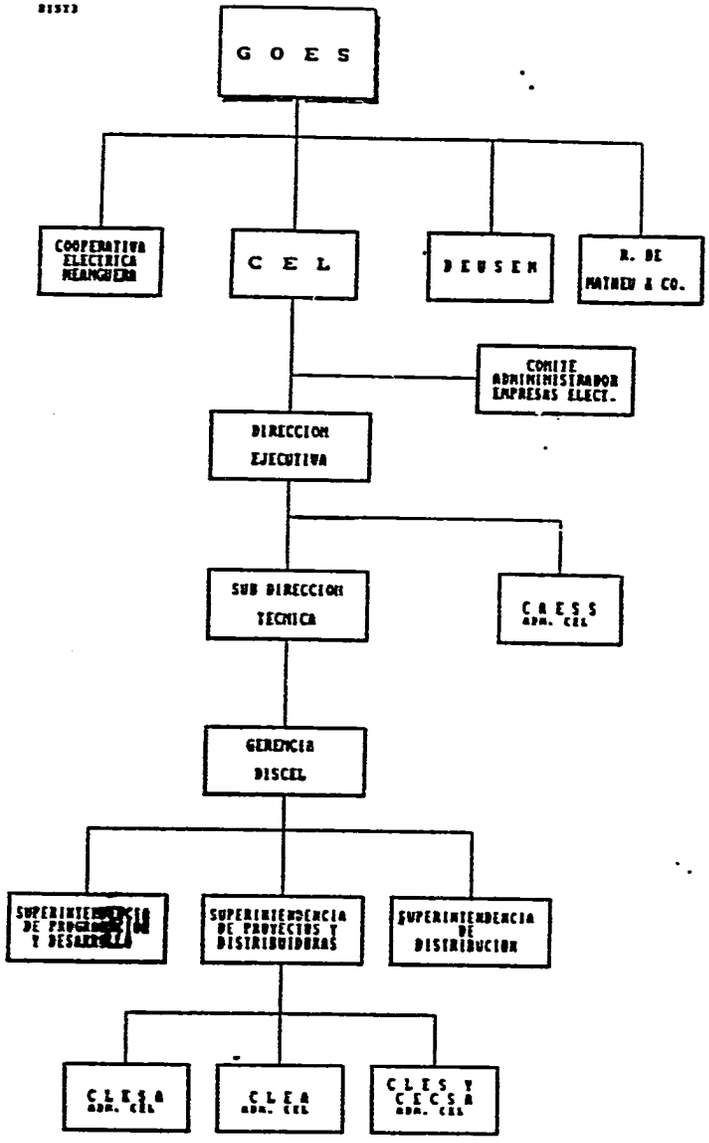


Chart IVG1-1

PROPOSED INTERIM ORGANIZATION
OF THE POWER SECTOR WITH THE
PROPOSED INTERIM POWER SECTOR REPRIVATIZATION AUTHORITY

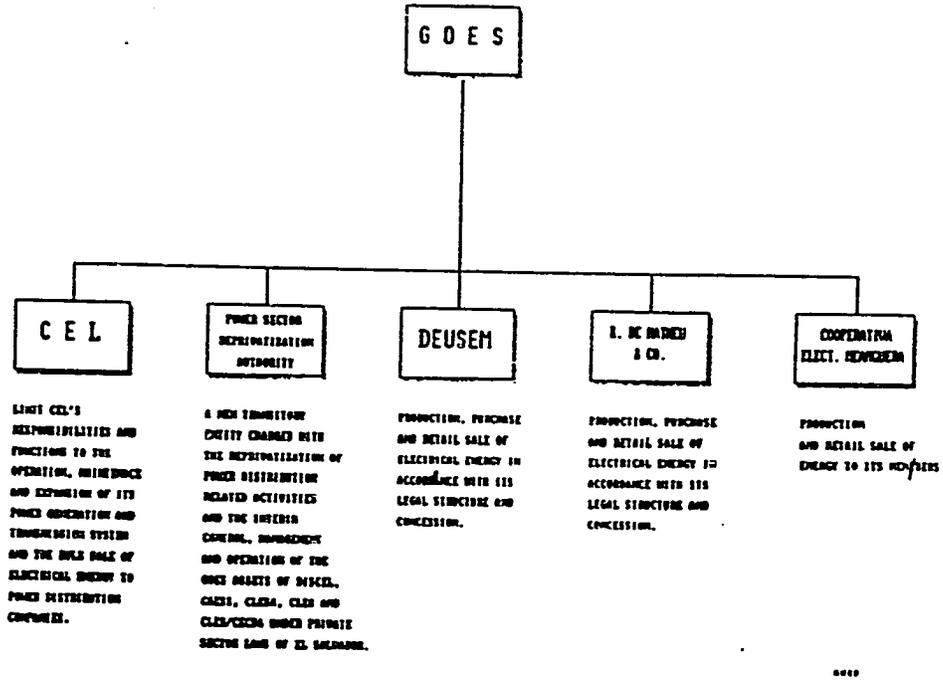


Chart IVG1-2

Charts taken from Gaither Consultants Report

V. Findings, Conclusions and Recommendations.

A. Major Recommendations.

1. Program Enhancement.

a. Finding. The NRECA original and supplemental proposals only considered service connections from distribution lines constructed under this project. Many of these new lines are only short extensions to older lines. Because there was no credit program available for house wiring when the original distribution line was constructed, many potential consumers originally could not afford to connect. However, there is a backlog of applications for connection to existing distribution lines which, for a number of reasons, DISCEL has not been able to satisfy. Under this new rural electrification program, NRECA is able to purchase meters at a much reduced cost, arrangements have been made with electricians to wire houses better and cheaper and credit is being made available by CEL. Consequently, many people under the old distribution system have expressed a desire to connect.

b. Conclusion. Connections to the existing rural distribution system will bring in new consumers rapidly and be very cost effective in social, economic and financial terms. The proportional cost per person served would be much lower than for connections only to new lines. Adding these service connections will cost money not presently programmed, but may be more cost effective than other planned elements. More funds may be needed, or decisions made on trade-offs, but the financial exposure can only be determined by a brief study. Also, these additional connections should improve the load factor for the distribution system.

c. Recommendation. NRECA should be authorized to prepare an in-house study (analysis) showing the cost for including connections to existing distribution lines. If these costs cannot be absorbed into the present project or AID is not willing to add funds, NRECA should suggest trade-offs for less economically and financially viable components. If the study is positive, then CEL, NRECA and USAID should add these services to the program.

2. Productive Uses and a Credit Program.

a. Findings. Great emphasis is being placed on the establishment of a "Productive Use" program to improve the distribution system financial viability (improved load factor) and, on the social-economic side, to improve the standard of living in the rural areas. It has been documented in other countries that the three critical parts of a productive use program are awareness, technical assistance and credit availability. NRECA appears to have developed a cost effective and highly visible approach to awareness. Their mobile demonstration operations show villagers potential uses of electricity to better their lives and income. NRECA and DISCEL demonstrate over twenty difference productive uses of electrical appliances and machinery that rural people can use to increase their income and

standard of living. These demonstrations draw a crowd of over 100 people each time they are given and the PU department is set up to do this several times a week if necessary.

What is missing at this time is the technical assistance and credit elements needed for a successful program. NRECA first proposed that DISCEL provide the technical assistance and credit through a special technical unit and include the loan servicing as part of their normal billing process. USAID vetoed this idea and required the credit program be run through a recognized financial institution. The credit program was delayed for almost two years while CEL and NRECA searched for a suitable financial institution interested in offering credits to small electric business consumers. Recently the BFA did sign an agreement with CEL to provide credit and offer technical assistance but real interest on their part in this program is lacking substance. During the PU demonstration witnessed by this team, the BFA representatives were not prepared to provide advice nor did they seem to be interested in the program. Further, BFA has a dubious track record in the technical assistance area.

b. Conclusions. USAID officials stated that it is not the bank's duty to provide technical assistance. That is true, even though the BFA committed themselves to provide this service. USAID stated that technical assistance will (or should) come from the private sector suppliers of equipment. That is a good philosophy of private enterprise but it fails to recognize that private enterprises are more interested in maximizing profits, not providing social services. Where sales can be made, service may be offered, but again only for the line of equipment being offered, which is not necessarily the most applicable. The U.S. recognized this deficiency when the agricultural extension services were created. The same is true here. The rural population does not necessarily know where to go for the best service. This is the case even when handed a list of supplier addresses.

Whether DISCEL has the expertise or not is questionable. But what they have, as a utility, is a desire to sell electricity -- a vested interest in making a productive uses program work. They have continual contact with the consumers and they can, and appear willing, to establish a technical assistance unit. Eventually, if the system is sold to a private operator or cooperative, the productive use unit would be included. Further, the distribution utility has a billing and accounting system in place to make loans (house wiring for example) and to make collections.

A good example of a productive uses program that worked is the Philippine rural electrification program. There every cooperative was given a small loan fund by the government's regulator and management authority as part of a pass-through of bi-lateral loans. It was the responsibility of the cooperative to provide technical assistance to member consumers wanting to use productive electrical equipment. It was in the cooperative's interest to assure that the equipment installed was the best and most efficient for the job. That way, the consumer was able to repay the loan, the community prospered and revenues increased. The key element was: all parties involved had a vested interest to making the project succeed. That is an ingredient missing in the El Salvador program.

The AID pendulum seems to have shifted from one where there was a heavy reliance on the government to provide free service to the present "market" approach where it is believed that private

enterprise will provide all services needed. There is a middle ground where some technical assistance (even if included as part of a loan) is required from the government to help small businesses with startup operations. In the U.S. the Small Business Administration is one group that provides that assistance. Many States have a similar program and farmer groups have their own. DISCEL may not be the best, but they probably have more interest and technical resources than the banks do at this time.

c. Recommendation. If the BFA credit process is not functioning well by April 1992, then USAID should reconsider its stand and allow DISCEL to serve as a lending agent for their rural consumers.

3. Small Scale Generation.

a. Findings. The original proposal included a component for the design and construction of a small hydro electric demonstration project. This element was included in the original Grant Agreement. Subsequently, the proposal for supplemental funds eliminated the pilot plant and said that NRECA would concentrate on technical assistance only. USAID, however, put the following language in the Project Authorization, Amendment No. 1, "....and to select, design, and construct a pilot project. Technologies other than hydroelectric may also be studied."

The Team does not believe there is a need to demonstrate small hydro technology since there are many small plants in existence throughout El Salvador. Most of these old plants are in a state of disrepair. The real issue is lack of maintenance; therefore, NRECA's talents could best be used to develop maintenance awareness.

b. Conclusion. The cost of developing small hydroelectric generation can cost between $600,000 to well over a million dollars per megawatt of power. To have any significance in a system with an installed capacity of about 1300 MW, USAID would need to put in more than $10.0 million in this single component to have any impact. In any event, this project is rural electrification distribution not power generation. NRECA is best suited to assist with the distribution and management problems and leave the small generation to other donors.

c. Recommendation. The requirement for design and construction of a pilot small hydroelectric plant should be deleted from the project. Money saved could be applied to adding service connections discussed in Recommendation V.A.1.

4. Consumer Costs for Connections.

a. Findings. It has been found in other studies that the greatest hindrance to the rural population in making a connection is the cost involved. CEL's policy is for the individual to pay for the line drop and meter (which then becomes the property of the utility company). In the case of

houses located away from the distribution line, the consumer also must pay for the line extension to the house, including transformers.

In the U.S. and in many AID supported rural electrification programs, the utility company owns the system up to and including the meter. The cost to the consumer is the internal wiring, which in itself can be substantial.

b. Conclusions. The financial burden on the consumer is substantial in El Salvador and deters many potential consumers from requesting a service connection. Furthermore, the connection charges are not uniform -- the cost depends on the location of a house in relationship to the distribution line.

The financial success of a utility company (or cooperative) increases with the number of service connections. The load factor improves and revenue increases. Also, it is more fair to distribute the system cost among all consumers. This can be done with the distribution utility paying for and owning the entire system, including the service drop and meter.

c. Recommendation. It is recommended that the utility company (DISCEL, private operator or cooperative) include the service drops and meters in their system development costs and not charge the individual consumer for these items.

B. Other Issues and Recommendations.

1. **DISCEL Management.** Many project delays can be attributed to the lack of timely and resolute decisions by DISCEL management. One such case is the decision to shift from a "lottery" to "competitive bidding" procedures. The decision to make the change was slower in coming than was necessary. Another case is in regard to rental of warehouse space and personnel assignments where decisions were postponed until the last moment. The same can be said regarding the promulgation of the new design techniques (staking procedures), assigning inventory and verification crews to the GIS mapping project, and slow or no action regarding from the voltage supply and load study recommendations.

One of the problems appear to be the turn-over rate in DISCEL staff assignments and the lack of available experienced managers. Most senior staff are dedicated but lack seasoning and management background that comes with years of administration assignments.

NRECA should consider offering an intensive management training course for the DISCEL top managers with special emphasis on decision-making. Regarding the turn-over rate, NRECA/USAID should obtain a written understanding from DISCEL on key staff assignments and their agreement not to make changes without first consulting NRECA/USAID. Any violation to this agreement would be elevated to higher GOES officials for resolution.

2. **USAID and SETEFE approval process.** The SETEFE procedures are too restrictive and do not provide sufficient flexibility for an implementing authority to use good judgement in making sensible implementation changes throughout the year. For instance, DISCEL is required to specify, one year in advance, the areas they plan to construct new lines -- down to a tenth of a kilometer. If a contractor is working in an area, and DISCEL sees the need for additional lines (due to receipt of new applications), they now do not have the flexibility of amending the contract to added this work. It must be programmed in the next annual workplan, necessitating the contractor to de-mobilize and re-mobilize a year later. Whether or not this is a SETEFE requirement, it is a practice.

It is recommended that both USAID and SETEFE examine their approval criteria and procedures to assure that annual workplans and other documents are approved in a reasonable length of time. Further, that these approvals provide sufficient latitude for DISCEL to make worthwhile mid-year adjustments in their program and not be micro-controlled by SETEFE.

3. **Disaggregation of data by gender.** Much of the information being gathered fails to disaggregate by gender. Disaggregation, where practical, should be done to satisfy AID's requirements as well as providing a valuable resource for future DISCEL planning. Baseline socio-economic studies should disaggregate data by gender where relevant. If practical, housing wiring applications should be disaggregated by gender. Statistics on visits to PU demonstrations should be disaggregated.

This issue was discussed with the NRECA Resident Advisor and he is aware of this recommendation.

4. **Monthly Report Summary.** Monthly summary reports lack information to track project indicators. The procurement tables lack totals. The tables should compare planned versus actual inputs and outputs. Overall the reports are well prepared and provide an excellent source of progress information, but the addition of the above information will make the reports even more useful.

C. Dialogue Issues.

1. **Need for a Public Utility Commission.** The present procedure to invoke tariff changes rests with the Ministry of Economy. A Ministry is not set up to continually track and act upon regulation and control issues of public utilities. Consequently, political concerns more often tend to drive decisions on whether to grant tariff changes. Furthermore, requests for review and adjustments in tariffs usually are delayed for long periods of time. Obviously, imposing increases in utility tariffs and taxes are never popular actions for a politician. And because of this, tariff increases are postponed for long periods of time. When the increases do come, the changes create substantial problems for the utilities. Recently in El Salvador, a tariff increase was approved in the range of 35% to 45%, but even this falls far short of meeting financial viability of the system.

There is a need for the GOES to create a Public Utility Commission headed by a fixed-term appointed Commissioner. NRECA and USAID should encourage the GOES to create this Commission.

2. **Re-privatization of the Distribution System.** Presently the government owns and operates all electrical generation, transmission and distribution systems in the country. The government ownership of the electrical distribution system is inefficient and not cost-effective in its operations.

There is general agreement within the GOES that privatization is necessary to shift the burden of development to the private sector and as a means of improving efficiency of operations. Several options are available to achieve a return to private ownership of distribution utilities. The first is to transfer (sell) ownership to cooperatives. The second is to sell the system to private operators.

The formation of cooperatives apparently can be done under present cooperative legislation. The cooperatives should be large enough to be financially viable, say two or three cooperatives country-wide. The only exception would be to return the urban section of CAESS to a private operator. If the GOES elects to go the cooperative route, DISCEL could be spun-off from CEL and made into an autonomous authority which would support the general needs of individual cooperatives with training, management and technical assistance, and be a conduit to pass-through multi- and bi-lateral grants and loans.

The second method of divesting itself of the distribution utility would be to sell off the assets to private operators. If this is the selected means of shifting ownership to the private sector, controls and conditions would have to be imposed to assure the rural areas would receive service. Since the rural areas will be on the low end of financial viability (even though they may have extremely high socio-economic returns), the private operator will be reluctant to make investments in areas of marginal returns without some pressure from the government.

VI. Lessons Learned

A. The CARES and NRECA-ES developed computer application, the "Demand Assessment Model" (DAM), has proved its value for site selection. The DAM incorporates a large number of socio and economic parameters as well as geographic and technical parameters. The DAM allows a more rapid determination of the economic rate of return than manual calculations. Consequently, it provides the opportunity to conduct sensitive analysis of changing parameters and to do "what if" types of calculations. It has the additional benefit of tempering political pressures for site selections by establishing a system of selections based upon technical, financial and economic indicators with everyone being treated equally. The DAM is a development resource that NRECA should consider sharing (possibly at a cost for this proprietary item) with other countries.

B. Rural electrification projects should not assume that consumers will connect their homes to electrical lines just because a line has been constructed. Connections in areas are a function of cost of the service connection, awareness and availability of credit. One way to reduce the service connection cost is for the electric company to absorb the service drop and meter installation as part of their system assets. In the long run, by adding more customers, the load factor should improve along with its financial viability.

C. Linkages between rural electrification and government sponsored social services are not attractive to power utilities. The non-payment of social service agencies' electric bills is part of the reason for the high debt of power suppliers. With certain exceptions (namely Costa Rica) schools do not include night classes with the arrival of rural electricity. One of the principal reasons why this occurs is the lack of budgetary resources to pay for the school's electricity or teachers. Health centers frequently do not have refrigerators in their budgets nor do their budgets include enough money to pay for electricity if one was purchased. Solving this obstacle is outside the terms of the NRECA program but it is a social development issue that government officials need to deal with in their overall development plans.

APPENDIX 1

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Project Title & Number: Rural Electrification Project (519-0338)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal (the broader objective to which this project contributes): To increase the availability and economic utilization of affordable electric service in El Salvador in order to increase the productivity and standard of living of its rural population.	Measures of goal achievement: 11. The supply of affordable and reliable power is provided to an increased number of villages, farms, rural enterprises, and homes. 12. Utilities are effectively managing their systems with minimal external assistance through the efficient use of available power, human, and financial resources. 13. The consumption of electricity in income-producing activity among existing and new consumers is greater. 14. The standard of living in rural areas as measured by improved housing conditions through the use of electricity in the home, in public and social services, and reduced drudgery is raised.	Utilities' commercial records. Utilities' records. Existence of qualified utility managers. Utilities' commercial records. Economic surveys in electrified areas. Utilities commercial records. Consumer surveys and social development studies in electrified areas.	Assumptions for achieving goal: 11. The GOES and NRECA execute a Memorandum of Understanding commensurate with the description and terms of NRECA's proposal. 12. The GOES local currency contribution funds are available to support technical assistance and construction activities when needed. 13. The civil conflict does not overwhelm the regions selected for project construction. 14. Needed complementary social, productive, and infrastructure investments are made. 15. The GOES and CEL maintain a supportive position toward sustainable long-term development of RE. 16. There are no catastrophic disruptions in domestic economic and financial markets.

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Project Title & Number: Rural Electrification Project (519-0358)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Project Purpose: To implement and demonstrate methods that are established for improving the delivery and end-use of electricity in rural areas of El Salvador.	Conditions that will indicate purpose has been achieved (End of project status): 1. New RE investment in high-priority economic development areas based on: o Rational investment selection driven by economic, financial, and development criteria. o Resource-efficient, least-cost construction design. o New, alternative power generation sources, where appropriate. 2. Existence of high-impact programs of promotion and demonstration in electricity use, including demonstration farms, credit and technical extension programs. 3. Establishment of efficient and self-sustaining management systems for RE system operation and maintenance.	Project status and evaluation reports. Utility records.	Assumptions for achieving purposes: 1. CEL management and personnel are motivated to adopt recommended changes in planning, carrying out, and managing RE programs. 2. The Central American Rural Electrification Support (CARES) Project (596-0146) activities in El Salvador are carried out in a timely and successful manner. 3. There are no prolonged power sector disruptions owing to labor disputes, guerrilla activity, international disputes with power-selling neighbors, etc. 4. Constraints on CEL's ability to set electricity tariffs are eased. 5. Other, non-power sector private and public Salvadoran entities participate effectively in planned productive-use program activities. 6. Laws and GOES/CEL policies permit the development of alternative forms of RE programs, including privately and cooperatively owned RE systems.

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Project Title & Number: Rural Electrification Project (519-0358)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Outputs:	Magnitude of outputs:		Assumptions for achieving outputs:
RE Distribution standards	RE standards developed. Cost of RE construction reduced by 5% minimum.	Program status reports.	1. Standards are uniformly used.
		Utility records.	2. Recommendations are implemented.
Improved RE management structure	Recommended, optimal management systems for project construction areas established.		
Improved RE operational systems and procedures	Work order procedures set up and in use. At least three new maintenance procedures set up and in use.		3. There is full cooperation by CEL staff.
			4. CEL trainees, facilities and equipment are made available.
Established demand-side management programs.	Minimum of two new DSM programs set up and in use. Peak demand reduced by minimum of 2%.		5. DSM programs are properly implemented.
			6. Spanish speaking trainers are available.
Trained utility staff:			
o Managers	15 key managers trained in utility management systems and practices.		7. Trainees can train others.
o Operations staff	Minimum of 25 engineers/operations staff trained in RE design and ops.		
o Technical staff	Minimum of 50 technical staff/linemen trained. Trainees train others.		

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Outputs:	Magnitude of Outputs:		Assumptions for achieving outputs: outputs:
Established productive use program to assist rural electricity consumers:	Permanent productive uses of electricity program established.	Project status and evaluation reports.	1. Utility staff effectively participate in productive-use activities.
o technical assistance	Minimum two productive-use extension agents trained. Rural electric productive-use consumers trained.	Utility records.	2. Non-power sector entities effectively participate in productive-use activities.
o training assistance	Credit extension program in place.	Agricultural cooperative records.	3. Rural electric consumers visit demonstration sites, are willing to invest in power equipment.
o credit assistance		Credit institution records. Rural electric consumers borrowing funds for productive-use of electricity investments.	4. Sites and materials for demonstrations are made available.
Productive use demonstrations for farm-uses of electricity.	Minimum of 20 on-farm demonstrations of electricity use set up.		5. Relative stability in RE construction areas is maintained.
Inventory of small hydropower resources, pilot project.	Small hydro inventory completed. Feasibility study, design, and implementation of pilot project completed.		6. Electricity is reliable and affordable.
Rural electric grid extensions.	800 km of distribution lines built serving up to 30,000 new consumers.	Contractor records	

PROJECT DESIGN SUMMARY
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NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Inputs:			Assumptions for providing Inputs:
Expatriate person-months:	Implementation targets	Project description	1. Qualified project management personnel are available on a timely basis.
Resident Advisor 48	(See Budget Figures)	Project budget data	
NRECA Professional 22			
Consultants 14			2. Qualified consultants and contractors are available on a timely basis.
Home office support 11			
Local staff person-months:			3. Necessary local personnel/services are made available.
Support staff 48			
Consultants 7			4. Materials and equipment are available on a timely basis.
Local construction contracts			
Allowances			5. CEL provides suitable facilities and support for project staff and consultants.
Materials and supplies			
Equipment			6. Funding approvals from USAID secured o

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Consultants 14			
Home office support 11			
Local staff person-months:			3. Necessary local personnel/services are made available.
Support staff 48			
Consultants 7			4. Materials and equipment are available on a timely basis.
Local construction contracts			
Allowances			5. CEL provides suitable facilities and support for project staff and consultants.
Materials and supplies			
Equipment			6. Funding approvals from USAID secured on a timely basis.
Travel, transportation, and per-diem expenses			
Office facilities and services			

Is a one year action plan appropriate?

Aren't the problems really indicative of a lack of planning on the part of CEL?

Other Comments:

- p. 2 para 3 AID and multilateral donors are pressing for reprivatization.

- p.3 last sentence, "And at this time..." either substantiate or drop. We assume that what is meant by investment is equity.

- p. 8 #3 please quantify "great strides"

  Why has DISCEL management not moved ahead no implementing the staking manual? Please make recommendations for improving implementation. Also see page 36 and make consistent.

- p. 9 para 3 is this appropriately a training problem or is it really an institutional problem? We are skeptical that training at this level will improve decision making. If there is a larger problem what can AID and NRECA do to improve the situation?

- p.15 "At this time...NRECA," CEL and AID

- p. 17 para 3 the statement that the new bidding procedures are in place is incorrect. They are still pending approval by CEL and AID.

  Evaluators should provi[illegible]dan explanation of why shift was required to competitive bidding process from lottery. As worded it appears that the decision was made unnecessarily.

- p. 18 "In fact..." A long term commitment may be necessary from the GOES but is inconsistent with the Mission's strategy set forth in the VXK. No major investments in the energy sector are ux:. Perhaps more appropriate would be a statement regarding the need for investment and that donors should be encouraged by the GOES and CEL.

- p. 21 "The Amendment also..." please explain rationale for this decision.

- p. 22 "NRECA feels..." Substantiate this comment or drop. As it appears it is clearly biased.

  para 2 reference is made to recommendation V.B.3 - where is this?

APPENDIX 2

Summary of Comments Received
(from USAID/El Salvador)

General:

- Executive summary must be submitted before review by Mission Evaluation Committee.

- Please provide an annex which extracts all recommendations. There are several good ones in the body of the text which should be aggregated.

- Entire document should be reviewed to eliminate prejudicial and biased statements. It is useful to remember that this is a public document and will be seen by all organizations participating in the project.

Major Findings (p.72)

1. Program Expansion. In reality the point is not to expand but rather enhance the program. Section should therefore be entitled "Program Enhancement". Recommendation should be proactive such as "If the study is positive, CEL, NRECA and USAID should add these services to the program." Specifically internal review recommended should identify hidden costs in the recommended expansion, and other negative impacts such as diversion of effort from other construction efforts.

2. Productive Uses and a Credit Program.

- This section overall lacks a sense of objectivity.

- It is noted that USAID vetoed the idea of provision of credit through CEL but no explanation is given as to why this decision was made.

- Background is needed in this section on what has already been done, i.e , NRECA study of available sources, description of existing BFA/CEL arrangement, the revised delivery system of credit, the guarantee arrangements etc.

- It should be noted that the current system with the BFA has only begun to function. The recommendation should give them 6 months to a year to produce results.

- The recommendation for an additional study on delivery of technical assistance and credit should be deleted. Such a study has already been performed.

- Page 76 paragraph 2 suggests that there is a better way to do the job. Evaluators should be specific. Please provide details on how this would could be accomplished.

3. Small Scale Generation. This section should be more sensitive to U.S. trade issues. Please delete all references to assisting in the review of Japanese investments in small scale generation. Modifications will also be needed on pages 57-58.

4. Consumer Costs. Recommendation should beÇÇ1596Xstated definite action not another study, i.e., the utility company should . . .

5. Other Issues

DISCEL Management

What management problem will be solved by training?

How would the evaluators suggest the turn-over problem be dealt with?

USAID and SETEFE approval process

In part the problems noted on page 80 have been resolved. NRECA or CEL can designate more areas than they are going to construction then choose from that list what they are going to construct. This has greatly alleviated earlier problems.

Constant statements deriding the approval process are incorrect and were not confirmed by interviews with the USAID Local Currency Unit or SETEFE,

The approval process for the 1990 Action Plan began with its submission on March 9, 1990 and ended with its approval on May 2, 1990. The duration was 7 weeks not months. (FYI there was no 1989 Action Plan)

The 1991 Action Plan was delayed due to a change in the contracting procedures. A.I.D. had good reasons in asking for the delay and good faith efforts on both sides are being made to develop better contract award systems.

This section should address the following questions and make recommendations as to what changes are needed:

- p. 32 para 3 this should be included in the lessons learned section.

- p. 33 please provide more details on CEL's current credit package for installation.

- p. 34 para 5 please elaborate.

- p. 35 para 2 language on the BFA should be toned down and based on facts rather than anecdotes and unsubstantiated claims.

  para 3 The problem here seems to be one of a planning overlap not the database. Since CEL builds all lines, as such CEL should be able to prevent overlap between NRECA and CONARA.

  para 3 last sentence. Unnecessary - delete.

- p. 40 para 1. Please check data on voltage levels.

  para 3. What is not noted here is why CEL has not done this. This is a very expensive process and not essential.

- p. 50 para 1 last sentence is unnecessary and unprofessional - delete.

- p. 52 para 2 should read "The evaluation team...courses. If this process is not in place we recommend that this be done with each training activity."

- p. 65 para 3. Given the attached information on approval time this information is faulty and should be deleted.

APPENDIX 3

List of Persons Contacted

Agency for International Development - El Salvador

Gonzales, Raul, Engineer, IRD/MID, USAID.

Kennedy, Deborah, Chief, Program Development Office, USAID.

Moseley, Charles, Deputy Chief, IRD, USAID.

Nagy, Tibor, Engineer, IRD/ENG, USAID.

Wise, Mike, Project Office of the Rural Electrification program, RDO, USAID.

Comisión Ejecutiva Hidroeléctrica del Río Lempa (CEL)

Aguillón, Lic. Salvador Alfredo, Aux. de Superintendencia, División de Distribución de Energia Eléctrica (DISCEL), CEL.

Alas, Luis, Chief Commercial Section (Superintendencia, DISCEL) CEL.

Bolañes, Leonel, Commercial Manager of CAESS (previously Superintendencia DISCEL).

Chavéz, Gustafa, Manager (Superintendencia), División de Distribución de Energia Eléctrica (DISCEL), CEL.

Oseas, Oscar, Jefe de Seción de Usos Productivos.

Vargas, Ing. Rudolfo Antonio, Jefe de Departamento de Información y Servicios al Consumador.

National Rural Electrification Association

Armstrong, Noemy, Administrative Assistant, NRECA-ES.

Clark, Paul, Regional Coordinator, NRECA/DC.

Kitson, Alden D., Asistente del Proyecto, NRECA. Primary duties include "Productive Uses Demonstrations."

Manon, Myk, Resident Advisor (Asesor Residente de Proyecto), NRECA.

Turner, Ross M., Rural Electrification Engineer, Central American Rural Electrification Support Program, Guatemala, C.A.

Others

Alvarado, Misael Monge, General Manager of Coopesantos R.L., Cooperativa de Electricación Rural Los Santos in San Marcos de Tarrazu, San Jose, Costa Rica, C.A.

Five Salvadorans living or working near Canton Punta Remedio, Sonsonate, the area where the first NRECA Project distribution lines were constructed.

APPENDIX 4

List of Documents Reviewed

Agency for International Development

Bangladesh Rural Electrification: Preliminary Assessment, (Final Report, deLucia and Associates, Inc., November 1989.

Bolivia: Rural Electrification, AID PROJECT Impact Evaluation Report No. 16, December 1980.

The Philippines: Rural Electrification, A.I.D. Project Impact Evaluation Report No. 15, December 1980.

Power to the People: Rural Electrification Sector, Summary Report, A.I.D. Program Evaluation Report No. 11, Wasserman and Davenport, December 1983.

The Product is Progress: Rural Electrification in Costa Rica, Project Impact Evaluation No. 22, Agency for International Development, October 1981.

Rural Electrification Annual Evaluation Report, AID Loan 522-T-033 Honduras, September 1980.

Comisión Ejecutiva Hidroelétrica del Rio Lempa CEL)

Convenio B.F.A. - CEL para la Aplicación del Sub-Programa de Creditos para Usos Productivos de la Electricidad, March 1991.

Plan de Trabajo 1990, Superintendencia de Programas y Distribuidoras, Departamento de Servicios al Usuario, December 1989.

Sistema de Control de Creditos, CEL/NRECA.

National Rural Electrification Association

A Proposal for a Rural Electrification Project in El Salvador, NRECA, June 1988.

A Proposal to USAID/El Salvador for a Supplemental Amendment, NRECA, April 28, 1989.

Analysis of Productive Uses of Electricity in Bolivia, World Bank Group, Ronald C. Orozco, November 1989.

Central American Rural Electrification Support Program - Fiscal Year 1991 Annual Workplan, NRECA-IPD, August 1990.

Central American Rural Electrification Study, USAID LAC Bureau, August 1990.

Demand Assessment Model Application in El Salvador, NRECA, Investigaciónes de Población y Mercado (IPM), Julio de 1989.

El Salvador Banco de Datos Proyectos de Desarrollo Rural, R.G. Asociados, January 1990.

El Salvador Rural Electrification Program - Workplan for Calendar Year 1989, NRECA, November 1988.

El Salvador Rural Electrification Project - Workplan for Fiscal Year 1990, NRECA, September 1989.

El Salvador Rural Electrification Project - Workplan for Fiscal Year 1991, NRECA, November 1990.

El Salvador: Uso Productivo de Energia Electria en el Medio Rural, Estudio Demografico y Socioeconomico, IPM, July 1989.

El Salvador: Uso Productivo de Energia Electria en el Medio Rural, Estudio Economico y Financiera, IPM, July 1989.

Implementation Guide for a Load Study, NRECA, 1991.

Initial Estimates of the Structure of the Marginal Cost of Rural Electrification in El Salvador, Steven C. Fisher, Planning Research Corporation, August 1989.

Memorandum of Understanding for the Rural Electrification Program in El Salvador, NRECA and CEL, January 27, 1989.

Metodologia Para de Evaluación de la Demanda y El Analisis de Sitios para Electrificación, Manual para el Usuario del Modelo (Version 1.6.8), CARES, Marzo 1990.

Mid-Term Evaluation of the NRECA Central America Rural Electrification Support Program (CARES), Oak Ridge National Laboratory, ORNL/TM-11567, September 1990.

NRECA Coordinación de Organizaciónes de Desarrollo Con el Programa de Usos Productivos de DISCEL, R.G. Asociados, October 16, 1987.

Programación Financiera: Otorgamiento de Creditos para la Adquisición de Equipo para Uso Productivo de Energia Electrica en el Medio Rural Salvadoreno, IPM, January 1990.

Propuesta De Alternativa De Creditos, Programa CEL-NRECA, Electrification Rural Para Usos Productivos, R.G. Asociados, San Salvador, March, 1990.

Recomendaciones Sobre: Comite De Seguimiento, BAnco De Datos, Alternativa Para Creditos, Compra De Equipos Demonstrativos, Informe Final, R.G. Asociados, January 31, 1990

Report of an Organizational and Management System, (Review of the Division of Distribution of CEL, El Salvador), Jim Morris, Executive V.P. Texas Electric Cooperatives, January 7, 1989.

Review of Productive Uses Equipment Pricing, A Case Study in El Salvador, NRECA, RG Asociados, El Salvador, May 1989.

Rural Electrification Program - USAID 519-0358 - Summary Report (monthly reports), NRECA-ES, May 1989 and January 1990 through February 1991.

Salvadoran Power Sector Re-Privatization Program (draft for discussion), Gaither Consultants, March 20, 1991.

Scope of Technical Assistance Services, Distribution Design Study for Comision Ejecutiva Hidroelectrica Del Rio Lempa, NRECA, December 22, 1988.

Small Hydro Resources and Private power Potential in El Salvador, Robert A. Chronowski (NRECA), October 1990.

Supply Voltage Study, CEL, NRECA and Stanley Consultants (CARES/AID Project No. 596-0146), February 1989.

Uso Productive de Energia Electrica en el Medio Rural, Estudio Demografico y Socioeconomico y Estudio Economico, R.G. Asociades, San Salvador, 1989.

OTHER

Geographic Information Systems for Rural Electric Cooperatives, C. H. Guernsey & Company, (undated 1989).

How to Use a Geographic Information System to manage Your Facilities and Maps, C. H. Guernsey & Co, February 1989.

Infrastructure Sector Assessment - Summary Report, Volume I, Tech International, Louis Berger International, Choussy, February 1990.

Infrastructure Sector Assessment - Electric Power, Volume IV, Tech International, Louis Berger International, Choussy, February 1990.

Modulo de Administración, Banco de Fomento Agropecuario, Programa de Microempresas, Nueva San Salvador, Mayo 1990.

APPENDIX 5

Scope of Work and Methodology

A. Scope of Work for Mid-Term Evaluation of El Salvador Rural Electrification Program.

General Evaluation Tasks:

1. Review all project and related documentation, including administrative and technical reports produced by project staff or consultants; as well as project papers, progress reports and USAID directives.

2. Interview key project personnel, utility counterparts and other participating institutions and/or affected institutions or parties.

3. Assess major project activities addressing management, technical scope, content and quality work; and assess effectiveness of technology transfer and the extent to which this meets the rural electrification needs o the Comisión Ejecutiva Hidroeléctrica del Rio LEMPA (CEL).

4. Study the nature of the interaction between the El Salvador Project and the Central American Rural Electrification Support (CARES) Project; and evaluate the extent of is support and effectiveness.

5. Prepare draft and final reports, and orally present major findings and recommendations prior to team's departure.

General Requirements:

1. Basis for review:

The team will be expected to review the project from the standpoint of original goals and objectives, and progress achieved toward meting interim goals. The team should also address the extent to which changes in any underlying assumptions for the project have changed or issues have emerged which would suggest changes in the project.

Findings and recommendations should be developed on both of the above bases, and presented to USAID/El Salvador. The team should pay particular attention to the needs expressed by CEL and the extent to which these are being adequately addressed by the project.

2. Management:

The team will be expected to provide constructive criticism designed to facilitate and improve management and execution of

the project in any areas where such input is determined desirable. This may include timeliness and completeness of reporting, quality of workplans, degree and nature of interaction with counterpart staff, financial management, home office support, appropriateness of output indicators and degree to which output indicators are met.

B. Methodology

The mid-term evaluation is to examine the progress of the project toward specific goals, the performance of NRECA and the Comision Hidroelectrica del Rio Lempa (CEL) in implementing the project. In general, the evaluation is to review issues pertaining to the overall project direction, its duration, funding levels, etc. In carrying out this assignment, the team found that the original and revised log frame, at the purpose and goal level, failed to provide quantifiable indicators. Nevertheless, the team assumed performance levels based upon the general intent of the Proposal, Memorandums of Understanding and other program documents. There was neither enough field time or staff to perform a detailed evaluation; however, because the program is in its initial years of development, the macro-view provided by this evaluation should be sufficient for NRECA, CEL and USAID to make shifts in program direction.

The El Salvador rural electrification project evaluation team included a retired AID Senior Foreign Service Officer (engineer) and a social scientist (research specialist). The team spent three days in the United States in pre-evaluation review of a limited number of documents and held discussions with some of the NRECA headquarter staff. NRECA/DC provided an overview of the electrification project goals and objectives. They also provided a brief overview of the parent project, the Central America Rural Electrification Support (CARES) program operating out of the USAID ROCAP office in Guatemala.

The USAID/ES mission and NRECA-ES provided additional records, reports and miscellaneous information on the program development and progress. The bibliography (Appendix 4) lists the literature the Team reviewed on rural electrification and on the El Salvador setting before and during the field evaluation. The Team also held a series of interviews in Washington and El Salvador. Interviewees included USAID, NRECA-ES, CARES, DISCEL and CAESS staff members. See Appendix 3 for list of persons contacted. In addition to the interviews, the Team had open access to the files of USAID/El Salvador and NRECA-ES.

The Team spent fourteen work days in El Salvador with the AID Mission, NRECA and CEL staff. NRECA provided an overview of the electrification objectives and progress to date, as well as a background for the coming year's planned activities. One day was spent in the field to observe a "productive use demonstration" in the Province of La Libertad and one day visiting the first site

where project lines were constructed, Puntos Remedias, in Sonsonate.

On the last day in San Salvador, the Team presented preliminary findings and recommendations to the USAID Mission and NRECA. A draft report was provided both groups. Written comments were requested for guidance in preparation of the final report. Following the exit briefing, the Team returned to Washington, D.C. to finalize the final draft report.

APPENDIX 6

EVALUATION TEAM

RICHARD DANGLER, TEAM LEADER. Mr. Dangler, a Registered Civil Engineer in the States of California and Colorado, is a retired Senior Foreign Service Officer. He has over 30 years experience working overseas with private engineering firms and the U.S. Government. As Assistant Director in the Philippines he directed one of the largest and most successful rural electrification program financed by A.I.D.

ROBERTA (BJ) WARREN, TEAM MEMBER. Ms Warren, Sr. Associate for Management Systems International in Washington, D.C. was recently involved in two evaluations in El Salvador, CAPS and FEPADE. She has over 25 years experience in project design, management, survey research and evaluation projects, many of these in Latin America.