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WESTINGHOUSE

EL SALVADOR HEALTH SYSTEMS UTILIZATION STUDY

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Volume I

WESTINGHOUSE HEALTH SYSTEMS
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ACKNOWLEDGEMENTS

All members of the El Salvador Health Systems Vitalization Study Team wish to express their heartfelt thanks to all the Government of El Salvador Officials who assisted in making this study possible. The list of persons to whom credit should be expressed is too long to include here in this brief summary. However, note that in annexes of each report, lists of counterparts and persons contacted are included so as to give individual recognition to Salvadorans who contributed to this study.

Special thanks are expressed to His Excellency Dr. Napoleon Cardenas, Minister, Ministry of Public Health and Social Assistance (MSPAS); Dr. Juan Antonio Figueroa Aviles, Sub-Secretary, MSPAS; Dr. Humberto Alvarez Cruz, Director General, MSPAS; and Senor Jorge Ulloa, Director of Administration, MSPAS. All of these persons gave unstintingly of their time to providing guidance, direction, information, and expert advice to the team as a whole, as well as to individual members as circumstanced.

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the Government of El Salvador. Dr. Massey was assisted in these efforts by Dr. Guillermo Toledo.

It also should be noted that Dr. Massey authored a major section of the report pertaining to Emergency Medical Services and provided invaluable technical advice and guidance on all aspects of the study.

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The team expresses its special thanks and appreciation to Ms. Paula Feeney and Ms. Susan Merrill who joined those team members remaining in El Salvador over the interval from June 1st to June 12 and who made numerous important contributions to the various reports. Particular appreciation is extended to Ms. Feeney who provided an excellent briefing to the team leader prior to his departure to El Salvador.

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I. Introduction

A. Background and Process

The El Salvador Health Systems Vitalization Team carried out a pre project paper design study over the interval May 8-June 12. A total of 12 persons contributed to the study (See Annex A of this statement). Of these, 8 persons were completely supported under Westinghouse contract. Travel and per diem costs were paid on behalf of Dr. Marcello Vernengo who was assigned to the team by the Pan American Health Organization (PAHO). However, all 11 partaicipants functioned as a single team under the technical direction of Dr. James R. Jeffers, who served as Team Leader under Westinghouse contract.

Dr. Jeffers received two days briefing: One day at Westinghouse Health Systems, Columbia, Maryland, and one day briefing at AID/LA Department of State, Washington, D.C. Mr. John Henson and Mr. Joseph Haratani also received one day briefings from AID Washington.

A total of eight persons were in El Salvador on May 8. Others came later and departed at various intervals during the course of the study. The Team Leader was in El Salvador during the entire period of study.

On May 9th, the team held an organizational meeting and developed its tentative work plan. Team meetings were held every Thursday throughout the courses of the study and on three occasions when special circumstances warranted special meetings.

After an initial contact with the Ministry of Health Officials on May 10, all team members were assigned one or more counterparts with whom they worked closely throughout the course of the study. Regular meetings were held with the Sub-Secretary, MOH and his staff, every Wednesday during the period of study.

The Team Leader was in contact with Dr. John Massey, Division of Human Resources and Humanitarian Affairs, AID/ES on a daily basis. Weekly meetings, usually every Friday, were held between the Team Leader, Dr. Massey, the AID Mission Director and/or Deputy Director, and other AID/ES officials and team members as appropriate.

Ms. Paula Feeney and Ms. Susan Merrill arrived in El Salvador on June 1st to draft a project paper based on the study team's findings and analysis. Ms. Feeney and Ms. Merrill worked closely with the Team Leader and individual members of the team, attended several meetings held among MOH and AID/ES and team members, and attended several individual meetings with MOH and AID/ES officials, the latter concerning strictly project paper matters.

In summary, the team worked closely with MOH and AID/ES officials at all levels, as well as with AID/Washington personnel during the course of the study.

B. Reports

Recognizing that the ultimate use of the team's reports was for the purpose of preparing an AID project paper, an effort was made to combine reports whenever possible so as to facilitate AID project paper preparation. Reports were combined as closely as possible to conform to the major project components as defined in the Project Identification Document (PID) of which there are three. A fourth component, Emergency Medical Services (EMS), was added one week after the team's arrival, prompting the addition of Dr. Massey to the team who took principal responsibility for this fourth component. These matters were discussed with USAID/ES officials who provided approval for this reporting approach.

As a result of the purposeful combination of the subject matter covered in each individual's scope of work into fewer but more useful reports, a total of nine reports were produced as a result of the team's activity. These reports are listed in the following table:

TABLE 1

TITLES AND AUTHORS OF EL SALVADOR

TITLE OF REPORT	AUTHOR(s)
1. Health Supplies Management	Mr. George Kraus Mr. John Henson Dr. James Jeffers, (Team Leader)
2. Maintenance/Vehicles	Mr. Carlos Pereira
3. Maintenance/Medical Equipment	Mr. Richard Betron
4. Economic Analysis	Dr. Ronald Vogel Dr. James Jeffers, (Team Leader)

5.	Management Information	Mr. Rafael Martinez
6.	Water and Sanitation	Mr. Joseph Haratani
7.	Malaria Control	Dr. Larry Cowper Dr. Mauricio Sauerbrey
8.	Drug Quality Control	Dr. Marcelo Vernengo
9.	Emergency Medical Services	Dr. John Massey

Note that Dr. Jeffers (Team Leader) contributed to two reports, and did not submit individual report as contemplated in his original scope of work. The reason for this is that the material included in Dr. Jeffers' original scope of work was most suitable and in many respects essential to the Health Supplies Management Report, which in turn was developed as a composite of logistics and procurement, the titles of the scopes of work originally assigned to Mr. Kraus and Mr. Henson. Since the content of Component I of the project, as identified in the PID, broadly labeled Health Supplies Management, logically encompasses both logistics and procurement, the reports of Mr. Krause and Mr. Henson were combined as a single report. Since the material involved in Dr. Jeffers' scope of work also most explicity is of relevance to Health Supplies Management, this material was also filtered in the text and annexes of the joint Kraus and Henson Health Supplies Management Report.

Dr. Jeffers also assisted in revising and drafting the Economic Analysis section of the draft project paper at the specific request of AID. Two other reports, related to Malaria, were combined into a single report. Since both the reports of Dr. Sauerbrey and Dr. Cowper concerned the topic of Malaria Control, their efforts (malaria control design and an initial environmental examination (IEE) of the use of malaria insecticides)

both of these scopes of work and resulting reports were combined into a single jointly authored report. The procedure of reporting was approved by AID/ES. Finally, an extra report, EMS, was authored by Dr. Massey as a result of adding this component to the project after one week of activity as already mentioned above.

C. The reports in total constitute nearly three hundred pages of documentation. Therefore, it is not possible to do more than very generally describe the team's major findings. Major findings are listed immediately below:

1. The team continued and elaborated on the need for the type of project originally contemplated for El Salvador as described in the PID. The PID definitely was on target and entirely appropriate. However, the level of funding originally suggested was found to be fully inadequate to effect even a "quick fix" of the Salvadoran health services developing system in the areas of logistics, procurement, maintenance and mangement information.

2. The team was able to verify completely the major findings of the Faich/Coppedge report concerning the need to provide additional, if not massive, resources to strengthen their capacity of the health services delivery system to deal with trauma and casualties due to conflict and social unrest in El Salvador. The team recommended an additional amount of funding equal to nearly twice the amount of the total project funding as originally specified in the PID for the purposes of strengthening EMS in El Salvador.

3. The team found the MOH to be woefully deficient in vehicles, equipment, drugs, medical supplies and maintenance and repair programs including spare parts and tools. Inventory control Management, warehousing and logistical support systems are in places but are poorly managed largely because of a shortage of materials and technical assistance which has demoralized the system. A serious problem exists in the lack of reliable information on which to base management decisions. Therefore, it is clear that there is a definite need for MIS support, and U.S. technical assistance, as well as for commodity support.

4. Malaria Control Programs are almost in a state of collapse and malaria is a major health problem (93,000 verified cases in 1981) that potentially could explode in the future.

5. There is a definite need for the contract start-up activity in order to facilitate the implementation of the project. The team provided scopes of work for these activities.

6. The MOH is extremely cooperative, worked extremely closely with the team and can be relied upon to work enthusiastically to implement the project as well as participate fully in precontract activities necessary to facilitate actual implementation.

In summary, the team concluded that the project addresses the most urgent needs that the MOH is facing today and for near future. The team strongly recommends that the project be funded to the maximum level possible and implemented rapidly.

ANNEX A

EL SALVADOR HEALTH SYSTEMS VITALIZATION STUDY TEAM PARTICIPANTS

AFFILIATION AND DUTY	PERIOD IN EL SALVADOR
I. Westinghouse Participants.	
A. Dr. James Jeffers Team Leader/Health Manpower	May 8 - June 11
B. Mr. George Krause Health Supplies Management/ Logistical System	May 8 - June 4
C. Mr. John Henson Health Supplies Management/ Procurement	May 8 - June 4
D. Mr. Carlos Pereira Maintenance/Vehicles	May 8 - May 28
E. Mr. Richard Betron Maintenance/Medical Equipment	June 1 - June 12
F. Dr. Ronald Vogel Economic Analysis	May 15 - June 4
G. Mr. Rafael Martinez Management Information	May 8 - May 20
II. Washington/WASH	
A. Mr. Joseph Haratani Water and Sanitation	May 8 - May 28 and May 2
III. Local Expert (Westinghouse)	
A. Dr. Mauricio Sauerbrey Malaria Control/I.E.F.	May 8 - May 25
IV. AID/Washington	
A. Dr. Larry Cowper Malaria Control/I.E.E.	May 18 - May 27
V. AID/EL Salvador	
A. Dr. John Massey Project Manager/EMS	May 8 - June 12

VI. PAHO

A. Dr. Marcello Vernengo
Drug Quality Control — May 15 - May 28

June, 1983

SUPPLY MANAGEMENT REPORT

Prepared by
George Kraus and John Henson

A. Situational Analysis

1. Background and Present Situation

a) Existing manuals and analytical documents indicate that in the mid seventies MSPAS conducted studies of its procurement, supply management, warehousing, and MIS systems. In 1978 a warehousing manual was published, followed in 1981 by the production of a procurement manual. Also, in February of 1981, the systems unit published a manual describing the function of a supply information system, using the administrative structure described in the above warehousing and procurement manuals. These three manuals provide a description of management systems that currently should be in operation. Unfortunately, the system was not implemented completely, nor have those elements in use been evaluated in a consistent manner. Thus, most discussion with ministry personnel concerning the actual supply management system in use necessarily is anecdotal.

The supply-distribution system in terms of operation has also been complicated by indifferent human resources management, including ambiguous hiring policies, absence of training strategies, little supervision, and few, if any, formal incentives.

b) Sub-Secretary level discussions indicate a commitment to upgrade and revitalize the MSPAS management structure, supply and distribution system, transport, maintenace, and MIS in order to provide health delivery services to 85 per cent of the Salvadoran population.

c) MSPAS services are provided on a variety of levels, from hospital to mobile units. The supporting logistics system is designed to respond to demands as determined on the facility level (See Chart No. 1 for Regional Breakdown of Facilities).

2. Operating Facilities

There are currently 319 service facilities in El Salvador (See Chart No. 1) of which 45 have been closed or are inaccessible due to civil conflict. These facilities, with the exception of hospitals, are dependent administratively and logistically on Regional Offices (Chart No. 4) provides a table of organization of a Regional Office. Each regional headquarters provides logistical support and supervision for health center, health units, health post, and mobile units (See Charts Nos. 5, 6, 7, and 8 for Tables of organization). Regional hospitals currently receive logistical support and supervision directly from the central level, through the office of the director general and direction of operative services. Due to population displacements produced esentially by the civil conflict, some operating facilities have been upgraded (e.g., Health post to health unit and health center to health unit) to provide additional services to an increased patient load (this

was noted in the Western Region). There are also 54 mobile health units to support No. 158 health posts. However, only 40 mobile health unit vehicles were reported as operational during the first quarter of calendar year 1983. Charts No. 9 through 12 show the grographic territory and population of each region. Chart No. 13 provides the total salaries personal on regional level, and chart section No. 4 contains total personnel breakdown by region, including hospitals. The salaries staff is augmented by additional personnel either contracted directly by MSPAS, or employed at day rates through arrangement with the Ministry of Finance.

The health care delivery system operates with six types of facilities. They are briefly described below in descending order of sophistication of the health services provided. In theory, there is a system of upward referral from the least complex to the next tier in the system.

1) The Hospital, of which there are 14, provides the highest level of health care.

2) The Health Center, offers out-patient services and hospitalization for easily treatable patients, especially women in childbirth and pediatric care. The centers have a broad range of action in the field of preventive medicine.

3) The Health Unit, has no hospital beds. It is served by physicians and nurses, but does not have 24 hour staffing. These units generally close at 4 PM. Most professional personnel commute to health units, and are thus not available to provide emergency services.

4) The Health Post, is the most basic establishment. Although it has the same functions as the Health Unit, it has no permanent physician on its staff. However, a physician is supposed to visit one or two times per week - as part of mobile unit team consisting of a physician, a nurse, and ocassionally a public health inspector and a secretary. The Health Post is staffed by a nurse auxiliary. The rural health aides work with the Health Post or the Health Unit.

5) The Community Post, of which there were 34 in 1981, is to be visited one or two times per week by a health team consisting of a physician, a nurse auxiliary and a public health inspector.

6) The Health Dispensary of which thee were 6 in 1981, is attended by a permanent nurse auxiliary who is concerned with immunization, supplementary feeding, basic first aid and health education.

7) The Rural Nutrition Center (created under AID Project 519-0153) of which there were 23 operating in December'82, provides nutrition education and supplementary feeding to the most vulnerable population (children under 5 years old). These centers are staffed by local collaborators who receive a monthly bonus and supplementary feeding as well. In 1982, the regional distribution was as follow: Western (4), Central (5), Metropolitan (3) , Paracentral(8), and Eastern (3).

The establishment Nos. 3 through 7 assist in the provision of services in preventive medicine, especially to women, nursing monthers, and children. They offer nutrition education and serve as a vehicle for supplementary feeding. They work with family planning and immunization programs, as well as with the environmental program. It is the intent of this project to benefit the users of the establishments listed below, although some equipment may be provided to the hospitals from project resources).

d) Warehousing

1. Central Level - San Salvador

MSPAS has two major warehouse facilities, Institute of Urban Housing (IVU) and Matasano, and additional warehouse space at Candelaria, used essentially for the family planning program, and San Esteban, used for storage or maintenance equipment.

a) IVU warehouse. This plant contains 3,303 (m2) of warehousing space, divided by brick walls into 12 sub-warehouses, ten of which each have 210 (m2) of space, and number 11 (paper/stationary and office supplies) with 394 (m2), and number 12 (inspection returns, misc.) with 809 (m2). The plant is on loan from the Institute of Urban Housing. It is inadequately maintained, poorly vertiled, and divided in a manner that hinders efficient warehouse operations. Since the IVU Plant must be returned to IVU, it makes little sense at this point to upgrade existing warehouse space or construct additional facilities within the same compound. It has a staff of 35, of which 23 are day workers and not included in the annual budget. Six of these day workers are assistant warehousemen, each responsible for the reception, storage, and dispatch of medicines placed in one of the 10 sub-warehouses. Each assistant warehouse keeper earns approximately 429 colones per month. There is a warehouse chief or manager who is responsible for the entire plant operation, an assistant, a quality control person, office staff, and assistant warehousemen. There is little efective communication between the procurement section, servicios operativos, and this warehouse.

b) Matasano is a warehouse complex that includes space for PLANSABAR, grains for feeding programs, and hospital supplies. There are 4,018 (m2) available of which 1100 (m2) could easily be converted into warehousing of medicines, etc. The plant is new, clean, and would need improved ventilation and temperature control in areas where sensitive products would be stored. This space would be suitable also for construction of a refrigeration unit. Additional space exists within the grounds for the construction of a 1500 (m2) warehouse building, that would have covered access to the warehousing space now available. Currently, MSPAS has 3 warehousemen thee to manage the grain section and hospital supplies. The facility is under utilized. The grain section (390 m2) is empty, and the equipment space (696 m2) contains small clusters of equipment that could be moved easily to another storage area.

2. Regional Levels:

Each of the five regional warehouses has an average of 200 (m2) storage space, most of it modern construction, although adequate ventilation is lacking in many cases. Most hospitals have between 120 (m2) to 200 (m2), though these storage spaces are generally old, poorly ventilated, and inadequately maintained.

3. Health center, units, and posts also have storage facilities sufficiently adequate for two month supplies of essential items; however, ventilation is the most salient problem.

B. Transport

As the vehicle maintenance report indicates, transport has also between a contraint to the distribution of medicines and products. Transportation is further constrained by civil strife, either through destruction of infrastructure, e.g., bridges and railway stock, or causing all transport to function at reduced levels due to road blocks and need for such security measures as movement in columns.

C. Distribution Management System

1. Central Level

Distribution of medicines and medical supplies is coordinated on the central level by departments of three MSPAS directions. 1) Administrative Services, 2) Operative Services, and 3) Technical Services, (See Chart No. 2). Operative Services, however, has the key role in the management system: here distribution decisions are made and information regarding central warehouse inventories, receipts, and dispatches are retained. Control over distribution is maintained by checking requests from hospitals and regions against amounts of medicines and medical supplies programmed (programming based on annual request from each region and each hospital, a total of 19 intermediate distribution points), balances on hand (from inventory reports), utilization rates, and availability on central level (stocks in central warehouse). Orders are transmitted to the central warehouse (IVU) from Operative Services or processed directly by the central warehouse, which also has a copy of the annual program plan.

Transport is made available from the transport section upon rquest by Operative Services or the chief warehouse person. Drivers receive a manifest of products assigned to intermediate distribution points and return with a signed copy as proof of delivery.

2. Regional Level

Medicines and equipment are dispatched by truck and mobile units to health centers, health units, and health posts. Receipts return to regional warehouse. A cardex register for each product is kept on file and utilized for inventory central. This same simple cardex system is used in operating facilities, including hospitals. Drugs, medicines, and medical supplies are distributed by medical personnel directly (mobile units), or through small pharmacies in health centers, units and hospitals.

a) Cold Chain: The cold chain currently in place is designed to support a vaccination program and transfer other pharmaceutical items that need special temperature controlled storage. The products are secured on national or international level and are transferred from central level to regional levels through a series of administrative and logistical links that are inefficient and undependable. At the central level MSPAS uses a small cold storage unit (20 ft (ft2) located in its IVU warehouse and, also, a cold storage unit at the National Brewing Company. Transfer of international shipments is done at the International Airport, which has a cold room unit, to regular MSPAS transport without refrigeration unit. Each shipment is then sent either to IVU or Brewing Company cold storage facility. Products are then transferred to hospital and regions with minimal planning, supervision and coordination, utilizing ice chests when available. Regional warehouses and hospitals each have a minimum cold storage capacity of (20 (ft2)), augmented by refrigerators of varying numbers, sizes, and states of condition. On the Regional level the transfer of product is accomplished from warehouse to facilities by ice chests when available. Health centers and health units each have approximately 20 (ft 3) of refrigeration units. Health posts usually have a 10 (ft 3) refrigerator. Mobile health units carry products in ice chests or thermos bottles.

Cold storage facilities on the Central Level are antiquated, insufficient in capacity, and undependable. The Regional Level facilities, on the whole, are a reflection of the National Level and need additional capacity and, in some cases, replacement of existing equipment.

b) The logistic cycle

The complete logistics cycle, 1) selection, 2) procurement, 3) distribution, 4) utilization is a twelve month process that includes the following activities:

1. Regional facilities determine quantities of medicine and supplies - July-August.

2. Regions and hospitals transmit lists to central level (Direccion de Servicios Operativos) - Aug-Sept.

3. Central Level (procurement and operative services) compiles and selects in accordance with budget - Nov-Dec.

4. Tendering are held and orders are placed - Jan-Feb-March.

5. Products usually arrive at central level - May-June

6. Products distributed to hospital and regional warehouse - June-July.

7. Products ar regional operating facilities -July-Aug.

c) Budget

1. In comparison to the social security health systems, salaries of key logistics personnel (warehouse, procurement, transport, maintenance) are relatively low approximately 30-40 per cent less than positions of similar responsibility.

2. In 1983, two million colones were budgeted for gasoline and oil or 6,689 colones, per vehicle, (299 vehicles in operation), an amount that would provide a minimum of a 1000 gallons per vehicle, plus oil and lubricants. An analysis of the first quarter fuel consuption for vehicles in the mobile unit program indicates a mileage rate of 8 miles per gallon. The total 1983 budget for tires and tubes was 145,000 colones.

3. Maintenance of vehicles for cal year is budgeted at 243,000 colones, no funded have been set aside for warehouse repair or maintenance.

D. Analysis of Distribution System

a) MSPAS has not developed a coherent distribution strategy. Products move through the system with little supervision. Operative services has no administrative support staff; central warehouse operation is antiquated, cumbersome, and inefficient. (Approximately one million colones were lost last year due to inefficiencies in this system). Information regarding inventories, product movement, warehouse personnel is not organized or easily accessible. The warehouse manual is not adhered to; training of personnel is not done; supervision is negligible; management is passive, without goals or objectives.

b) The regional level is best described as a reflection of the central level. Among observations listed in the 4 regional management audits (diagnostico administrativo) completed during 81/82, the following provide an indication of some problems identified in the logistic cycle: 1) inventory records not up to date, 2) ignorance of inventory controls, 3) shelves insufficient or inadequate, 4) ignorance of physical balances in warehouses, 5) inconsisted storage grouping of medicines, 6) ignorance of safety stocks levels, 7) excessive investment in certain types of medicines due to uncontrolled ordering, 8) dupplication of stocks, 9) no control (file) over requests for resupply, etc.

c) In brief, current procurement practices, warehousing and distribution management, are the most serious constraints to the revitalization of the MSPAS logistic system.

E. Major Constraints of Problems

a) MSPAS does not establish inventory, warehouse, transportation strategies, set implementation targets, or conduct evaluation of progress and results. Management of the logistics system is diffuse, operating units are loosely related, and there is no continuous and reliable information flow to support management of products.

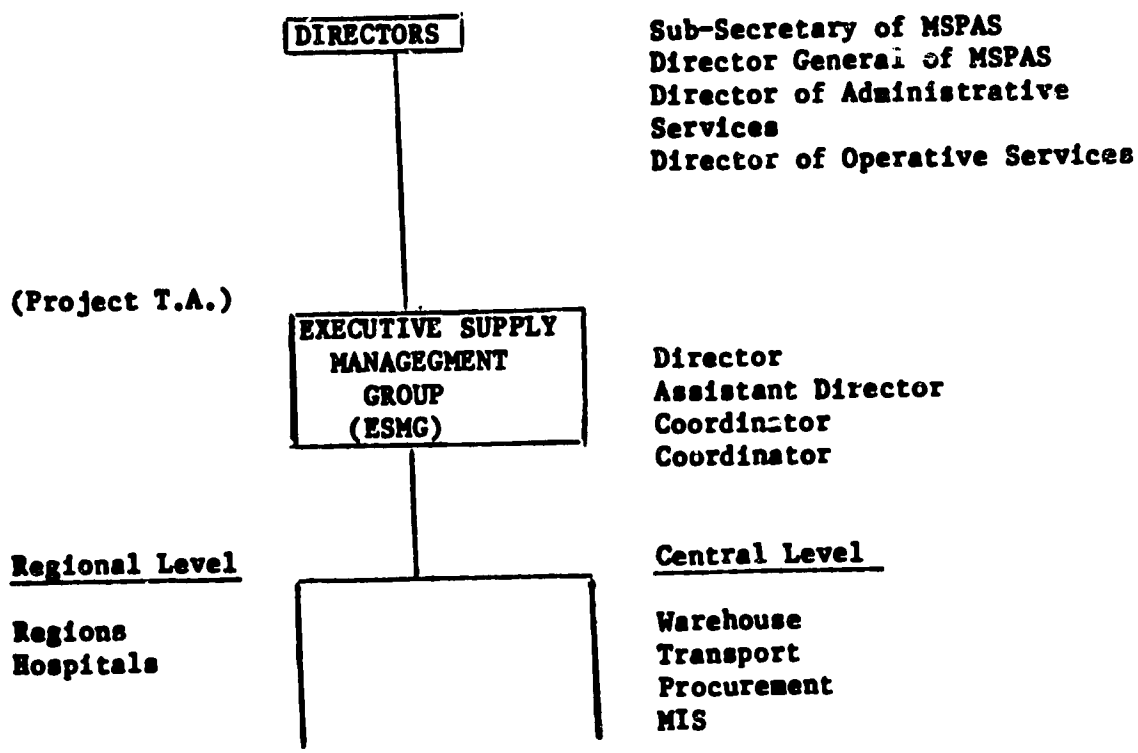
b) Budget: with an improved management system MSPAS will be able to deliver services with more efficiency. However, the 1983 budget contains 9.8 million colones for the purchase of medicines, or 65% less than the total amount requested by the operating facilities (a value of 28 millions). Also, there is little budget for maintenance of vehicles, hospitals, equipment, and warehouse. Unfortunately, in terms of maintenance, warehousing has perhaps the lowest priority. Inspection of IVU and some regional warehouses (exception of Matasano) indicates that a maintenance and repair program is essential for effective operation. Also, an additional 1500 (m2) warehouse space at Matasano is necessary to replace the inadequate warehouse space at IVU.

c) Current procurement practices of commodities, supplies, and materials is another limiting factor that retards a system already constrained by low budgets and ineffective management.

F. MSPAS Response to Problems and Constraints

a) In terms of human resources, MSPAS does have sufficient personnel to manage an augmented distribution program in both short and long term. It is necessary to restructure management and thereby increase productivity. MSPAS has already recognized this problem, but has not gone beyond the analytical stage.

MSPAS has recently formed an Executive Supply Management Group to support delivery or services to all operating facilities. The following Diagram provides an idea of its structure:



1) Directors: The Sub-Secretary of Health is the Chairman of the Board of Directors, a group which meets at least once each month to review the work report submitted by ESMG, and discuss the work plan developed for the next month. Once the work plan is approved by the directors, the ESMG then has responsibility and authority for implementation.

2) ESMG: This group is composed of a Director, Assistant Director, two coordinators, and has direct access to secretarial and other support staff. Its primary purpose is to manage and supervise all logistics and supply-management functions of MSPAS. To accomplish this purpose, ESMG has the following tasks:

Planning,
Implementation
Supervision
Evaluation
Reporting
Training

For those projects financed through grants and loans by U.S.G., the AID Health Office will have a seat on the Board of Directors. Technical Assistance Advisors working in support of AID/MSPAS will coordinate their functions through the MSMG.

The ESMG will prepare all Financial and Discursive Reports and evaluations to satisfy the requirements of an AID financed project.

Currently, the ESMG work plan includes a series of activities in preparation for phase one of the AID/MSPAS vitalization of Health Systems project. These tasks include the reduction of vehicle inventories, hospital equipment inventories, and medicines and medical supply inventories, that are either absolete, unserviceable, or redundant. The ESMG will also 1) begin a management audit of procurement and warehousing facilities on Central and Regional Levels, 2) Develop plans for warehouse construction, 3) and prepare to manage the Distribution of supplies and commodities financed through the AID/MSPAS utilization project.

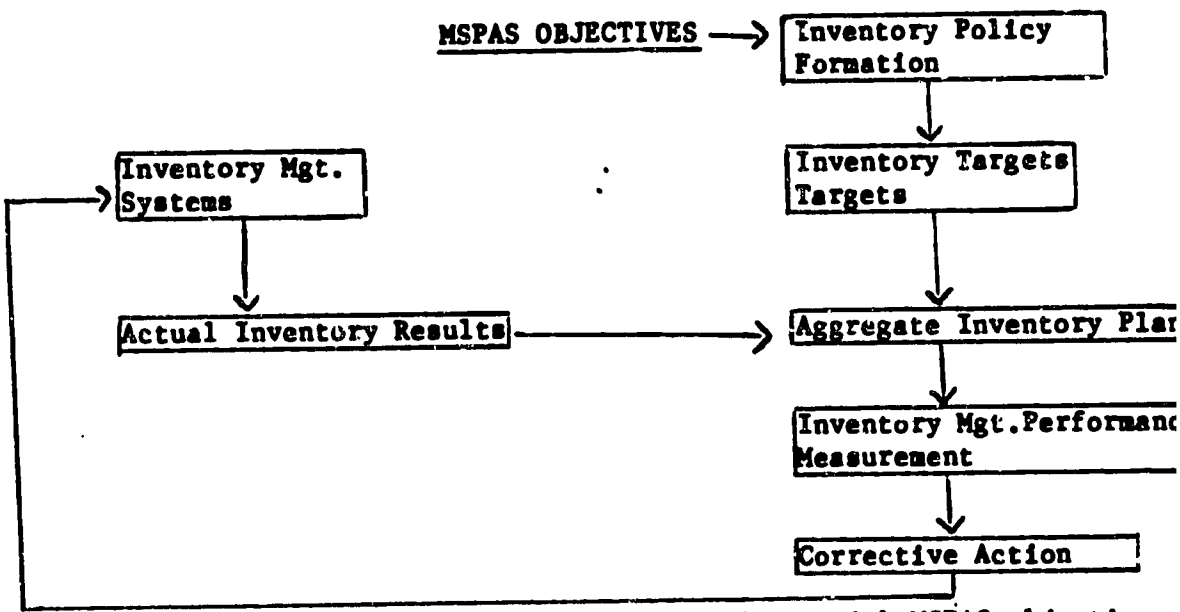
b) In the area of logistic management, MSPAS has obtained a consultant from the U.N. Technical Assistance Unit attached tothe National Planning Ministry 9Project ELS/78/010). This consultant is currently doing an analysis of the procurement part of the supply management system. He has produced a preliminary report,which has been made available to MSPAS a copy of which is attached to this report.

c) UNICEF has U.S. $74,000 available to support the refurnishment of the MSPAS cold chain. This fund can be utilized in coordination with inputs provided by this project. The T.A. supply management and procurement advisors should coordinate purchasing of cold chain equipment and supplies with the UNICEF representative.

G. Proposed Assistance Strategy

1. The Health Supply Management Component will assist the MSPAS Executive Supply Management Group (ESMG) develop an Inventory Management Policy, Procurement Policy, Warehousing Programs, and Evaluation Systems. The ESMG will, of course, also coordinate activities with 1) maintenance, 2) management information, and 3) Emergency Medical Service Components.

a) Inventory Management Policy: the below diagram provides an example of the inventory management process.



1. Inventory Policy is developed in accordance with MSPAS objectives, management structure, distribution capability, and financial structure.

2. Inventory targets take into consideration the following elements: Client targeting, timing, storage facilities, transport, budget demand, etc.

3. Aggregate inventory plan takes into account storage facilities on all levels, inventory targets, audit developed annually in coordination with service facilities and procurement. The ESMG will develop and use this plan during implementation.

4. Performance measurements such as order fill rates, prescription fill rates, inventory movement rates will be utilized as elements in continuous evaluation.

5. Corrective action should be taken on both regional, hospital, as well as central levels, on the basis of performance measurements developed as part of Inventory Policy

6. Feedback concerning corrective action taken will be utilized to modify stock positions, transfer commodities, modify part of delivery system, or change aggregate inventory plans. This information then becomes part of the performance measurement system.

b) Training

Training is an essential element of the project. OJT will be conducted dto ensure that management, administrative, and warehouse personnel are familiar with various aspects or the supply management system. Also, the ESMG, assited by T.A. and such host country institutions as the Institute of Social Insurance, will implement training programs to upgrade skills in warehousing, warehousing administration, inventory management, office administration, record keeping warehouse maintenance and sanitation, and reporting. The publication unit of MSPAS will prepare the training material. Instructors will be utilized from MSPAS and contracted from the ISS or other salvadoran training institutions. Programs will include: 1) seminars in San Salvador, 2) seminars in regions, 3) visits by MSPAS personnel to other operating agencies and institutions, both public and private.

c) Warehousing Program

ESMG will develop a warehousing plan for both phase one and phase two objectives:

i. Phase one objectives are:

a) Repair and modifty existing facilities on regional, hospital or central levels.

b) Systematize handling and storage procedures.

c) Systematize information system.

d) Prepare a set of universal guidelines that standarise receiving, storage, issuing, and shipping procedures.

e) Establish inventory system as management tool that provides the best information possible within an acceptable time frame.

f) In-country on the job training or regional and national warehouse personnel.

g) Coordination with procurement and Corte de Cuentas (Unit of Treasury) which supervises the utilization of all GOES property and equipment) concerning control and disposition of inventories.

h) Direct supervision of all warehousing and continuous evaluation of warehouse performance.

ii. Phase two objectives:

a) Construction 1500 m^2 new warehousing on central level.

b) Rehabilitation of 2000 m^2 warehousing on central and regional levels.

c) Production of procurement, inventory management, and warehousing manuals.

d) Printing

The project will also assist MSPAS upgrade its printing section. This will enable MSPAS to publish formats, guides, and manuals to support the restructured supply-management system. The equipment MSPAS now has on hand is inadequate and undependable. This will also support training programs.

2. End of Project Status

At the end of project the following sub-components will be optimally functioning with the MSPAS systems, under the direct management and supervision of the ESMG:

1. Sub-Component No. 1 - During two years the project will maintain inventories of medicines, medical supplies and equipment at optimal levels that will enable MSPAS to provide effective services to populations targeted for vaccination programs. Preventive and curative health care, in support of services provided by all MSPAS operating facilities. MSPAS will also have an upgraded procurement, storage, and delivery capacity, including a physical system of warehouses, vehicles, and a management system essential to the institutionalization of effective and efficient supply management.

2. Sub-Component No. 2 - MSPAS willhave a comprehensive warehousing plan. This aggregate plan will include regional warehouses, central warehouses, hospitals, and health units. Matasano will be expanded and upgraded, and regional storage units rehabilitated; with these additional upgraded facilities MSPAS will have sufficient capacity at the all levels. The IVU warehouse will gradually be phased out of the MSPAS system. In total, 3500 m^2 of warehousing will be rehabilitated or constructed on regional and central levels during the two year period. The two year project will also contain a budget for both commercial transport (truck, rail, air) and storage. This will allow the project to ensure movement of all supplies during the initial six month period should there be delays in procurement of vehicles or augment transport at critical periods (this line item should be subject to revision during the life of the project and transferred when feasible to support warehouse construction or maintenance/repair of vehicles).

22

3. Sub-Component No. 3 - The project will construct two cold rooms, one in San Miguel to support vaccination programs in the western region, and one in San Salvador, which will support the central and western regions. Each cold room will have an area of 30 m^2. The total estimated cost, including design, construction materials, labor, refrigeration equipment, and generator, is $83,000 per unit ($48,000 for construction and $35,000 for equipment). In coordination with the UNICEF input the project will also provide additional equipment as specified in Annex A. An upgraded cold chain will assist MSPAS increase coverage of its vaccination program, now reaching only 50% of its annual target.

IMPLEMENTATION PLAN

The following implementation plan has been for convenience separated in three parts: 1) supply management system, 2) cold chain refurbishing, and 3) warehouse construction and rehabilitation. Scopes of work are also attached for both long term and short term technical assistance:

1. Supply management advisor, 18 months

2. Supply management advisor, 6 months

3. Supply/warehouse management, 6 months

I. Component 1.b. Health Supplies Management-Procurement

A. Situational Analysis

1. Background and Present Situation

a) Relevant History

In 1976 Bustamante y Asociados, S.C., a consulting firm, made an in depth study of management and administration in the Procurement and Supply Management areas of MSPAS and developed a formidable manual outlining a proposed organizational structure, functions, responsibilities, authorities and procedures for a "Proveeduria Especifica del MSPAS". Included were more recommendations for the legislative codification of a law to govern the acquisition of goods and services for the Ministry and to create the Proveeduria Especifica. The legislation apparently fell through the cracks and was not passed.

Between February 1981 and April 1982 the Organization and Methods Unit of MSPAS implemented most of the Bustamante recommendations, issuing manuals with minutely detailed, step-by-step procedures, functional descriptions and organizational structures for the three major management components of procurement, i.e., programming, purchasing and expediting.

In April 1982 the Junta issued Decree Number 1083 which established the Law and the Proveeduria Especifica which the Bustamante study had recommended.

In general the written procurement procedures closely parallel those used in the United States by government agencies and the Law is broadly in line with American contract law as it pertains to procurement.

b) Present Policies

Implementation of the Law and the detailed procedural manual indicates no particular variance in policies in the area of procurement In the development of requirements for drugs, medicines and pharmaceuticals (drugs), however, the MSPAS is trying to implement a policy which will reduce the number and variety of drugs and establish a national formulary. This is a sorely needed policy and some success is being achieved. See paragraph 4 below.

Budgetary restrictions on and in the MSPAS adversely affect the caliber of personnel available in the Ministry to manage and administer programs and procedures. The procurement of commodities also is limited by budgetary restrictions. See para. 2.a. below.

Significant in its affect on the availability of locally manufactured drugs in the severe foreign exchange shortage coupled with the imposition of price controls by the GOES which operate as disincentives to the manufacturers and potential producers of drug products. See para 2.b. below.

c) Current Resources and Activities

1) Programs

Health improvement of the population of El Salvador was designated in 1978 as the first priority in the social sector of the nation's Five Year Plan and specific goals were established for improvements in the public health sector in 1981. The problems that have arisen over the past five years as a result of violence and economic disruption have prevented the achievement of these goals and the status of health delivery systems has greatly deteriorated. The MSPAS must now obtain foreign assistance to support the immediate need to obtain and distribute essential drugs, medical instruments and supplies, and equipment and spare parts. For the longer term the MSPAS programs will include efforts to improve and strengthen its health delivery systems.

2) Manpower

There is no apparent shortage of manpower availability in El Salvador, but, until budgetary limitations are eased or some other means found to provide incentives to attract and keep better qualified and more highly motivated middle and lower level managers and operational level personnel, the effectiveness of management and administration will continue to be limited. Training of personnel will help to alevlate some of this problem, but often, after receiving training and experience, employees of quality will leave the ministry for other jobs.

3) Budget

Inadequate resources at all levels. Allocation of funds for the procurement of spare parts and replacement equipment have been meager at best and, in 1983, there are no funds available for procurement of medical equipment. See para 2.a. below.

4) Operational Management Policies and Procedures

a) When the limited management information system were installed in MSPAS in 1976 the procurement area was not included in the systems. There is no automatic system in MSPAS which will pinpoint problem areas and bottlenecks in the procurement cycle. When a procurement clerk learns of a problem he may, or may not take action to resolve the problem and, if not, the knowledge that a problem exists will not be passed on to others concerned with the procurement. See para. 2.b.below.

b) Procedures, as written, are adequate for effecting procurement as long as there are no exceptional activities or occurrences in the cycle. Exceptions require management or administrative initiative and timely information for action.

c) Policy and procedures provide for expedited, urgent procurement when justified. Commodities have thus been procured in as little as four days locally and in less than thirty days from offshore.

d) Since 1978 MSPAS has maintained a national drug formulary of sorts, which, until recently had over 690 drugs on the list. Efforts are being made to reduce the list to approximately 200 or so essential drugs, more in consonance with the World Health Organization's recommended list of about 250. The original drug procurement program for 1983 had reduced the MSPAS list to about 400 items. The current emergency requirement of 156 line items does not conform to the WHO list due to the "quick fix" nature of the procurement. For the longer term, however, MSPAS is continuing its effort to establish an official national formulary in the line with WHO recommendations.

e) Determination of requirements for procurement is hampered by poor record keeping and inadequate information flow. Inventory control systems need to be integrated into an automated management information system and the information flow tied into the office making requirements decisions. See para C.1.a. (1), 2. (d) below.

5. Supplies and Materials

Drugs, medical supplies, vehicles, equipment and parts are needed at all levels of the health delivery system. Budgetary restrictions and foreign exchange shortages have precluded the acquisition of any medical equipment or spare parts since 1979. Over the years the procurement of medical equipment from many sources has resulted in no standarization, items from many countries, and instruction and maintenance manuals in various languages with few in Spanish. See para. 2.c. below.

2. Major Constraints or Problems

a) Budget

The major constraint that most seriously hampers health supply procurement is the limitations on funds. This applies to the actual procurement of goods. It is also felt in the management of the procurement system when salary levels are too low to attract and keep competent, experienced personnel. It also restricts training of personnel who do show promise.

b) Management, Policies and Philosophy

1) The management of procurement, eg., techniques and systems for alerting key managers in a timely manner of delays, bottlenecks, slippage, errors, etc., in the procurement cycle, needs considerable improvement. Information systems must be made more responsive to the needs of problem solving and must be automated to provide timely management data on a regular basis. Document flow in the procurement cycle may be interrupted by an office failing to act promtly on a procurement paper, but little action is taken (if any in the management arena, by anyone, to force the paper out of the holding office. For example: a procurement award document was held up in the Legal Office from the 5th of November 1982 until the 13th of May 1983 because the

Purchasing Office had inadvertently neglected to advertise the solicitation in the newspapers, a legal and procedural requirement. Had the Legal Office acted in an expeditious manner in rendering its decision, a new procurement action could have been initiated and the needed commodities obtained with minimum delay. It could not be determined if any action had been taken during the six months by responsible Procurement Department personnel to pry the document out of the Legal Office and/or failing that, what action, if any, might have been taken to obtain intervention by a higher authority. A functional Management Information System would have revealed the situation to higher level managers before it got out of hand.

2) During an inspection of warehouses, a large quantity of eye drops, amounting in value to over $167,000 U.S. were found which had been purchased in 1977. The eye drops were never distributed because the bottle size differed from what had been requisitioned. Competent management would have taken immediate action at the time of original receipt to alert the Procurement Department of the discrepancy. Likewise, the discrepancy should have been identified when Procurement reconciled receiving reports with purchasing documents. In either case action would have been prompted to resolve the problem.

3) Instances of short shelf life drugs passing their expiry date, which are still warehoused, are numerous. Again, the basic problem is weak, inefficient management practices. Such items must be handled differently and information maintained and used at each level of the supply delivery system to alert managers well before expiration dates are reached. The Procurement Department has a responsibility in this respect to properly identify such items on accompanying paper work, flaging it for special attention.

4) Lack of continuity in management has been a further contributing factor adversely affecting the efficiency and effectiveness of the Procurement Department, e.g., the Proveedor has been replaced four times in the past year.

c) Commodities, Supplies and Materials

1) Drugs, medical supplies and other expendables are in acute shortage throughout the health supplies delivery system. Some surgical instruments are in critically short supply. Vehicle are needed for transportation of supplies and personnel. Ambulances are in short supply. Vehicles and hospital equipment are in need of repair and maintenance, and there are acute shortages of spare parts in both these areas. Some hospital equipment is antiquated and unserviceable. Generators, air conditioners, cold chain equipment, X-Ray machines, etc., are urgently needed.

2) Some materials will be needed for renovation and rehabilitation of existing structures and the construction of new facilities. Hospitals, new and old, are in need of equipment from beds to autoclaves, etc.

3) Commodities and equipment will also be required to support programs in this project in malaria control, water resources and MIS, and to outfit the new drug quality control laboratory.

3. MOH Response to Problems and Constraints

a) Resources

Budgetary restrictions limit the Ministry's ability to improve the quality level of management.

b) Policies

Procurement policies (and procedures) are satisfactory, but management and administration needs considerable improvement. The MSPAS has made an effort to program resources to resolve some problem in spare parts acquisition by a policy to require that new equipment purchases include at least a 5 per cent increment of the equivalent value in spare parts.

c) Programs

Program development in the Procurement Department for improvement of management and administration are generally stagnant because of lack of funds for training and for improving salary and incentive structure.

d) Donor Assistance

A United Nations technical cooperation team is presently studying management and administration ion the Procurement Department. That group's findings, to date, generally confirm that the major problem in procurement management is ineficiency resultiong from the limited capabilities of personnel, insufficient training and the absence of motivation due to inadequate salary and incentive levels.

B. Proposed Assistance Strategy

1. Objective or Purpose of Component Assistance

The objectives and purpose of the procurement sub-component of this project is:

a) To facilitate the early acquisition of critically needed commodities for infusion into the health supplies delivery system of the MSPAS.

b) To restore the management and administrative capability and effectiveness of the Procurement Department, and to instituionalize this capability and effectiveness.

2. End of Project Status

At the end of the second year of this project, management systems (including information systems) will be functional, procurement flow will be efficient and management will be effective in avoiding, or promptly resolving, delays and bottlenecks in the procurement cycle. Controls will be in place to help prevent losses due to expiry of short shelf life items. Requirements development for all commodities, including drug selection, will be accomplished on a more standarized, routine basis, utilizing management information system inputs.

C. Project Sub-Component Description

This sub-component is designed to immediately infuse the MSPAS health supplies delivery system with large quantities of critically needed commodities during the early part of the first year. Direct technical assistance in procurement management, administration and training will also begin at the inception of the project and will continue through the end of the first year. During the second year the Supply Management Advisor (SMA) will assume functional responsibility to oversee and to advise the Procurement Department in its continuing efforts to instituionalize effective management and administrative techniques and training in the Procurement Department.

1. Outputs

a) Administrarive, Management, Operational, Policies and Procedures

1) Advance T.A. (two months)

a) Prior to initiation of the project a Procurement Management Advisor (PMA) will be brought in to review and refine specifications, determine probable sources, prices, lead times, special delivery schedules, compliance with AID regulations and to determine the need for and initiate waivers for source/origin and other requirements and/or to request approval of proprietary procurement, standarization, etc. He will coordinate with the Supply Management Advisor (SMA), Maintenance Management Advisor (MMA), and the MIS Specialist (MIS) (all advance TA). He will coordinate with the Proveedor to develop advance procedures for the integration of procurement data generated by the emergency procurement (to be effected by a private contracting agency) so that the procurement information flow will include the MSPAS. Further coordination will be effected with the SMA and the SMA's counterparts to advance plan the receipt, storage and distribution of the emergency procured commodities.

b) It is anticipated that the critical list procurement (drugs and medical supplies), will be delivered in two traunches, to the extent this is feasible. The first traunch is to be delivered at the earlist practicable date. The second traunch is to be delivered in the six month of the first year of the project. A tentative listing of both

traunches is attached as an Annex to this report. Some drugs and medical supplies may need to be air freighted and this determionation is to be made by the advance PMA in coordination with the SMA and the Proveedor, with approval of the USAID. Some commodities other than drugs and medical supplies, certain critical spare parts, for example, may also need to be air lifted and these will require coordination wioth the SMA, the MMA, if appropriate, and the Proveedor, with USAID approval.

c) The advance PMA will effect liason with and coordinate with other donor representatives to ensure that the commodity element of AID's programs do not duplicate inputs of commodities being imported in the same areas, and that the programs are mutually supportive.

d) The advance PMA will screen excess property lists for subsitutability of requirements. In this respect funds are available from another project (519-0256) to finance travel of MSPAS personnel to inspect/select excess equipment. TA funds are also available to install such excess equipment, if needed.

2) <u>Procurement Management Advisor (12 month TA)</u>

a) The PMA is to come on board at the inception of the Project. He will advise and assist the Proveedor during the first full year of the Project.

b) First priority for the PMA is in country management of the emergency procurement of critical drugs and medical supplies followed by and/or intermingled with, as necessary, in country management of the procurement of other commodities required for the "quick fix". These commodities are listed in the procurement annexes attached.

c) Second priority is the examination of the management/administration of the Procurement Department of the MSPAS and rendering advise and assistance to the Proveedor for improvement in these areas with follow-on actions to achieve institutionalization of such improvements by not later than the 10th month of the first year of the project.

d) Among other improvements to be pursued by the PMA is the development and institutionalizing of a program to obtain close coordination between the office of the Proveedor and the Office of the Director of Operations Services. The latter office is responsible for the development of commodity requirements and the selection of drugs. It is essential that the MSPAS assure the maintenance of constant levels of drugs stocks annd medical supplies on hand for regular and emergency distribution. When emergency requirements cause these levels to dip below certain (to be established) points, immediate action for acquisition of replacements must be taken. To attain the management and coordination necessary to accomplish this requires that various supply management elements be involved. The requirements development official must have timely input data from inventory control centers, e.g., stock

levels, usage rates, re-order points, etc. From the Proveedor he must have information inputs regarding lead times, availability, source, price, etc. From the Operations Services Directorate he must have decisions on drug selection, national formulary, etc. An effective way to accomplish this is to have scheduled pre-planning meetings of representatives of the three elements on a periodic basis (perhaps quarterly) to review status and pre-plan requirements. With the establishment of improved information management the data on which to base requirements decision should be readily available. (See para. (e). below). The PMA will assist and advise the three elements involved in instituting the necessary coordination and cooperation. He will also coordinate with the MSIS specialist to assure the required data is integrated into the system. All three elements must be on distribution for regular (weekly) reports from MIS.

e) The institution of new improved management information systems in MSPAS will facilitate the collection, recording retrieving and timely distribution of management data which, in the Procurement Department, has not previously been automated. To an excessive extent procurement information, manually collected and recorded, has not been used. Information generated in the procurement cycle, when automated, can be most useful in providing data on sources, prices, quantities, unit, specifications, required and actual delivery dates, vendor performance, commodity receipt/condition, short falls, excesses, shelf-life/expiration dates, etc. Any exceptional occurrances, e.g., delays or bottlenecks ion the procurement cycle or documentation slow-downs or administrative delays beyond pre-specified time elements, can be reflected in the information system, thus drawing attention to these problems for prompt remedial action by responsible managers. The PMA will coordinate with the MIS and will assist and advise the Procurement Department in modifying or redesigning existing forms or in developing new forms for compatibility with MIS procedures and equipment. Procurement operating personnel must be trained in the use of new forms, equipment and operations of the systems. Management personnel must receive trainiong in utilizing the information generated to make management decisions. The PMA will work closely with the MIS specialists in effecting such training.

f) The PMA will examine existing commodity lists with the view of developing additional equipment standardization, where feasible and jusfiable, and follow-up with AID as appropriate.

b) <u>Commodity, Supplies, and Materials Transfers</u>

See Commodity Lists, Annexes at the end of this report.

c) Construction, Remodeling and Upgrading
None required in the Procurement Component.

d) Deployed Personnel

D. Project Sub-Component Inputs

1. Technical Assistance	YEAR (1)	YEAR (2)	TOTAL
a) Long Term Procurement Management Advisor 12 PM (12 x $10,000)	120,000	None	120,000
b) Short Term Procurement Management Advisor 6 PM at $11,000 mo.	66,000	None	66,000
c) Logistic Support	1,500	None	15,000
Sub-Total	187,500		187,500
2. Training In house on the job training	None	None	None
3. Commodities			
a) Drugs	4,700.000	4,700.000	9,400.000
b) Medical Supplies	1,800.000	1,800.000	3,600.000
c) EMS supplies	1,334,000	-	
Sub-Total	7,834.000	6,500.000	13,000.000

E. Implementation Schedule

1. YEAR I

a) Technical Assistance

(1) Long Term PMA will arrive at inception of project
(2) Short Term PMA arrive not later than end of six month following project inception.

b) Training

In the job training of key personnel in the Procurement Department will comence in the second or third month of the project and will continue under PMA supervision until end of first year.

c) Commodities

Drugs, medical supplies and EMS supplies will be scheduled for delivery in accordance with priorities established by MSPAS in coordination with the Advance PMA. There will be two traunches of drugs, the first traunch to be delivered during the first six months of the first year and the second in the second six months period. However, top priority items, when justified will be air shipped. Commodity deliveries could begin within 30 to 45 days after inception of the project.

2. YEAR II

a) Technical Assistance

None, However, the SMA will oversee programs of procurement and institution building in the procurement Department.

b) Training

On the job training will continue under guidance of the SMA.

c) Commodities

Drugs and some medical supplies will be scheduled for delivery in two traunches, but in general commodities will be phased in to a more normal procurement cycle. Emergency needs will, of course, continue to receive priority attention. A few items might have to be airshipped due to emergency conditions.

COUNTERPARTS CONTACTED

1.	Lic. David Castro	Collaborator, MSPAS - Div. de Servicios Administrativos
2.	Lic. Miguel Interiano	Collaborator, MSPAS - Div. de Servicios Administrativos
3.	Lic. Roberto Lopez	Collaborator, MSPAS - Div. de Servicios Administrativos
4.	Lic. Jorge Ulloa	Director, MSPAS, Div. de Servicios Administrativos.
5.	Dr. Jose Antonio Pereira	Collaborator, MSPAS, Div. de Servicios Operativos.
6.	Dr. Navarro	Director, MSPAS, Div. de Servicios Operativos
7.	Dr. Hernandez	Director, MSPAS, Div. Malaria/ Epidemiology
8.	Dr. Aguilar Rivas	Director, MSPAS, Div. Planning
9.	Dr. Paulino Henriquez	Assist. Director, Div.Planning
10.	Ing. Carlos Gonzalez Avila	President, Construction Company of El Salvador Calle El Progreso No. 1918
11.	Arch/Ing. Carlos Delgado Valencia	Architect at ISS - Inst. of Social Insurance.
12.	Lic. Raul Berterretche and Lic. Juan Carlos del Conte	UN Technical Assistance

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SCOPE OF WORK ANNEX No I

Contracting Agency

Scope of Work

A. Background

I. Purpose of Scope of Work

This scope of work is to provide guidance in the preparation of a Request for Proposals (RFP) in connection with the El Salvador Health Systems Vitalization Project (Project No. 519-0291). The proposed procurement is to obtain the services of a Contracting Agency to manage the project in all its aspects, i.e., Technical Assistance, and commodity and services procurement.

II. Project Description

The purpose of this two year project is to assist the Government of El Salvador (GOES) to (1) increase existing levels of primary health care services by meeting the short-term needs of the Ministry of Public Health and Social Assistance (MSPAS) for urgently required, essential goods and support services, and (2) restore the institutional capacity of the MSPAS in health supplies management (procurement, distribution, storage, maintenance) including drug quality control, and information management systems, as well as in the direct supply of emergency medical services and selected environmental health services, i.e., malaria eradication, and water and sanitation programs.

III. Qualifications Required of Contracting Agency:

A. Scope of Work - General

The contracting agency will be required to demonstrate that its organization is experienced in the design, planning, development and implementation of health systems abroad and in the procurement of commodities for such systems, including drugs, medical supplies, hospital equipment, vehicles, parts, facilities, services, and in the management of maintenance systems. The agency must also show experience in recruiting technical experts to manage foreign health system entities and to train and advise their personnel. In the short, the contracting agency must be able to put together and manage a qualified team of experts to provide technical assistance and training to the MSPAS, and to procure, deliver and manage the flow of commodities and services into the MSPAS health delivery system.

B. Scope of Work, Specifics

Specific guidance relative to the Technical Assistance and Commodity and Services Procurement and Training are contained in the attached annexes which are listed in sequence with the related Components.

I. Component I - Health Supplies Management

a. Technical Assistance

	TITLE
I.a.1	Health Supplies Planning/Management
I.a.2	Procurement Management
I.a.3	Drug Quality Control Labortory

b. Training

I.b.1	Local Training-Procurement/Inventory Control Management

c. Commodities and Services

I.c.1	Drugs (Pharmaceuticals, Medicines)
I.c.2	Medical Supplies (Consumables)
I.c.3	Emergency Medical Equipment
I.c.4	Spare Parts for Medical Equipment
I.c.5	Medical Equipment, Warehousing, Commercial Transportation, Printing.
I.c.6	Drug Quality Control Laboratory Equipment
I.c.7	Vehicles and Spare Parts
I.c.8	Malaria Control Equipment/Chemicals
I.c.9	Equipment for Water and Sanitation
I.c.10	Medical/Hospital Equipment

d. Acquisition/Construction/Upgrading

I.d.1	Regional Warehouse
I.d.2	Drug Quality Control Laboratory

II. Component II - Public Health Infrastructure Maintenance

a. Technical Assistance

II.a.1.	Maintenance/Repair Team
II.a.2	Transport Equipment Mainteance

b. Commodities and Services

II.b.1	Spare Parts for Equipment/Vehicles
II.b.2	Preventive Maintenance Tools-Medical Equipment and vehicles.

c. Acquisition/Construction/Upgrading.

II.c.1	Regional Maintenance Workshops

d. Training

II.d.1	Third Country-Management of Maintenance Systems

III. Component III - Management Information Systems

a. Technical Assistance

III.a.1	Information Assessment-Needs and Design and Installation of System.

b. Commodities and Services

III.b.1	Computers/Software/Maintenance Contract Suplies.

c. Training

III.c.1	Local and Third Country Training

IV. Component IV - Emergency Medical Services

a. Technical Assistance

IV.a.1	Emergency Medical Service

b. Training - Local

IV.b.1	Surgical Teams
IV.b.2	Surgeions (Hospitals, Centers, Units)
IV.b.3	Nurses, Auxiliaires in Trauma Stabilization

c. Commodities- (See I.c.3.)

TECHNICAL ASSISTANCE ANNEX A
SCOPE OF WORK
Short Term (advance TA)

1. Title: Procurement Management Advisor(PMA)

2. Education Requirement: BA in Business Administration of equivalent,

3 Special Experience

a. Four years of experience as a Procurement Officer or six years as a Supply Management Officer (or combination of these) in a Government Agency, preferably having served in such capacity abroad. Ideally, this experience would have been with AID or a similar foreign assistance agency. Must be familiar with AID procurement regulations and procedures, specifications writing, expediting, etc.

b. Prior service in a Latin American environment preferable, but not essential.

4. Language Requirement: Fluency in Spanish language at a foreign service level of 3 in speaking, reading and writing.

5. Grade Level Equivalent" GS-14 or 15.

6. Time Required in Country: Two months. The PMA will be brought on board as far in advance of the inception of the project as possible.

7. Duties and Tasks: The purpose of this TA is to provide necessary procurement pre-planning and delivery scheduling, etc., to assure that procurement action can be initiated immediately by the Authorized Procurement Agent upon execution of a contracting agency contract. The PMA's duties and tasks will include the following:

a. Develop a brief procurement plan indicating actions to be taken in priority sequence to assure that project commodities will be received when needed.

b. Examine tentatively developed specifications and commodity requirements, refine and prepare specifications in final form, complete and ready for use in solicitations.

c. Determine priority delivery requirements for most critically needed commodities based on dates required in country and probable lead times, and establish basis for authorizing air shipments where such is appropriate.

d. Prepare schedule of deliveries for all requirements based on dates items are neede in country for implementation of project phases.

e. Review all commodity requirements for compliance with AID eligibility rules.

f. Establish need for waivers, special authorizations, etc., and prepare documentation to support requests as appropriate. These will include source/origin waivers, propietary procurement authorizations, special certifications, etc., in accordance with AID Regulations.

g. Prepare lists of potential sources for procurement, or include this information in the specifications, as appropriate.

h. In the design of specifications for drugs, labeling, including dosage information, must be in the Spanish language. For equipment, vehicles, etc., instruction and maintenance manuals must likewise be in Spanish. Care must be taken to include these requirements in the specs and in considering capabilities of potential suppliers.

i. Screen excess property lists for possible new commodity substitutions.

j. Advise and assist the Procurement Office of the Ministry of Public Health and Social Assistance (MSPAS) to gear up for the infusion of large quantities of commodities into the health system. They must be prepared to assimilate the increased amount of procurement paper-work even though actual procurement will be effected by a private contracting agency.

k. Work closely with the Supply Management Advisor (SMA) to establish and coordinate systems for receiving commodities and processiong claims, etc.

l. Coordinate closely with the Management Information System Advisor (MIS) to assist and advise the MSPAS Procurement Office with regard to proposals for integration of procurement information into the MIS Program.

m. PMA should obtain and bring following publications to El Salvador.

1. Drug (pharmaceuticals, medicines, vaccines) catalogs.

2. Latest Excess Property Lists.

3. AID documents Kit for Export Supplier.

4. Managing Drug Supply; Editor: Jonathan Quick (1981) $10,00 from: Dr. Ronald O'Connor; Management Sciences for Health. 165 Allandale Rd., Boston, MA 02130 - Tel: (617) 524-7799.

SCOPE OF WORK

SHORT TERM (ADVANCE TA)

1. Title: Supply Management Advisor (SMA)

2. Education: MBA or equivalent experience in supply management, logistics, warehousing and distribution.

3. Special Experience:

   a. a minimum of 3 years direct experience as manager of a commodity (medicines preferrable) supply and distribution program in an LDC setting. Knowledge of auditing and management auditing principles and procedures. Experience in warehouse construction highly advantageous

4. Language Requirements: Fluency in Spanish language at FS level 3.

5. Time required in country: two months. The SMA should be in position as far in advance of project inception as possible.

6. Duties and Tasks: The purpose of this TA is to provide necessary assistance to the MSPAS Executive Supply Management Group in planning warehousing and inventory management systems, and distribution networks to support MSPAS health delivery services at all health facilities.

   a. Assist ESMG develop initial supply management strategy to effectively channel commodities imported from offshore sources or purchased in country.

   b. Assist ESMG prepare plans for construction of 1500 m^2 of new warehouse space in the Matazano installation and remodelling of 2000 m^2 warehousing on both central and regional level.

   c. Assist ESMG dispose of old inventories or medicines, drugs, and equipment, exprired or no longer needed, located in warehouse on central and regional (also) hospital levels.

   d. Effect management audit of distribution system to ensure that initial shipment of supplies will be properly managed in accordance with standard management inventory principles.

   e. Liaise with PMA to ensure that procurement receives timely information necessary for ordering and reporting.

   f. Coordinate with PMA to ensure effective control for receiving and surveying shipments of commodities.

   g. Assist ESMG plann all phases of internal transport to ensure efficient movement of commodities through the distribution network.

h. Assist ESMG supervise all levels of supply management system.

i. Provide formal evaluations to ESMG of inventory management, warehouse, and transport based on field visits.

j. Assist ESMG take corrective action to improve supply management and delivery system.

k. Assist ESMG prepare reports on supply/commodity movement distribution for the MSPAS and USAID.

l. Develop outline of tentative supply management system and formats to support receipt and despatch of commodities, inventories, etc.

M. Refine and Revise Project Implementation Plan and present to long term SMA TA.

N. Design initial Training (OJT) Programs for ESMG unit and warehouse personnel (coordinate with ISS)..

ANNEX A.

SCOPE OF WORK

I. Health Supplies Management

A. Technical Specialty: Health Supply Management and Team Leader.

B. Level of Effort: 18 months.

C. General Objective: Provide technical assistance to MSPAS during the development and revitalization of a comprehensive supply management system.

D. Specific Tasks.

1. Technical

a. Assist MSPAS in the implementation of an emergency medical service, specific tasks, of which include scheduling arrival of pharmaceutical products, medical equipment and vehicles, assisting MSPAS Executive Supply Management Group (ESMG) in receiving, warehousing, and distribution.

b. Advise the MSPAS ESMG in the revitalization of a comprehensive supply management system, including inventory control, warehousing, delivery.

c. Develop in country training programs for MSPAS supply management personnel.

d. Coordinate with MSPAS ESMG and procurement section to facilitate the development of an optimal procurement plan.

e. Advise MSPAS ESMG in the upgrading of a cold chain system for distribution of vaccines.

f. Assist MSPAS in coordination of project activities with MSPAS, MIS, maintenance, procurement, and planning units.

g. Advise MSPAS ESMG in the development of standard manuals for warehousing, inventory management, and distribution.

2. Administrative:

a. Advise in selection of short term technical assistance.

b. Supervise short term technical advisor.

c. Produce periodic reports for MSPAS-AID.

d. Produce annual report at the end of each year.

Desired qualifications

MBA or equivalent experience in an area such as supply management logistics, distribution management, adn 3 years direct experience as as logistics manager in an LDC setting. Person must be able to relate to MIS personnel, medical professionals, Ministry personnel. Fluent Spanish and cultural sensitivity are necessary. Train Leader for T.A.

ANNEX B

SCOPE OF WORK

1. **Health Supplies Management:**

A. Technical Specialty: Health Supply Management.

B. Level of Effort: 6 months.

C. General Objectives: Provide short term technical assistance to the MSPAS during the first 6 months of a project designed to revitalize the supply management system.

D. Specific Tasks:

1. Technical.

a. Assist long term supply management person and MSPAS Executive Supply Management Group ESMG distribute medicines, medical equipment, hospital equipment and supplies to regional level hospitals and health facilities that serve 85% of the Salvadoran population.

b. Assist ESMG develop mechanisms of inventory control during the first phase of the project.

c. Assist ESMG develop reporting mechanisms during first phase of the project.

d. Implement OJT training sessions of regional and national level.

e. Assist ESMG perform management audits of MSPAS supply management system of central and regional levels.

f. Assist ESMG develop an internal auditing programs.

2. Administrative.

a. Submit weekly progress as determined by the long term supply management person.

b. Produce periodic reports requested by MSPAS and AID.

c. Produce final report evaluation upon completion of six month period.

Desired Qualifications:
Five years direct experience as supply distribution manager. Degree in business, engineering, or economics. Person must be able to relate to MIS personnel, medical professionals, ministry personnel, fluent Spanish is necessary.

TECHNICAL ASSISTANCE ANNEX C

Long Term TA

Procurement Management

1. Title: Procurement Management Advisor (PMA).

2. Education Qualifications Required:
   BA in Business Administration, or equivalent.

3. Special Experience Qualifications:

   a. Four years of experience as a Procurement Officer or six years as a Supply Management Officer (or combination of these) in a Government Agency, preferably having served i such capacity abroad. Ideally this experience would have been with AID or a similar foreign assistance agency. Must be familiar with AID procurement regulations and procedures, specifications, writing, expediting, etc.

   b. Prior service in a Latin American environment preferable, but not essential.

4. Language Requirements:
   Fluency in Spanish language at a foreign service level of 3 in speaking, reading and writing.

5. Grade Level Equivalency: GS 14 or 15.

6. Time Required in Country: One year.

7. Duties and Tasks:
   The purpose of long term technical Assistance in the procurement area of the Ministry of Public Health and Social Assistance (MSPAS) is: First, to provide management, in-country, for the emergency acquisition of critically needed commodities, including drugs (pharmaceuticals, medicines, vaccines), medical supplies, equipment, vehicles and parts. These commodities will be procured by a private contracting agency under the project. Second, to examine management and administrative practices in the Procurement Office and related elements of the MSPAS, develop improvement in these areas and advise and assist the Ministry in implementing and institutionalizing such improvements.

   b. Efforts in management/administrative improvement of the procurement area of the MSPAS are to commence at the inception of the project, to the extent practicable. However, priority attention must be given to management of the emergency procurement during that procurement cycle.

c. Management of Emergency Procurement:

(1) Review, on a continuing basis, procurement plan and delivery schedules prepared by short term PMA, update and revise expand as necessary.

(2) Examine all facits of the procurement, as prepared or initiated by the short term PMA, including specifications, waiver and special authority requests, standarization, etc., and follow-up with the contracting agency on any needed corrections or additions.

(3) Monitor, analyze, control, expedite whole procurement cycle of the emergency procurement being effected by the contracting agency.

(4) Review all commodity requirements under this project forcomplience with AID regulations and eligibility rules, initiating, as necessary, waivers and requests for special authorizations, eg., source/origin, propietary procurement, certifications, etc.

(5) Work closely with the MSPAS Procurement Office assisting and advising them regarding the assimilation of procurement information generated by the emergency procurement.

(6) Screen Excess Property lists periodically to identify substitutes for new procurement within the scope of the project and initiate action to effect such substitutons.

d. Institution Building:

(1) Review the relevant laws, regultions, and procedures of the Procurement Office and determine need for revision, improvement.

(2) Examine management/administrative practices, systems, methods, forms, routines, etc., to identify areas needing improvement as well as training.

(3) Develop a procurement management improvement plan to be followed over the ensuing two year period of the project.

(4) Work closely with the Technical Assistance Managment Informations System Advisor (MIS) and the Procurement Office in identifying procedures/forms, etc., that need to be altered to accomodate the itegration of procurement information into the MIS program.

(5) Examine control and expediting techniques and advise/assist Procurement Office in implementing improved methods.

(6) Review commodity coding system used by MSPAS to determine possible alternate system (eg., SIC codes, Schedule B, etc.) if present system is inadequate.

(7) Provide guidance/advice/assistance to Procurement Office, Directorate of Operations Services and other MSPAS elements concerned to institute a requirments pre-planning program. This should involve responsible persons with knowledge of lead times, specifications, prices, availabilities, etc., (procurement), with those possessing information on warehouse stocks, usage rates, re-order levels, etc., (Administrative Services Directorate), and the requirements development officials (Operations Services Directorate) in periodic pre-planning meetings and exchanging data. PMA must work closely with MIS to determine information to be entered in the information system for this purpose.

(8) Examine lists of existing equipment to develop long term standarization programs.

(9) Assist the Procurement Office in developing a useful, up-to-date procurement catalog library.

(10) Advise/assist the Procurement Office in developing standarized specifications for recurring requirements.

(11) Establish, conduct on the job training program to each specification writing techniques.

(12) Establish on the job training programs for all other procurement areas determined to need management improvement, eg., expediting, etc.

(13) Monitor/assist the MSPAS in its effort to reduce the essential drugs list and establish a national formulary.

(14) Develop guidelines for monitoring and evaluating progress in management reforms and in the institution building programs.

(15) The PMA, in the 11th month of the project, will provide the SMA with a report of progress and status on management improvements and institutions building in the Procurement Office.

(16) PMA should obtain and bring following publications to El Salvador.

1. Drug (Pharmaceuticals, medicines, vaccines) catalogs.

2. Latest Excess Property Lists.

3. AID Documents Kit for Export Supplies.

TECHNICAL ASSISTANCE ANNEX D
SCOPE OF WORK
Short Term

1. Title: Procurement Management Advisor (PMA).

2. Education Requirements: BA in Business Administration or equivalent.

3. Special Experience:

   a. Four years of experience as a Procurement Officer or six years as a Supply Management Officer (or combination of these) in a Government Agency, preferably having served in such capacity abroad. Ideally, this experience would have been with AID or similar foreign assistance agency. Must be familiar with AID procurement regulations and procedures, specifcations writing, expediting, etc.

   b. Prior service in a lating American environment preferable, but not essential.

4. Language requirements: Fluency in Spanish language at foreigh service level of 3 in speaking, reading and writing.

5. Grade Level Equivalent: GS-14 or 15.

6. Time Required in Country: Six months. The PMA will be brought on board by the end of the sixt month following.

7. Duties and Tasks:

   a. The purpose of short term technical assistance in the procurement area of the Ministry of Public Health and Social Assistance (MSPAS) is: First, to assist the providing long term PMA in management, in-country, for the emergency acquisition of critically needed commodities, including drugs (pharmaceuticals, medicines, vaccines), medical supplies, equipment, vehicles and parts. These commodities will be procured by a private contracting agency under the project. Second, to assist in the examination of management and administrative practices in the Procurement Office and related elements of the MSPAS, assist in the development of improvement in these areas and advise and asist the Ministry in implementing and institutionalizing such improvements.

   b. Managment of Emergency Procurement:

      (1) Assist in the review, on a continuing basis, of the procurement plan and delivery schedules prepared by short and long term PMA, update and revise, expand as necessary.

(2) On a continuing basis, assist the long term PMA to examine all facits of the procurement, as prepared or initiated by the advance, short term PMA, including specifications, waiver and special authority requests, standarizations, etc., and follow-up with the contracting agency on any needed corrections or additions.

(3) Assist the PMA to monitor, analyze, control, expedite the whole procurement cycle of the emergency procurement being affected by the contracting agecy.

(4) Continually review all commodity requirements under this project for compliance with AID regulations and eligibility rules, initiating, as necessary, waivers and requests for special authorizations, eg., source/origin, proprietary procurement, certifications, etc.

(5) Assist the PMA and with him, work closely with the MSPAS Procurement Office assisting and advising them regarding the assimilation of procurement information generated by the emergency procurement.

(6) Assist the PMA n screening excess property lists periodically to identify substitutes for new procurement within the scope of the project and initiate action to effect such substitutions.

c. Instution Building: Assist the PMA in all of the following functions:

(1) Review the relevant laws, regualtions, and procedures of the Procurement Office and determine need for revision, improvement.

(2) Examine management/administrative practices, systems, methods, forms, routines, etc., to identify areas needing improvement as well as training.

(3) Develop a procurement management improvement plan to be followed over the ensuing two year period of the project.

(4) Work closely with the Technical Assistance Management Informations System Advisor (MIS) and the Procurement Office in identifying procedures/forms, etc., that need to be altered to accomodate the integration of procurement iformation into the MIS program.

(5) Examine control and expediting techniques and advise/assist Procurement Office in implementing improved methods.

(6) Review commodity coding system used by MSPAS to determine possible alternate system (e.g., SIC codes, Schedule B. etc.), if present system is inadequate.

49

(7) Provide guidance/advice/assistance to Procurement Office, Directorate of Operations Services and other MSPAS elements concerned to institute a requirements pre-planning program. This should involve responsible persons with knowledge of lead times, specifications, prices, availabilities, etc., (procurement), with those processing information and warehouse stocks, usage rates, re-order levels, etc., (Administrative Services Directorate), and the requirements development officials (Operations Services Directorate) in periodic pre-planning meetings and in exchanging data. PMA must work closely with MIS to determine information to be entered in the information system for this purpose.

(8) Examine lists of existing equipment to develop long term standarization programs.

(9) Assist the Procurement Office in developing a useful, up-to-date procurement catalog library.

(10) Advise/assist the Procurement Office in developing standarized specifications for recurring requirements.

(11) Establish, conduct on the job training program to teach specification writing techniques.

(12) Establish on the job training programs for all other procurement areas determined to need management improvement, e.g., expediting, etc.

(13) Monitor/assist the MSPAS in its effort to reduce the essential drugs list and establish a national formulary.

(14) Develop guidelines for monitoring and evaluating process in management reforms and in the institution building programs.

ANNEX E.

SCOPE OF WORK

1. Health Suppliers Management

A. Technical Specialty: Warehouse Management

B. Level of Effort: 6 months

C. General Objective: Provide technical assistance to MSPAS during the development and revitalization of a comprehensive warehousing system.

D. Specific Tasks

1. Assist MSPAS in its planning and implementation of central level warehouse construction (1500 m^2),and repair and remodeling of MSPAS central and regional warehouse (2000 m^2).

2. Assist MSPAS executive supply management group develop a storage plan and system for the distribution of medicines, medical supplies, hospital equipment, cold chain supplies to MSPAS operating units through central level and regional level warehouses.

3. Develop OFT training progrms and in-country seminars on warehouse management for MSPAS warehouse logistics personnel.

4. Assist MSPAS optimize the cold chain storage systems.

5. Assist ESMG prepare warehousing guidelines and formats.

6. Assist ESMG and MIS group develop a computerized warehouse Inventory management system.

7. Advise ESMG in the developoment of warehousing manual.

E. Administrative

1. Submit reports and recommendations to the Supply Management Consultant.

2. Prepare monthly work plan

3. Prepare evaluation of training programs provided to MSPAS warehousing personnel before leaving country.

4. Prepare and submit a six month activity report.

F. Desired qualifications

Professional warehouse management experience. Two years experience in warehousing commodities and health products in LAC Selting. Degreeor experience in design and implementation of training programs. Person must be able to relate to MIS personnel, medical professionsl, Ministry personnel. Fluent Spanish is necessary.

Rafael Martinez' Report

I. FRONT PAGE- AID

II. PROJECT BACKGROUND AND DETAILED DESCRIPTION

A. Background
1. General - J.J.
2. Specific

The Department of Management Information Systems and Data Processing (DMIS) within the Directorate for Administration and General Services of the Government of El Salvador, Ministry of Public Health and Social Assistance (MSPAS) was created in 1976. Its creation came as a result of the increase in scope and complexity of the MSPAS activities. The functions and responsibilities of the DMIS were defined as follows:

a - Planning the development of a comprehensive integrated management information systems (MIS) for the MSPAS.

b - Developing the subsystems to be components of the MSPAS - MIS.

c - Coordinating data flow and data quality control for each system's user.

d - Producing feasibility studies related to the MSPAS information needs.

Hardware/software support for this effort were obtained by means of an interagency agreement with the Salvadorean Institute of Social Security (ISSS). The ISSS had an IBM 370-125 with DOS/VS operating system. All applications were programmed in COBOL.

By 1979 the DMIS contributions to the administrative functions of the MSPAS were quite significant. In such a short time the DMIS had developed subsystems for:

a. Payroll
* b. Control of medical supplies in the Central Warehouse
* c Control of the distribution of medical supplies to hospitals and Regional Offices
d.. Outpatient - inpatient statistics
e. Financial control for investment programs.

* This subsystem was dropped at a later date due to incompatibilities between its computerised aspects and the procedures and forms being used.

In 1979, the Pan American Health Organization (OPS) performed a test in the use of data processing in the Benjamin Bloom Hospital. OPS donated an Ohio Scientific C3-A microcomputer to the Hospital and provided technical assistance for the development of several subsystems.The success of the test resulted in the donation of two similar microcomputers by OPS to the MSPAS in April of 1979. This equipment was reinforced by a bigger Ohio Scientific C3-B acquired by the MSPAS in August of 1979.

The subsystems previously operating in the ISSS's IBM 370-125 were converted to the Ohio Scientific equipment using EXTENDED-BASIC.

3. Existing Situation

The data processing equipment available to the MSPAS at the present is:

a. Unit No. 1
Ohio Scientific Model C3-B13 CPU with 6502,6800, and Z-80 processors. The CPU has a memory of 148 kbytes and operating systems OS-65U and OS-65D. It has a random access memory (RAM) of 600 kbytes in diskettes and 74 megabytes in disk. BASIC is the only compiler available. The CPU is accessed through three Televideo TVI-912B CRTs. An Okidata AC-5A 160 LPM printer is used for output

b. Units No. 2,3, and 4a*
Ohio Scientific Model C3-A-S1 with 6502A, 6880 and Z-80 processors. Each CPU has a memory of 48 kbytes and operating system OS-65U. They have 600 kbytes RAM in diskette. BASIC is the only compiler. Each CPU is accesed through a Hazeltine 1500 CRT. Okidatas 22-125 LPM printers are used for output.

All equipment is maintained by SERVIDATA, local Ohio Scientific representative, under a yearly maintenance contract.

The DMIS personnel includes a head of department, a secretary, three programmers, six data entry-operators, and three control assistants.

* One of these units is in the Benjamin Bloom Hospital and is being used for personnel, payroll, meals control, inpatient statistics, and control of medical supplies inventory.

Subsystems that are presently fully operational are:

a) Payroll.
b) Financial control for investment programs.
c) Personnel.
d) Outpatient-inpatient statistics.
e) 0-4 year old children weight statistics.

B. Strategy and Detailed Description

1. Sector - AID
2. Project - AID,JJ
3. Target Group - AID
4. Detailed Project Description
   a - Project Goal

The goal of the management information component of the project is to improve the MSPAS's capability to collect, process, and store data so as to produce meaningful management information.

b. Project Purpose

The purpose of the management information component is to provide the MSPAS with the resources necessary to improve its information management capabilities. These resources might be in the areas of hardware, software, personnel, teleprocessing equipment, support equipment, and technical assistance. Specifically the project should:

i. Improve the information management capability of the MSPAS.

ii. Develop a comprehensive data base to support MSPAS activities.

iii. Implement a distributed data processing (DDP)* system in accordance to MSPAS decentralized organization.

iiii. With the highest priority, implement subsystems to support the vehicle and medical equipment maintenance, and the procurement and supply management functions of the MSPAS.

c. End of Project Status

The following should be accomplished by the end of the project:

- Properly sized data processing units will be installed in suitable environments at MSPAS headquarters and each one of its five regions.

- MSPAS personnel will be fully trained and capable of operating all new hardware/software.

- Several subsystems will be fully operational, particularly the maintenance, procurement, and supply management subsystems.

- A substantial number of employees, now involved in data collection, codification and tabulation, will be available for other tasks.

- Information needed for MSPAS activities will be readily available in a meaningful and useful way.

d. Project Output Components - General- J.J.

e. Health Technology Components - AID

i.

ii. Support systems

1-<u>Management Information System (MIS)</u>

<u>Problems and Constraints:</u>

A summary of the problems the MSPAS is facing in the area of management information is as follows:.

- Existing Ohio Scientific equipment is configured to maximun capacity with no marging for expansion.

- Existing Ohio Scientific equipment is not compatible with equipment provided by other local vendors, i.e. it cannot act as inteligent terminal to other equipment.

- Existing subsystems were designed independently, making the crossing of files extremely difficult.

* A DDP system is one where CPUs and peripheral equipment are physically distributed throughout the organization so that data can be collected, processed, and stored in the most convenient location.

- All applications are programmed in EXTENDED-BASIC which offers very little flexibility for producing true management reports. Most reports are of a "dump" type.

- Maintenance management, procurement management and supply management systems are not proper for immediate automation.

- The MSPAS has no one formally designated as computer systems analyst.

- The MSPAS has no one formally trained as information systems analyst.

- Power supply is very unreliable, particularly in the eastern region of the country. Even in San Salvador, there are considerable voltage and cycle fluctuations.

- All data processing is done in a centralized mode, that does not respond to the MSPAS decentralized organization.

The objective of the MSPAS-MIS is to provide meaningful information, in the proper format, at the required level within the organization to support the decision making process and daily operations. In essence the MIS should have subsystems for :

a) Personnel
b) Accounting
c) Finance
d) Maintenance management
e) Procurement management
f) Supply management
g) Project management
h) Health statistics
i) Facilities management
j) Payroll

It is anticipated that the project will consist of three phases as follows:

Phase I. Develop simple computer programs using existing hardware/software to provide immediate support the three other major components of this project. These are:

a)- Maintenance management - A simple subsystem to support these activities should include: equipment identification- make, model, serial number, manufacturer, year; location-geographical location, responsible unit; preventive maintenance cycle-what, when, required parts, required specialized tools, availability, required service manuals; qualified personnel-location, experience, training requirements; spare parts inventory- stock number, description, location, quantity, minimum stock, reorder point, supplier, unit cost, etc.

b)- Procurement management - A simple sybsystem to support this activity, should include: item identification - code, manufacturer, model number, stock number; ordering information - supplier, address, unit cost, shipping costs, minimum quantities, estimated time of arrival, etc.

c)- Supply management - A simple sybsystem to support this activity should include: item identification - code, stock number; balance by location, total balances, usage rate, minimum stock, reorder point; demand by location, assignment by location; routing, distribution schedules, expiration date, lot number, etc.

Phase 2 Prepare for the converaion and development of subsystems to support each of the functions of the MSPAS. Output of the activities during this phase are:

a) Statement of information requirements
b) General MIS design
c) RFP for hardware/software
d) Objective proposal evaluation methodology
e) Evaluation of proposals
f) Procurement of hardware/software
g) Installation of hardware
h) Training of DMIS personnel

Phase 3 Development of subsystems to support each of the functions of the MSPAS. Output of the activities during this phase are repetitive in nature, and for each subsystem are:

NOTE: As a result of these effort it might be necessary to have another shift in the DMIS to accomodate for the increase in data entry workload and the limited number of data entry devices available.

a) Detailed subsystem design
b) Programming of subsystem
c) Testing of subsystem
d) Users' systems manual
e) Training for end users
f) Subsystem implementation

The implementation of a comprehensive MIS requires several changes and adjustments by part of the MSPAS organization. Automation is proper for activities that are clearly defined with processes and procedures that are standardized throughout the organization. A very important part of the other components of this project is the detailed revision and modification, if necessary, of existing management and control procedures. This revision and modification should be done in close coordination with DMIS personnel to ensure suitability for automation.

Training in the use of new technology is necessary for the success of the project. The training program for the MIS component should include formal courses in systems analysis, data base management systems (DBMS), data base design, telecommunications, hardware operation, programming and applications software development, etc. Some of the training would be provided by the hardware vendor as part of the initial procurement package, however, normally it is necessary to reinforce that training with additional courses. The training program might look like:

TRAINING PROGRAM

Type of Training	Number of Persons	Duration	By Whom	Purpose
System Analysis	2	3 months	Local or foreign institution	Produce systems analysis capabilit in MSPAS
DBMS	2	6 weeks	Local or foreign institution, vendor	Produce DBMS capability in MSPAS
Data Base Design	2	1 month	Vendor	Develop data base design capability in MSPAS
Telecommu nications	1	1 month	Vendor	Complement standard vendor training
Hardware operation	2	2 weeks	Vendor	Complement stndr vendor training
Programming software development	2	1 month	Vendor	Accelerate software development

It is anticipated that the hardware/software combination to support the MSPAS will be configured in a distributed data processing (DDP) mode. The DDP mode is probably the best to support the decentralized activities of the MSPAS, while at the same time it would not be as disrupted by failures in the communications system of the country as a centralized system with remote access. The central data base would be managed by a DBMS package, while the regional data base would be managed by specially developed software or by a mini DBMS package. It is envisioned that the hardware would be approximately configured as follows:

a) Central Unit - Medium size general application CPU with approximately 512 kbytes of memory and 300 megabytes of RAM. The unit would be locally accessed by approximately 16 CRTS, some in the data processing unit, and others in the end users location. The unit should have at least one fast printer and an 800/1600 BPI tape drive for periodical backup. It should be fully compatible with the regional offices unit and be equipped for teleprocessing. This unit would be located in the MSPAS headquarters.

b) Regional Units - Five small size general application CPUs (one per region) with approximately 128 kbytes of memory and 75-90 megabytes of RAM. The units would be locally accessed by approximately four CRTs. Each unit should have one line printer. These units must be fully compatible with the central unit, both in operating system and teleprocessing. They should also have ways of physical communications, i.e. by means of magnetic media - cassette or diskette.

Under the DDP mode the data would be collected, processed, and stored where most convenient. The processed data would be transmitted to the central unit as determined or be made available upon demand. The regional units would have access to the DBMS software on a teleprocessing mode.

All the hardware should be acquired at close to the lower end of it expansion capability to allow for future system's grow. The possibility of using optical character readers (OCR) should be considered due to the high volume of data being collected for healt statistics.

Since the Ohio Scientific equipment is not compatible with other hardware, it should be dedicated to other purposes. Two possible alternatives are:

a) Acquire work processing software and dedicate them to word processing functions exclusively.

b) Assigned them to the major hospitals in the nation to be used i a similar fashion as the one in the Benjamin Bloom Hospital.

A cost-benefit analysis should be performed for these and other alternatives during Phase II to indicate the most beneficial to the MSPAS.

There are several actions that should be considered in order to accelerate project implementation. Some of these are:

a) Considered the acquisition of subsystems already designed, programmed, and fully tested in accordance to MSPAS needs (turn-key)
b) Considered the acquisition of specialized application software- finance, personnel, inventory management, etc. that could be modified for MSPAS peculiarities.
c) Study other similar applications in the country, such as in ANTEL, for design or software compatibilities.

SUMMARY OF PROJECT INPUTS-FUNDS

	AID FX	AID LC	GOES	TOTAL
3-MIS-Component				
a.- Technical Assistance				
1.-Assessment of information needs, general system design, hardware/software selection, installation, system implementation.	240			
2.-Short-term for specific subsystems development-finance, personnel, inventory, etc.	60			
b.- Commodities				
1.- Hardware/software	500			
2.- Teleprocessing devices	100			
3.- Support equipment-voltage regulators, batteries, air conditioners.	15			
c.- Training				
1.- Local				
a.- Administrative personnel health personnel		100		
2.- US/Third country				
a.- Information Systems 15 person/months at $3,400 each.	50			
d.- Supplies				
1.- Paper, ribbons, other	10			
2.- Publications, forms		15		
e.- Maintenance contract	60			
f.- Administrative supervision and support				
1.- Local travel and per diem		10		
g.- Site preparation			18	
SUB TOTAL	1,035	125	18	1,178
Evaluation	35		25	
SUB TOTAL	1,070	125	43	1,238

III.- Project Analysis:

A.- Administrative Analysis - MIS

The implementation of an MIS in the MSPAS will have a significant impact in the management philosophy of the organization. A management information system can only support well defined, standardized procedures, and its development will force the MSPAS to go through an autoanalysis which in the end will be as beneficial as any of the outputs of this project. The full benefits of an MIS are normally not felt for a long period of time and require a long edification process.

B.- Economic Analysis:

1.- External Efficiency.
The improvements in health care delivery as a result of an MIS are very difficult to measure and are a complex function of the MIS output, people that use it, and the long range policies made based on the information its produces.

2.- Internal Efficiency.
The MIS component of this project should have the most impact on the MSPAS internal efficiency. A properly designed MIS will indicate discrepancies, flag potential problems, and signal overall significant factors in the MSPAS operation. Futhermore, as mentioned in Section III-A, the autoanalysis and subsequent tuning-up of administrative procedures should result in a much more streamlined administration. A significant number of employees that are presently dedicated to manual activities related to management information will become available to perform more beneficial tasks as a result of the automation of these processes.

C.- Social Analysis

1.- Impact of the Technology.
The technology introduced by the MIS component is not new to the MSPAS; maybe more advanced. It should have no impact on the targe group since it is too far away from the administrative process to even notice it. The highest impact, hopefully, would be an improvement in the overall health care system. Another significan impact will probably be felt in the area of statistical processing Presently, the statistic units are mainly dedicated to the collection, codification and tabulation of data; most of these activities will be taken over by the computer, allowing more time for truly statistical function, such as analysis and inferences.

D.- Technical Analysis: - J.J.

E.- Financial Analysis:

1.- Overview - J.J.
2.- Summary Cost Estimate and Financial Plan - AID
3.- Summary AID Grant/Loan Analysys - AID
4.- Account input Analysis - AID
5.- Projection of expenditures by project year - AID
6.- Methodology and assumptions - AID
7.- Financial Impact on GOES - AID

IV.- Implementation Arrangements

A.- Implementation Plan
The implementation plan for the MIS component of the project is as follows:

ACTIVITY	Begining Month	Duration (Mos)
*Write simple computer programs to support the maintenance, procurement and supply management functions.	1	2
*Define information requirements of the MSPAS.	1	3
*Revision of maintenance management, procurement management, and supply management procedures in conjunction with technical advisors in these areas.	1	6
*General design of MIS	3	3
*Write RFP for hardware/software	6	1
*Write evaluation methodology to be used in proposal evaluation	6	1
*Begin using and testing new procedures in maintenance management, procurement management and supply management.	6	6
*Receive proposals for hardware-software.	9	--
*Evaluate proposals	9	1
*Procure hardware/software.	10	1
*Site preparation in accordance to vendor specifications.	11	1

*Receive hardware.	13	--
*Hardware/software installation.	13	1
*Subsystems detailed design	6	18
*Subsystems programming	14	10
*Subsystems testing	16	8
*Write user's manual	15	9
*Users'training	16	8
*Full system implementation	18	6

B.- Procurement Plan:

Timing of procurement for MIS related equipment is as indicated in Section IV-A.

Only vendors with local representatives and creditable, reliable service should be considered for this procurement. All computing-teleprocessing-voltage regulators-batteries-, etc, should be acquired from one vendor as a package to eliminate the possibility of "finger pointing" (defining responsibilities) in the future. The equipment should be considered delivered the moment it is installed, and functioning according to specifications; not before. The extended maintenance contract should be included as part of the initial procurement package.

The posibility of using the vendor's resources for software development (turn-key) should be considered. Though it might be more expensive than an in-house effort, it should be much faster; in addition MSPAS-AID can use the leverage of a large procurement to obtain good commercial conditions, and include it all in the initial procurement package.

The air conditioners should be purchased locally.

C.- Evaluation Plan:
There should be a short evaluation (maximun one month) early in the second year of the project. This evaluation should measure progress versus the chronogram, improvement in personnel capability at the MSPAS, appropriateness of system design, and reasonability of future plans.

Another evaluation (six weeks) should be perform prior to project conclusion or shortly afterwards for the same purposes and to consider the need or posibility of a follow-up project. Factors such as political instability in the country, lack of continuity of MSPAS authorities and key personnel should be considered in both evaluations.

The evaluations should consider outcomes such as:

- Number of subsystems fully operational
- Adequacy of reports
- Adequacy of computer installations
- Quality of data being provided by the system

D.- Conditions, Covenants, and Negotiating Status:
The following conditions are necessary for the success of the project:

a) The MSPAS must create at least two positions for systems analyst.

b) All MSPAS personnel involved in the MIS effort should have salaries that are competitive in an area of low supply and high demand in this country.

c) Key personnel in the project should not be named-changed without prior consultation with AID.

d) The MSPAS will designate and remodel, as necessary, location for the hardware and working areas for MIS personnel.

e) The MSPAS will coordinate all local services such as the use of telephone lines-channels, or electrical power.

f) The MSPAS should entered into a contractual agreement with personnel that is specially trained under this project so as to ensure repayment for the cost of the training if the person leaves.

g) The MSPAS must budget to take over the contract for equipment maintenance as soon as the contract included in the initial procurement expires.

ANNEX A

LIST OF CONTACTS

A. Counterparts

Sr. Roberto Aguila Zelaya,	Jefe, Departamento Procesamiento de Datos
Ing. Oscar Armando Osorio,	Jefe, Departamento Organización y Método

B. Others

Dra. Rosa Amalia de Alvarenga,	Director, a.i. Región Oriental
Dr. Atilio Lazo,	Director, Hospital San Juan de Dios, San Miguel
Dr. Jaime Napoleón Cárcamo,	Director, Región Occidental
Lic. Enriqueta Castro de Estrada,	Gerente Administrativa, Región Occidental
Sr. Milton Vega,	Jefe, Centro Procesamiento de Datos, ANTEL
Sr. José Luis Cortez,	Sub-Jefe, Centro Procesamiento Datos, FEDECREDITO
Ing. Max Martinez,	Jefe, Centros Procesamiento de Datos, Banco Cuscatlán
Srta. Ana Celcilia Recinos,	Jefe, Operación Procesamiento de Datos
Sr. Joaquin Antonio Andaluz,	Jefe, Hospital Bloom
Sr. Atnonio Córdova,	Sub-Jefe Centro Procesamiento Datos, MIPLAN
Sr. Rene Santiago Carrillo,	Sectorialista de Salud, MIPLAN
Sr. Mariano Garay,	Gerente Técnico Ser[illegible]ta
Dr. Carlos Alberto Sagastume,	Jefe, Departamento de Estadística de Salud
Sr. Jorge Ayala,	Programación de Proyectos, Oficina Planificación de Salud.

ANNEX B

REFERENCES

Title	Author	Date
Información y Recomendaciones Procesamiento de Datos	Roberto Aguila Zelaya	5 de marzo 1983
Sistema General de Información para el MSPAS	Bustamante y Asociados	1976
Funcionamiento del Sistema de Información para el LArea de Suministros	Unidad de Organización y Método	18 Feb. 1981
Ampliación del Manejo Electrónico de Datos en el MSPAS	Dirección de Planificación de los Servicios de Salud Dept. de Proyectos e Inversiones	Oct. de 1982
Decentralización Administrativa		
Quantitative Health and Population Data		March 1982

ANNEX C

LIST OF COMMODITIES

A MIS Component

Description	Quantity
512 KBYTES CPU	1
800/1600 BPI TAPE DRIVE	1
300 MBYTES DISK DRIVE	1
600 LPM PRINTER	1
CRT	36
128 KBYTE CPU	5
125 LPM PRINTER	5
90 MBYTE DISK DRIVE	5
2-1/2 TON AIR CONDITIONERS	7
10 KVA VOLTAGE REGULATOR	1
5 KVA VOLTAGE REGULATOR	1
5 KVA VOLTAGE REGULATOR	5
BATTERY PACK	6
MODEMS	6
MULTIPLEXER	1

ANNEX D

STATEMENT OF WORK

I MIS Component

A. TECHNICAL SPECIALITY: Management Information Systems

B. Level of Effort : 24 Mos.

C. General Objective : Provide technical assistance to the MSPAS during the development of a comprehensive management information system.

D. Specific Tasks:

1. Technical

   a. Assist in the development of computer programs to support the other components of the project - maintenance, procurement, and supply management.

   b. Coordinate the development of a statement of information requirements for the MSPAS.

   c. Advise in the general design of a comprehensive information system.

   d. Advise in the writing of hardware/software RVP.

   e. Advise in the development of a methodology to evaluate proposals.

   f. Coordinate hardware/software selection and procurement.

   g. Advise in site selection and prepartion.

   h. Coordinate hardware installation.

   i. Advise in the detailed design of sub-systems.

   j. Coordinate training program.

2. Administrative

   a. Advise in the selection of short term technical assistance.

   b. Supervise short term technical advisors

   c. Produce periodical written progress reports for MSPAS-AID

   d. Write annual report of the end at each year.

Desired Qualifications -

Bachelors or Masters degree in an area such as computer science, information information systems, mathematics, economics, operations reseach, business administration, plus minimum of ten years in the design of complex information systems for large organizations. Person must be fully bilingual-English/Spanish-and of easy adaptation to the Salvadorean culture.

Short Term Technical Assistance

Area	Time of Assignment
. Accounting, Finance, Payroll, Personnel	4 weeks
. Inventory Management	4 weeks
. Maintenance Management	4 weeks
. Logistics Management	4 weeks
. Health Statistics	4 weeks

Short term technical assistance should have a minimum of ten years experience in developing information systems in one of the following areas:

ANNEX E

POSITION DESCRIPTION

A - MIS Component

1. Systems Analyst

Minimum requirements - The equivalent of four year university education in an area such as computer science, mathematics, engineering, economics, business administration, etc., plus five years experience in the design of complex information systems. Up to two years of education can be substituted by additional experience at a rate of two years of experience per year of education.

Responsibilities -

a. Head the sytems analysis section within DMIS in the MSPAS.

b. Act as head of the DMIS in the absence of the official head.

c. Design information systems including:

1) Input forms

2) Edits

3) Overall programming technique

4) Data base structure

5) Outputs

6) Users manuals

d. Coordinate programming effort with programming section of DMIS

Reporting -

Reports directly to the Chief, Department of Management Information Ssytems, MSPAS.

COMPONENT III-2
MEDICAL EQUIPMENT

June 11, 1983 Richard E. Betron

Please note that the Maintenance Systems Advisor arrived on June 1, 1983, and will depart on June 12, 1983. Due to the reduced time in country this report will be brief and to the point without broad analysis. Reference material was brought by the consultant and provided by Westinghouse Health Systems. Additional material necessary was provided on a timely basis by telex or pouch.

A. Situational Analysis

1. Background

Currently there are 102 personnel assigned to the maintenance department however, there are only 12 technicians designated as Medical Maintenance Technicians. Six of these are qualified as instructors thus could conduct courses in Medical Maintenance. However, due to the shortage of the mentioned technicians all their time is spent repairing medical equipment.

In the survey of medical activities in-country many medical items and general maintenance items were out of service because of spare parts. It is my understanding that spares have not been purchased during the last year due to lack of funds.

a. Administration (Eng.Walter Avelar , Chief Maintenance Program and Prof. Luis Rivera, Chief Bio-Medical Equipment Maintenance) are responsible for receiving work orders and assigning personnel to repair equipment. They are also responsible for any training conducted in Medical Maintenance. Both men are doing an outstanding job under the austere conditions.

After conversing with Srs. Avelar and Rivera for a period of time, I found that an equipment maintenance program doesn't exist. The only maintenance performed is maintenance by exception (when equipment malfunctions, you get it repaired). This wouldn't be desasterous if spare parts were on hand. It was also noted that operating and maintenance manuals were not on hand or available.

b. The maintenance department has adequate space at the regional center however, at the individual hospitals and center space, if available, is taken up by unserviceable and junk equipment.

2. Major Constraints and Problems - Budget

Funding for spare parts and training is virtually non-existent. For example: a G.E. X-ray machine located at San Miguel has been out of order for 4 years, three centrifuges at San Miguel have been out order for 3 years because of spare parts, two German miscroscopes (Reichert Biovar) were out of order because of bulb shortage, a sterilizer at the La Libertad (Unit) (Market Forge) out of order for 8 months due to seals around door are not in stock.

An electroencephalograph located at the Psychiatric Hospital has been out of order for 1-1/2 years because of spare parts. Blood-gas analyzer located at the Psychiatric Hospital has been out of order 8 months for lack of a PH Electrode. See Attachment 1.

3. MOH Response to Problem

a. The MOH's financial situation is very restricted and future funding isn't foreseen in the near future.

b. Disposition of unwanted equipment should be expedited since it is a function of the MOH.

c. Problems are most prevalent in the medical equipment area due to the many different countries from which equipment is ordered. Spare parts storage is monumental if not impossible for so many different types of equipment.

Standardization of medical equipment would reduce spare parts expenditures as well as reduce down-time to a minimum.

B. Proposed Assistance Strategy

The objective of this assistance visit is to improve the maintenance program and to establish a Bio-medical equipment maintenance program which includes preventive maintenance. To do this it will be necessary to:

1. A spare parts inventory should be established at each medical facility and maintenance center.

2. Establish a Medical maintenance department at each Hospital, Medical Center and Regional maintenance activity. See Attachment 2.

3. Due to the location of all the facilities in this country a Mobile Medical Equipment Maintenance shop should be considered to assist all facilities on a scheduled basis. See Attachment 3.

4. Suggest that equipment needed for Medical Maintenance Repair shops be ordered as soon as possible. See Attachment 4.

5. Suggest that the list of spare parts be ordered as soon as possible in order that much needed serviceable equipment can be put back into service. See Attachment 5.

6. Emergency Medical Supplies and Equipment needed on a priority basis are listed in Attachment 6. List prepared with coordination of Westinghouse team leader.

7. Due to in-country unrest,funding and unavailability of trained Bio-Medical Equipment Technicians,much new equipment is needed. Attachment 6 (last page), lists the recommended purchases of medical equipment and maintenance items and funding amounts for spare parts.

C. Administrative - Outputs

1. Administrative

With the incorporation of changes indicated in this paper, MOH Maintenance Department will be on its way to assisting in the improvement of better health care to the people of El Salvador.

2. Commodities, Supplies and Material Transfer

Old unreliable equipment items will be discarded and replacements purchased when funding is available.

3. Construction

The procurement of diagnostic equipment and tools for the Medical Maintenance Department will necessitate providing separate work shop areas and security of material. Once unreparable equipment has been eliminated, space will become available for tools and equipment.

4. Deployed Personnel

Training will be accomplished in country through the efforts of the Pan American Health Organization (PAHO). Once PAHO receives the requests from the MOH as to quantity an duration, curriculums and training will be organized.

D. Project Component Input - T.A.

1. Long Term — See budget (J) further in this report and T.A. Annexes.

Short Term

E. Implementation Schedule

First year-90% of the funds directed to the Medical Maintenance Department will be purchased. Bio-Medical diagnostic equipment, tools, manuals and spare parts.

Second year-10% will be used to supplement spare parts inventory.

F. Evaluation

At the end of the first year unserviceable equipment due to spare parts should not be more than 25%.

At the end of the second year unserviceable equipment should not be more than 10%. Primary aim is 3-6% on all equipment.

G. Conditions Precedent

1. MOH

a. Standardization of equipment is imperative

b. A policy established to dispose of equipment when the life expectancy has been attained or expenditure of funds exceeds 80% of the acquisition cost.

c. Timely training of Bio-Medical Equipment Technician for future assignment to Hospitals and Medical Centers.

d. Removal of spare parts for equipment no longer on hand is essential.

H. Recommendations for Project Follow-Up

1. Policy Dialogue

An agreement must be made between MOH and AID concerning solving the problems of maintenance and the establishment of a Medical Maintenance Department.

Attention should also be given to training requirements, disposal of unusable equipment, and the establishment of a spare parts inventory at each Hospital and Medical Center.

Should solutions not be attained in these areas continued down-time will not only continue but will increase as other equipment malfunctions.

2. Need for Institutionalization

Regulations governing the management of the MOH/MPAS must include the guidelines for the establishment of a Medical Maintenance Department, which will include preventive maintenance. In addition disposal of unrepairable equipment is an obsolute necessity.

3. Resources Budget, Manpower, Supplies

After project implementation, training started, equipment installed, preventive maintenance program under way, and additional personnel are on hand, an accurate, up-to-date budget can be established and maintained. The justification will identify money required to insure timely replacement of equipment and spare parts.

I. References

Material required to determine needs for the number of Bio-Medical Equipment Technicians was obtained from the American Society of Hospital Engineering of the American Hospital Association. Federal Supply Schedules were to in determining types of sets kits and outfits for Emergency Medical Service.

TECHNICAL ASSISTANCE
SHORT TERM TA
MAINTENANCE SYSTEMS ADVISOR

1. **Title:** Maintenance Systems Advisor

2. **Qualifications Required:** Bachelor in Business Administration or equivalent

3. **Special Experience Qualifications**

a. Twelve to fifteen years experience as a Medical Material Officer with control over Medical Maintenance for an entire foreign country. Experience with AID or similar foreign assistance agency.

b. Prior service in Latin America essential

4. **Language Requirements**

Fluent in speaking, reading and writing Spanish.

5. Grade Level Equivalent GS 14 or 15.

6. **Duties and Tasks:**

a. The purpose of short term technical assistance in the Maintenance System are of the Ministry of Public Health and Social Assistance is: First, make an in depth analysis of priority equipment requirements at each Hospital and Medical Center with the assistance of MOH maintenance department. Coordinate priority lists with the administrator in order that they have had input to the requirements. Keep in mind that standardization of equipment is a first priority of this project. Second, refine specifications and source for procurement of spare parts. Do not buy parts for equipment that the life expectancy has lapsed. Third, give necessary assistance when appropriate to in identification of equipment to be salvaged. Insure that salvage tags are affixed and dates established when removal can be expected. Fourth, identify location and insure adequate space is available for the medical maintenance equipment and technical material when it arrives. Fifth, follow up on purchase of manuals recommended in initial assistance visit.

b. Establish ground work for the establishment of the Medical maintenance department at the maintenance centers. Establish personnel requirements for the centers and set target dates for maintenance departments establishment in the Hospitals and Centers. Have preventive maintenance schedules established for each medical facility with anticipated target dates for completion. Start an equipment operating and installation manual library for future reference information. Follow-up on training schools and identify personnel that will attend. Insure that this program is on going until the required number of technicians are trained for all Hospitals and Medical Centers.

TECHNICAL ASSISTANCE
LONG TERM T.A
MAINTENANCE SYSTEMS ADVISOR

1. **Title:** Maintenance System Advisor

2. **Qualifications Required:** Bachelor in Business Administration or equivalent

3. **Special Experience Qualifications:**

a. Twelve to fifteen years experience as a Medical Material Officer with control over Medical Maintenance for an entire foreign country. Experience with AID or similar foreign assistance agency.

b. Prior service in Latin America essential

4. **Language Requirements:**

Fluent in speaking, reading and writing Spanish.

5. **Grade Level Equivalent** GS 14 or 15

6. **Information and Duties**

a. **Background Information**

First, an analysis of the MOH's equipment maintenance program was made and found to be operating on as required basis, (if a piece of equipment broke down it would be fixed provided spare parts were available and 99% of the time they weren't). Maintenance personnel are available in most all areas however in the medical maintenance they are grossly understaffed with qualified personnel. Second, maintenance work shops were found to be either non-existant, disorganized, or so full of junk that maintenance couldn't find parts if they had them. Tools were in short supply in the general maintenance area and medical maintenance test equipment was non-existent. Third, presently maintenance personnel are not only in short supply in technical areas but are required to work on equipment that they aren't technically qualified. In some instances they have been fortunate enough to locate problems but those instances are few.

b. **Tasks**

i. Provide management and technical assistance for the establishment of medical maintenance departments and recommended staffing for hospitals, centers, and units. Scheduled preventive maintenance will be performed by qualified personnel to keep down time to an absolute minimum. It is suggested that spare parts inventories be established at each using activity. Suggest that a library of equipment operating instructions be set up at each facility with an original copy at the regional medical maintenance center. A long term training program should be started to provide future medical maintenance staffing. Suggest that a goal of 72 trained medical technicians be set. Short term training will be provided by in country technicians.

ii. Organization of management and administrative improvement of the medical maintenance area of the MSPAS will start at the inception of the project to the extent possible. Priority effort must be given to repair of life saving and essential medical equipment. Other essential equipment must also receive repair by their respective technicians.

iii. A review of GOES Project 604SF-ES is satisfactory in principal, however, situational requirements indicate immediate action to insure problems do not get overwhelming. The immediate problem as viewed is primarily economic. The lac of funding to procure spare parts has resulted in many equipment items being out of service due to lack of parts and a technician having time available to make repairs.

iv. Technical assistance required is urgent and should receive immediate attention primarily in the best interest of patient care. Personnel in the Medical Maintenance area of general maintenance should be identified for long term schooling in the Medical Maintenance field. Efforts to obtain a minimum of 72 qualified technicians for staffing at the 12 Hospitals and Units. Technicians at the Regional Center in San Salvador should make scheduled maintenance visits to hospitals, centers, units and posts for preventive maintenance. The San Salvador Center can also be called for technical assistance as well as personnel.

v. The list of Spare Parts and critical equipment have been reviewed and are a definite necessity in the interest of patient care. The list of spare parts are in English but the equipment needs are in Spanish. Recommend the purchase of Medical Maintenance equipment sets for each Hospital and Center. In addition, the purchase of a Medical Maintenance mobile unit would assist the entire country in maintenance capability.

c. <u>Management of Equipment Purchases</u>

i. Review on a continuing basis, equipment due-in prepared by the short term MSA, update and revise scheduled installations.

ii. Insure that all needed items have been placed on order with procurement. Insure that standardization has been strictly adhered to.

iii. Review on a continuing basis equipment to be salvaged and that requirements have been submitted for replacement.

iv. Insure that all manuals required for on hand equipment have been ordered and date material is expected.

d. <u>Medical Equipment Maintenance</u>

i. Review on a continuing basis the status of space available for implementation of the medical maintenance program.

ii. Insure that personnel training requirements have been submitted form MOH and (PAHO) has programmed the training on a continuing basis until requirements are fullfilled for Hospitals and Medical Centers.

iii. Follow-up on target dates for establishment of medical maintenance department in hospitals and medical centers.

iv. Review on a continuing basis the establishment of preventive maintenance programs for hospitals and medical centers and respective target dates.

v. Insure that a library has been established for operating and maintenance manuals for bio-medical equipment.

BUDGET

		Yr. 1	Yr. 2	GOES
I.	T.A.			
	A Long term 18 mo. 120/yr.	120	60	
	B.Short Term 12 mo. 11/yr	96	44	
II.	Commodities			
	A minimal Equip. needs.	511		
	B.Repair & Maintenance			
	1. San Salvador	180	45	
	2. San Miguel	180	45	
	C. Site prep. for X-Ray Martinez 12 units a 20			240
III.	Training - Possible Funding PAHO			
	A. 20 persons			60
	8 - San Miguel			
	12 - 1 at each of 12 Hosp.			

* It was noted in visitations at various Medical Facilities throught the country that bad lining of X-Ray rooms did not exist. In the interest of safety to patients andmedical personnel this recommendations is made.

81

ATTACHMENT NO. 1

Visits were made to the following areas to identify first hand the problems that exist and talk with personnel to gain insight as to the cause.

HOSPITALS

Rosales Hospital (General Medicine)

Maternity Hospital (Gynecology)

Psyquiatric Hospital (Special)

Bloom Hospital (Pedriatic)

Pnemologic Hospital (Special)

San Rafael Hospital (General Medicine)

HEALTH CENTERS

Health Center of San Bartolo

UNITS OF HEALTH OF

Lourdes

La Libertad

Zaragoza

POST OF HEALTH C

Panchimalco

Rosario de Mora

OTHERS

Central Laboratory in San Salvador

Malaria Laboratory in San Salvador

LOURDES - Unit locales at 25 km from San Salvador

Dental Unit Ritter - Model 180 - 1975

Spare parts needed - hoses for handpieces
" " evacuator

Sterilizer - needs replacement
small

Centrifuge - 2

Refrigerator - OK

Typewriter - OK

Exam tables could be replaced soon.

LA LIBERTAD - Unit

Centrifuges - Big - working
Small - Working

Dental Unit - Vacudent

Sterilizer - Market Forge - Needs seals around hose
8 mo. out of order.

Refrigerator - Working

ZARAGOZA - Unit located here (same layout as Lourdes)

PUESTO DE SALUD - PANCHIMALCO

Sphygmomanometer - replacement required

Exam tables - needed - antiquated.

PUESTO DE ROSALES - Rosario Mora

Sphygmomanometer - needed

Sterilizer - needed

Typewriter - needed

Small refrigerator

Exam table

Light

PSYCHIATRIC HOSPITAL - 450 - 900 total

Sterilizer - Bad Castle - replacement needed

Elec. Shock - Bad - replacement needed

Gimco Drainage - Bad - replacement needed

Dental Unit - Ritter - Bad - replacement needed

X-Ray 100 MA - Phillips - 30 yrs. + - Replacement necessary.

LABORATORY

5 microscopes - Bad - replacement needed

4 centrifuge - Bad - replacement needed

Sterilizer - Bad - replacement needed

2 calorimeter - working but not good replacement necessary.

Autoclave

KITCHEN - bad lighting

11 - gas open flow stove - replacement necessary

Food cart - Bad - 8 yrs.

No dishwasher.

No Med. Maint. Man required - close to center.

LAUNDRY:

Folding machine - Bad - 5 years.

Air Cond. - Bad - unserviceable - replacement needed

EEG - Japonese make - electronic circuits out - 7 yrs.

Electro Encephalograph - out of order.

PRIORITY REQUIREMENTS IN FOLLOW AREAS:

LAB -

Sterilizer

ECG-EKG - X-Ray equipment

PNEUMOLOGICAL HOSPITAL - 508 - 303 beds in use

Boiler - Need preventive maintenance

Food Service: General repairs needed

Have only 2 workers in maintenance - Gen. Maint.

O R Light - need replacement

Table - need replacement

Anesthisia Machines for children needed

Sunction pumps - needed

Emergency power for new section - needed

Air compressor - Bad - 6 mo. - replacement necessary

Air compressor - Bad - 1 week

Gast outlets - replacements required.

New Sterilizer - 1 yr. old - good operating condition

No maintenance manuals on hand.

Operating instructions in English - Meditien, S.A.
Apartado (01) 13
Tel. 265-665

Suction machine out of order 2 yrs.

Picker X-Ray - 30 + yrs - Bad tube - 1 mo. ago - out of order.

No protection

General Electric - 35 + yrs.

X-Ray/day 75 normal 25 now.

Need automatic processor

New 600 M A.Picker

No maintenance for optics

Olympus optical CLE-4u supply - Japan

Spare bulbs - needed

Instructions in English

Dishwasher hasn't worked 15 yrs.

Boiler - 30 yrs. old.

Water collector bad

Motor - Bad

Milner 50 No. washer motor needs repair - no $ - should be repaired.

Laboratory extractor motor out order 2 yrs. had for 4 yrs.

Instrument Laboratory - Blood gas analyzer

No. 326 2 years - 8 mo. bad because of PH

No. 213 electrode needed.

E K G - Neben Kohden

Need electrodes fasteners

Collins Sperometer Model 06031

Need hose for beathing air into machine

Need Nose Plyer

Need record paper - Line printer SP302 New 1 yr. old.

Ultrasonic Nebulizer 35B

Bird respirator - Thrisbird - 4 years old - many problems

June 2, 1983

ROUGH FIELD NOTES
ROSALES HOSPITAL
Over 100 years old

I. Areas visited

A. Emergency Room

1. Antiquated equipment
X-Ray machines portable - 1940
Exam tables - 1910 vintage - patched welded
Guerney's - broken parts, no cushion on top - no slides.
Outdated medical supplies injectibles

2. Many hosp personnel - don't seem tohave direction (overflow of patients in emergency room).
Patients sleeping on floor
Waiting for room on Guerney's .

B. Ward Areas

1. Hospital bed are iron beds of the 1920 or 30.
2. Few if any bed side stands.
3. Few if any overbed tables
4. No screens on windows.
5. No privacy screens for patients
6. Didn't see any Emergency Cort in areas visited
7. Didn't see any Thermometers.

C. Food Service Area

1. 1900 vintage stoves
2. 1900 vintage sinks
3. Didn't see desk machine at all
4. Unsanitary conditions
5. Poor lighting in all areas
6. Some ovens have been out of order for 3-5 years.
7. Chairs or benches ere not available for in patients to sit an thus they sat on curbs and floors.

D. Maintenance Area (General)

1. Huge quantities of inoperable equipment stock in every corner available. 95% of items mentioned were junk.

2. Medical maintenance is not separated from general maintenance.

3. Preventive maintenance is non-existent. Maintenance is conducted on an as needed basis.

4. Records and operating manuals are non existent in the maintenance area.

5. Location of the department is an area far removed from any activity, in most instances it is located in a shed or ban to or some corner in the boiler room

6. The general condition of the maintenance department is generally unorganized.

7. Boilers are antiquated and in need of replacement.

8. Air conditioners for surgical areas are non-existent causing serious sterile problems.

9. Considering the numbers of X-Rays films processed immediate consideration should be given for the installation of a silver recovery program. Money received from silver could be used to obtain new equipment or spare parts.

10. Individual consideration should be given each piece of equipment concerning its age, malfunction and cost for repari. Should repair cost more than 2/3 the acquisition cost the item should be salvaged.

E. <u>X-Ray Department</u>

1. The new X-Ray.

May 12, 1983

SAN BARTOLO

Director: Mrs. Zoila Platero

Center 80 beds
New Dental Unit
X-Ray working - No film - No protection
Sphymomometer - Bad.
Laboratory -
Equip working - PM needed
Sterilizer - replacement
Blood Bank Refrig - working - replacement
X-Ray - 300 Manuals Catalog No. 3485
Universal X-Ray Model Easymatic Super 325 Chicago, Ill.
No developer too small or silver recovery program
Orthopedics - reostate needed for lights No MM men available
OR - Drager Anesthesic Machine - 35 years.
In need of MM & PM program
Pedriatic Unit.
Lavanderia - Mexican equipment - most bad.
Incinerator - Bad - 2 years - bad door - regulator
Shenanodeh Model 1-71-ITC.
Oil fired incinerator - Harrisberg, Va. 22801.
Central Supply -
Sterilizer - Consolidated stills & sterilizers - Bad seal.
Cocina- Bad steam valves resulting is equipment breadkdoing.

ATTACHMENT 2

RECOMMENDATIONS:

I. Establish a Medical Maintenance department with direct line responsibility to the Administrator or his designated representative.

A. The number of personnel required in the Medical Maintenance Department is dependent on the number of beds in the hospital as well as the inventory of bio-medical equipment in each hospital, center, unit, post, etc. Due to time constraints recommendations for staffing shall be listed by Medical Maintenance Departments in similar size Hospitals in the United States in accordance with the American Society of Hospital Engineering and the Joint Commission on Accreditation of Hospitals (JCAH).

1. 250 Bed Hospital - 3 Biomedical Equipment Technicians (BMET) plus the chief of the department.
   All personnel will perform maintenance duties.
2. 350 Bed Hospital - 4 BMET plus the Chief.
3. 450 " " - 5 " " " " .
4. 550 " " - 6 " " " "
5. 650 " " - 7 " " " "
6. 750 " " - 8 " " " "
7. 850 " " - 9 " " " "
8. 950 " " - 10 " " " "

B. The number of BMET in each facility have speciality training within each medical equipment area thus have the capability to diagnose problems of equipment failure with great speed.

C. Suggest that a copy of the Book Medical Equipment Management in Hospitals be obtained from the American Hospital Association, 840 N. Lakeshore Drive, Chicago, Illinois 60611. This book will provide a complete guide for the establishment of the Medical Maintenance Program. It will also give suggested preventive maintenance schedules for all medical equipment in each department.

A copy of the Estimated Life of Equipment is attached. This material can be used as a guide to determine what equipment can be salvaged or programed for replacement in the budget.

D. In order to staff the hospitals and centers with sufficient BMET, an extensive training program must be initiated. It is suggested that a minimum of 20 people be sent to technical schools within the next 3-6 months. Lenth of training depends on the particular school: i.e Texas State Institute in Waco, Texas, has a 21 month program that starts in September with an estimated cost of $3500 per year. Avalability of lots for foreign students is not known.

The Pan American Health Organization (PAHO) has the training responsibility for medical Maintenance personnel but has not been asked by the MOH for the training. In view of urgent need for trained medical equipment repairmen, suggest that the MOH request that 20 slots be established for in-country training as soon as possible. Training in-country will be more economical and better comprehension due to its being taught in Spanish.

ATTACHMENT B-4

ESTIMATED LIFE OF EQUIPMENT

PART I—ESTIMATED LIFE OF MEDICAL EQUIPMENT

Item	Life Expectanc (In Years)
[redacted]	
Blast cleaning cabinets	8
Controllers:	
Dental engine	7
Dental handpiece motor	9
Fixture, light, ceiling	10
Freezer, laboratory	7
Gage, thick dial lens	6
Motors, alternating current	7
Refrigerators, mechanical biologicals and whole blood	8
Sealing machines:	
Electronic	8
Heat, portable	8
Trucks, hand, shelf	5
Vacuum pumps, rotary	10
[redacted]6515	
Absorber units, gas anesthesia apparatus	10
Adaptometers, radioactive plaque	9
Analyzer, oxygen portable	6
Anesthesia apparatus	12
Anesthesia set, endotracheal	12
Audiometer calibration set	10
Audiometers	10
Bone surgery sets	16
Booths, audiometric examination	15
Cases, bronchoscopic instruments	17
Cooler, introgastric, hypothermia	9
Culdoscopes	10
Cystoscopes	16
Dermatones	18
Dilator and suction apparatus, uterine evacuator	6
Drainage and suction apparatus	6
Drills, electric, bone	17
Electrocardiographs	9
Electroencephalographs	16
Electrosurgical:	
Apparatus	10
Sets	10
Forceps, cystoscopic	14
Frames, ophthalmological trial lens set	7
Generator electric diagnostic instrument	12
Hypodermic injection apparatus, automatic	8
Implant and conformer sets, orbital	15
Inhalators	5
Inhaler units	7
Insufflators	10
Lanterns, color perception testing	12
Laryngoscopes	7
Lens Sets:	
Gonioscope, ophthalmological	16
Trial, ophthalmic	9

Item	Life Expectancy (In Years)
Light carrier, cystoscope	12
Light, color perception	9
Light, head, diagnostic	5
Light, slit, ophthalmological	12
Lithotriptoscopes	15
Locator, electronic, surgical	10
Magnets, eye, electric	20
Mounting kit, inhaler unit	7
Nasopharyngoscope	7
Nozzles, automatic jet hypodermic injection apparatus	7
Operating apparatus, ENT	12
Ophthalmometers	12
Ophthalmoscope, polarizing	7
Ophthalmoscope, retinoscope and transilluminator sets	7
Ophthalmoscopes	7
Pan-Endoscopes	17
Perimeters, ophthalmological	11
Phorometers, ophthalmic	12
Phoropters units, with motor operated chair	11
Phoropters	11
Pneumothorax apparatus	16
Power supply, electrodiagnostic instruments	12
Prisms, gonioscope, ophthalmological	16
Projectors, ophthalmological	10
Resectoscopes	14
Resuscitators	8
Retinal detachment apparatus	17
Retinoscope, copeland	6
Saws, bone cutting	8
Spirometer	8
Stand, ophthalmic instrument	11
Stereoscopes	8
Stimulator, muscle, diathermy	12
Suction and pressure apparatus	6
Suturing apparatus	15
Tables, ophthalmic instruments	11
Tachistoscopes	9
Telescopes, cystoscopic	17
Tents, oxygen	8
Tourniquets, pneumatic	8
Ultrasonic unit	9
Vision test apparatus, color threshold	10
[redacted] 6520	
Articulator, anatomical	10
Bases, dental operating stool	6
Baths:	
Electrolytic dental laboratory	6
Water, dental impression compound	6
Cabinets, dental instruments and supplies	11
Cabinet-Sinks:	
Dental laboratory	11
Dental operating room	11
Casting machines, dental metals	10
Chairs, dental operating	8
Clamp and ejector, dental flask	10
Collector units, dust	10
Compressors	8
Curing units	8
Cuspidors, fountain	10
Dehydrators	8

Item	Life Expectancy (In Years)
Dental:	
Engines	8
Operating units	10
Evacuators, oral cavity, dental	5
Furnaces, dental laboratory	8
Glide, dental operating chair	10
Grinding and polishing machines	8
Handpiece, air	6
Hoods, dental laboratory grinding and polishing machines	10
Insert drawer dental instrument and supplies cabinet	11
Light oral cavity fiber optic	8
Light, dental operating	8
Mixer-Investors, vacuum	10
Motors, dental handpiece	9
Soldering and brazing outfits	9
Stools, dental operating chair	8
Surveyor clasp station	10
Tables, laboratory, prosthetic	7
Testers, pulp, dental	6
Trimmers, dental model	8
Ultrasonic prophylaxis units	10
Vibrator, dental	10
6525	
Booths, X-ray protective	10
Cabinets, cassette-film transfer	8
Cable assemblies and radiographic cone sets	8
Camera unit, photofluorographic	10
Cassette changers	8
Cassettes:	
Radiographic film	8
Radiographic paper and developer assembly	7
Chests, X-ray film protective	8
Collimators, X-ray apparatus	9
Control units, X-ray apparatus	10
Cooler and heaters, X-ray film processing apparatus	9
Coolers, X-ray film processing unit	10
Cutter, X-ray film	12
Densitometers	17
Driers and bins, X-ray film	8
Driers:	
Photographic film	8
X-ray film	8
Grids, radiographic	15
Hood, fluoroscopic screen	10
Illuminators, X-ray film	6
Locater, radiographic	17
Photofluorographic and roentgenographic accessory assemblies	11
Processing machines:	
Photographic film	6
Radiographic film, automatic	6
Radiographic paper and developer assembly	6
Processing units, X-ray film	6
Rectifier assemblies, radiographic and fluoroscopic X-ray apparatus	10
Safe, dental X-ray	12
Screens, X-ray protective	10
Sinus-mastoid positioner, radiographic	11
Stereoscopes	12
Tables:	
Field, X-ray apparatus	10
Radiographic	10

Atch. B-4, Part 1—Cont.

Item	Life Expectancy (In Years)
Tanks, master, X-ray film processing	6
Transformers, X-ray apparatus	10
Tube stand units:	
Dental X-ray apparatus	9
Medical X-ray apparatus	9
Tube-Transformer head, X-ray	10
Tube unit, medical X-ray apparatus	9
Viewers, X-ray film	10
X-ray apparatus:	
Dental	6
Photofluorographic	12
Radiographic	12
Radiographic and fluoroscopic	12
[redacted]6480	
Baker, physical therapy	12
Bassinet and dressing table combinations	8
Bassinets	8
Baths:	
Paraffin	10
Whirlpool	8
Battery power supply	11
Beds:	
Adjustable	12
Folding	12
Fracture	18
Non-adjustable	12
Orthopedic	18
Blowers, mobile respirator	9
Cabinets (instrument, medical, solution)	12
Carts:	
Clinical chart holder	12
Medicine	7
Orthopedic bed	7
Surgical dressing	7
Chairs:	
Examining and treatment, surgical	12
Sitz bath	12
Cover, surgical instrument and dressing cabinet	11
Cribs	12
Desks, flat top, metal	12
Detectors, hole, surgeon's gloves	6
Diathermy apparatus	12
Evacuation bag, casualty	18
Filter-mixer-tank units	6
Frames:	
Bradford	12
Overhead, hospital bed	6
Half-Tanks and undercarriages, mobile respirator	11
Headrests, surgical	16
Heaters:	
Heat treatment pad	8
Solid fuel, sterilizer	7
Incubators, infant	10
Lights:	
Infrared	10
Ophthalmic	10
Surgical bracket, portable	10
Surgical, ceiling	10
Surgical, field	8
Surgical stand	10
Ultraviolet	10

Item	Life Expectancy (In Years)
[redacted] Group 66	
Analyzing kit, meat fat content	6
Balances:	
Analytical	12
Prescription	9
Torsion	10
Blood gas apparatus	5
Blood testing kit, carbon monoxide	5
Case, microscopy supply set	9
Centrifuges	12
Comparators, color	6
Counter, blood cells	9
Counting apparatus, bacterial colony	8
Crucibles, ignition	8
Demineralizers	8
Detectors, hydrogen sulfide	6
Distilling apparatus	9
Ice making machines, laboratory	9
Incubators, bacteriological	10
Indicators:	
Carbon monoxide	8
Combustible gas	8
Lights, microscope	9
Meter, titration	7
Meters:	
Air velocity	9
Hydrogen ion test	10
Microscopes	10
Microscopy supply set	10
Microtomes	10
Mixing chamber, electric food blender	10
Ovens, laboratory	10
Photometers, flame	6
Pipetting machines	10
Refractometer, hand	12
Scale, dial indicating	6
Shaking machines, laboratory	10
Spectrophotometers	9
Stirrer-hot plates, magnetic	7
Test sets, water turbidity and color	12
Tissue processors	9
Titrator	8
Washer, pipet	8
Washing machine, glassware	10
Water baths, electric, serological	7
Water testing kits, bacteriological	
[redacted] Groups 67-99	
Box, pathological specimen	10
Camera, still picture	10
Chart set, anatomical	10
Cleaner, vacuum, electric	10
Desks, flat top, metal	6
Dolls, training	
Manikins:	
Resuscitation training	5
Thoracic cross section	5
Mattresses:	
Innerspring	6
Pneumatic	6

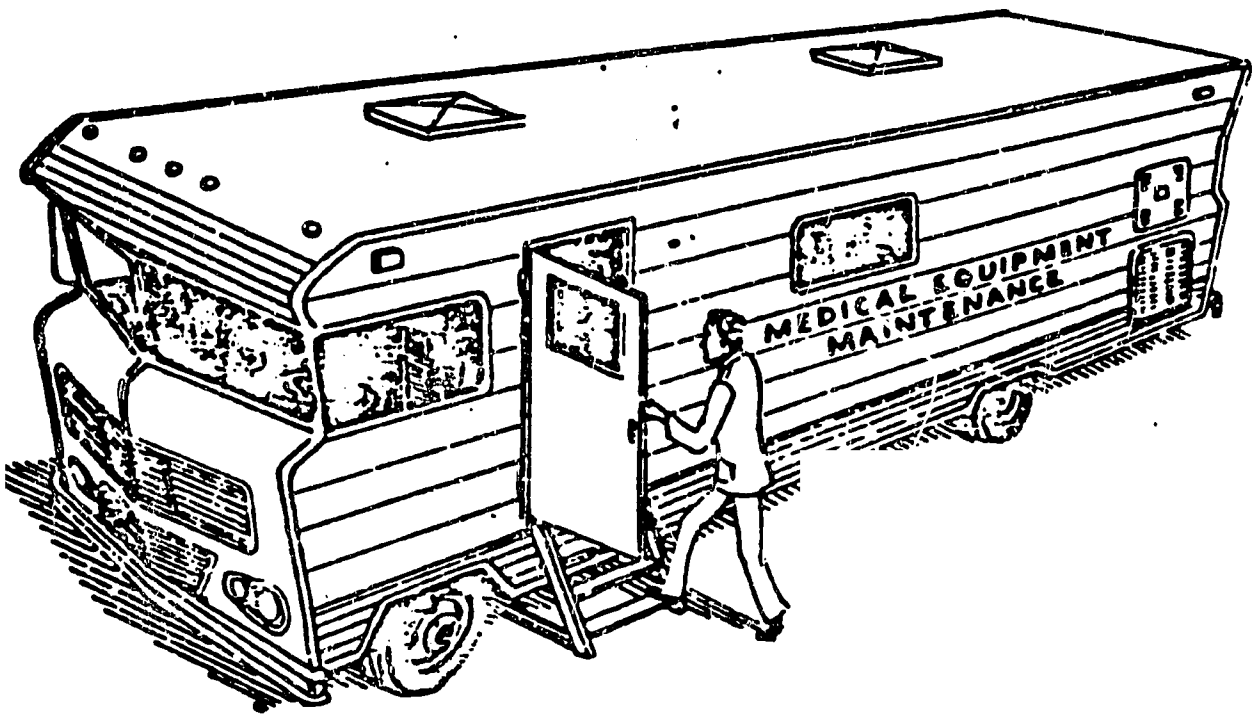
h 8.4. Part I—Cont.

Item	Life Expectancy (In Years)
Litter sets, folding pole litters	7
Litters, rigid, mountain or stokes	8
Moist heat apparatus, physicotherapeutic	12
Parallel bars, physical therapy	15
Power supply, mobile respirator	11
Racks:	
Drying, gloves	12
Surgical sponge	12
Rail, restraint, hospital bed	8
Regulator and litter mount, portable respirator	10
Respirators, mobile or portable	10
Sanitizers:	
Hospital utensil	11
Surgical instrument	11
Screen, bedside, aluminum	12
Sterilizer assemblies, water	12
Sterilizers, pressure (dressing, instrument and combination type)	12
Stands:	
Basin, double	12
Shelf	12
Surgical instrument	12
Stretchers:	
Ambulance	10
Hospital	7
Tables:	
Anesthetist's	12
Autopsy	12
Examining and treatment	12
Exercise, physical therapy	12
Folding legs, laboratory	12
Obstetrical and gynecological	12
Operating, animal	12
Operating, field	12
Operating, hospital	12
Orthopedic	12
Patient examining	12
Surgical instrument and dressing	11
Surgical sink	12
Urological	18
Utility, hospital	12
Thermoregulator, patient	8
Top, child's crib	12
Traction:	
Apparatus	14
Appliances, cervical injury	14
Truck, hand, shelf	6
Turning frames, orthopedic bed	18
Ultransonic apparatus, portable	12
Vaporizers	7
Warmers, nursing bottles and formulas	10
Washer-Sterilizer, surgical instrument	12
Washer, bedpan and urinal	8
Wheel chairs	5
[redacted]6540	
Colmascope, ophthalmic lens	10
Marker, ophthalmic lens	8
Spectacle fitting adjustment set	6

ATTACHEMENT 3

MOBILE MEDICAL EQUIPMENT

MAINTENANCE SHOP



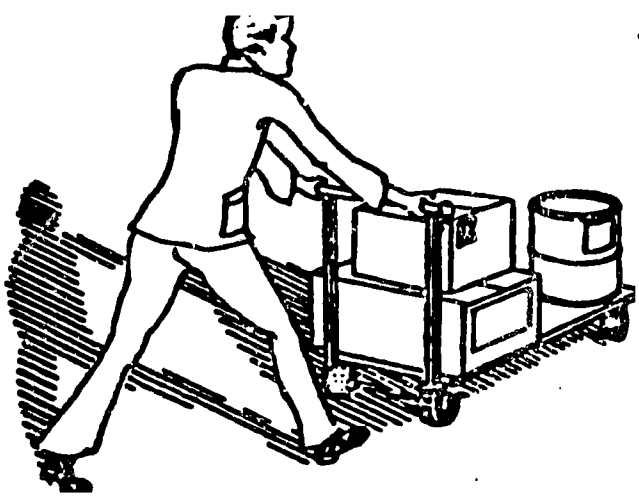
MOBILE, SELF POWERED VEHICLE

LIVING FACILITIES

WORKSHOP BENCHES, CABINETRY

TEST INSTRUMENTS

TOOLS & ELECTRIC MACHINES



GENERAL: Maintenance services to hospitals and clinics can often be provided in the field. The maintenance vehicle must be completely equipped with instruments, tools and materials. In addition, because of housing problems in remote areas and costs, the vehicle can also provide housing and essential facilities.

Medical Mobile Equipment Maintenance Shop meets these requirements. The ruggedly constructed vechicle has been constructed to be completely mobile, fully equpped to meet maintenance problems and liveable for the technician and/or driver. A full facility containing beds, toilet, wash basin, kitchen sink, gas range and oven, refrigerator, storage cabinets, cooking wear and dishes as well as linens are provided.

The interior is well lighted and attractively panelled. A vinyl floor for ease in cleaning, and a metal coated exterior assures effective long life utilization.

The interior, with climatic controls (both air conditioning and heating) provides for all weather conditions.

The work shop, provided with work benches and storage cabinets, contains test instruments, tools, machines and basic supplies.

A power generator and hot water supply is provided.

VEHICLE: The vehicle is 27 feet (approximately 8 meters) long and 7 feet-9 inche (2.3 meters) wide. Automatic transmission, power brakes, ancillary gasoline tank and heavy duty battery are a few of the many special features (complete description provided elsewhere in brochure) emergency road equipment and special vehicle spares are provided.

SHOP AREA: The shop area contains two spacious work benches and numerous storage cabinets for storage of instruments, tools and spare parts.

Overhead lighting and a 220V, 50Hz power source is provided for servicing clinical instruments.

The facility is equipped to provide service in such fields as:

1. Electrical Machines
2. Mechanical Devices
3. Optical Instruments
4. Electronics Equipment
5. Refrigeration Units & Air Conditioning
6. Heaters
7. Electromechanical machines
8. Gas Instruments

INSTRUMENTS & TOOLS: Two different sets of instruments are provided. One set of instruments is used for checking the patient safety of hospital equipment. Special labels are available for marking hazardous instruments. Complete hospital survey information and equipment is available for survey studies.

A complete set of laboratory and shop instruments, such as Oscilloscope, VTVM, Transistor Tester, Counter and Digital Voltmeter are available (see proforma invoice for complete listing).

Special instruments for checking cooling systems is also included.

Power tools, such as drill press, arbor press, portable drill, welding equipment and cutting equipment is provided.

HOUSING & LIVING AREA: A comfortable facility is provided for the worker(s). Two beds and two sets of all linens are provided.

The kitchen area is complete with gas range, oven, refrigerator, sink (hot and cold water) storage areas (for food supplies), toilet and wash basin. All needed supplies except food is provided.

A 50 foot hose for filling water tanks is provided and an auxillary power cable for connecting to main power lines is also included.

Extra quantities of chemicals is provided for waste disposal.

First aid and fire extinguishers as well as emergency ligh is also included.

A folding curtain behind the driver separates and encloses the shop area.

SUPPLIES: Some genera supplies such as solder, tape, hardware, fuses, etc., is provided. Specific spare parts as required for specific equipment cannot be included at the outset. These materials will have to be added after a determination of needs has been made.

SUMMARY: The transport of hospital instruments to a distant work shop may not often be feasible. Furthermore, the moving of delicate instruments can often cause more damage than originally existed. The repair of special cooling and heating appliances often cannot be removed for repair. Some equipments are too bulky to be moved.

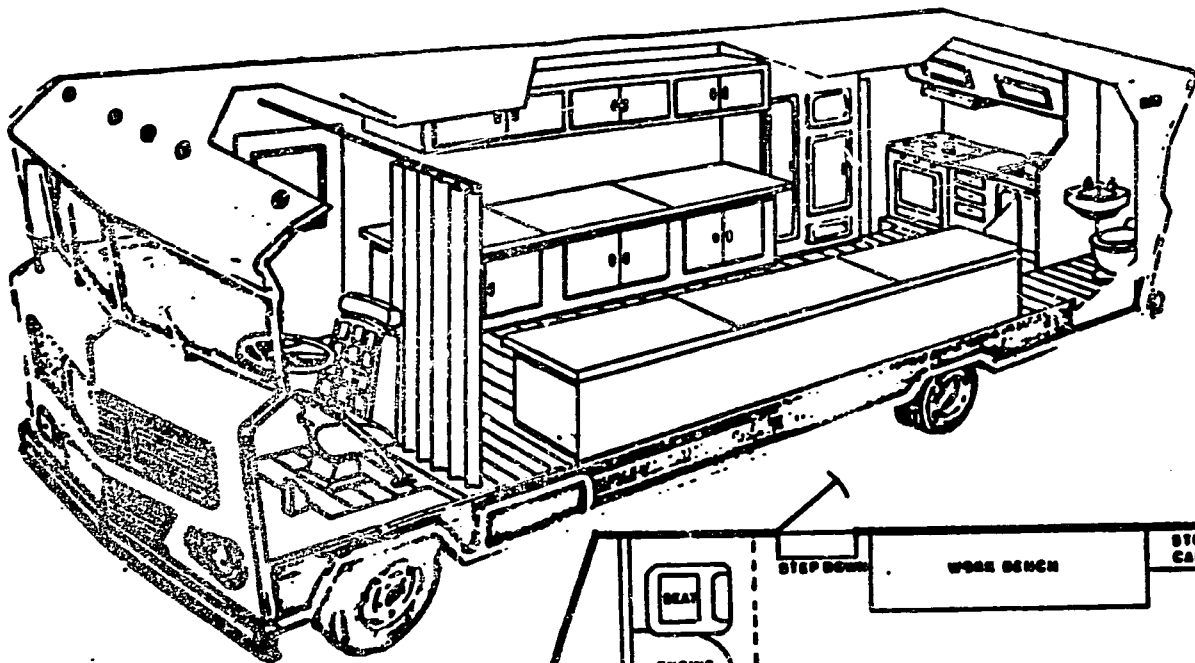
The survey of hospital equipment for hazardous conditions require that the technician has a variety of special instruments available on his visit to the hospital. Small repair parts are often required for on the spot maintenance. All of these required instruments and materials are made readily available for on the spot service.

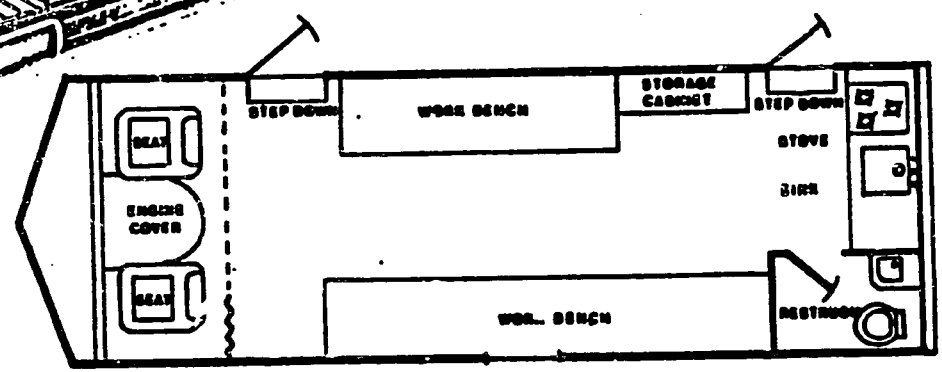
Housing of repairmen who have to travel for days, encounter housing problems. The vehicle provided includes comfortable living facilities with climatic control.

The Mobile Maintenance vehicle is the extension of a maintenance depot and except for major overhaul work, it can provide for 80% of most service requirements.

Each vehicle is provided with the name of the organization clearly displayed.

MOBILE HOSPITAL MAINTENENCE UNIT





VEHICLE:

-Model D-27 MI Industrial Van-27 Ft.in length, 7'9" wide mounted on a 178" wheelbase chassis with 413 cu. in. (or 440 C.I.) V-8 engine equipped with federally approved emission controls, also automatic transmission, power assisted brakes and power steering. It will be vinyl tiled industrial type covering. It will have a 6.5 KW Generator with remote control started switch and hour meter. There will be an Auxiliary Gasoline tank of 40 gal. capacity. There will be a screen door at the front door. There will be 2-10,000 BTU roof air conditioners. There will be a pair of combination mirrors (non-rusting). There will be a 2-30 lb., L/P bottles with the automatic change over regulator. The driver and passenger seats will be of the Chieftan style covering (gold) with arm rests. There will be 1 mattress 2" deep x 30" wide x 76" long. The exterior will consist of an enamel coating over aluminum. Your Name and Hospital Maintenance Unit will appear on one side.

VEHICLE ACCESSORIES:

6500 Watt (50H) Onan
2 - 10M BTU - (50H) Roof Air
220 AMP Battery 5 Gauges
Windshield Curtain
Screen Door
Convex Mirrors
Auxiliary Gas Tank
Glide-a-way Bunk (exchange)
L/P Automatic Regulator
Spare Tire

SPECIFICATIONS:

To supply mobile maintenance vehicles, in quantities as required, to be self-powered for mobility and electric power (220V, 50Hz), heated and air conditioned, sleeping, bathroom and kitchen facilities for remote travel usage, complete with work benches, power and hand tools, test instruments and vehicle spare parts.

INTERIOR SUPPLIES:

Formica Counters & Cabinetry-per drawings
4 - 48" Double Tube Flourescent Lites
4 - 220V outlets to work benches
1 - Fold-up Cot
2 - Sets Bed Linenes, Blankets, Pillows & Cases
2 - Sets Toweling & Wash Cloths
1 - Set Cookware & Utensils
2 - Place Sets - Dishes & Silverware
1 - Propane Liter for Stove & Water Heater
1 - 50' Non-Toxic Water Fill Hose
1 - Extra 10' Sewage Hose
12 - Packages Holding Tank Chemical
6 - Extra 48" Flourescent Tubes
1 - Emergency Road Flare Kit
1 - Emergency Bulb & Fuse Kit
1 - Set Engine Drive Belts (2)
1 - Set Engine Filters (4)
1 - Set Engine Water Hose (3)
1 - Fire Extinguisher (Std. Equip.)
1 - First Aid Kit

Best Available Document

MOBILE MAINTENANCE VEHICLE
FOR HOSPITAL EQUIPMENT
MAINTENANCE

	BUDGETARY PRICES
Mobile Maintenance Vehicle and Test Instruments and Tools - - - - - - - - - - - - - - - -	$125,000.00

MOBILE MAINTENANCE VEHICLE

M	QTY	MFG	MODEL NO	DESCRIPTION		PRICE IN DOLLARS EACH	AMOUNT
	1			Mobile Maintenance Vehicle; 7.9 x 27 ft., self-powered, air conditioned, heated, bathroom, kitchen facility, sleeping area, panelled walls, vinyl floor, work benches, storage cabinets.			
	1Set			Test Instruments, Tools; for Maintenance Vehicle, and safety publications.			

QTY	MFG	MODEL NO	ITEM DESCRIPTION	UNIT PRICE	AMOUNT
			MOBILE MAINTENANCE VAN		
			VEHICLE SPECIFICATIONS:		
			M I Industrial Van: 27 Ft. in length, mounted on a 179" wheelbase chassis with 413 cu.in. (440 C.I.) V-8 engine, h federally approved emission controls, ic transmission, power assisted brakes eering. It will be vinyl-tiled industrial g. It will have a 6.5KW Generator with ol starter switch and hour meter. There auxiliary Gasoline tank of 40 gal. capacity. t the front door. Double fold-away step r. 2-10,000BTU roof Air Conditioners. ain at windshield, spare tire and cover. ery with battery gauge. Pair of combination mirrors (non-rusting). 2-30 lb. L/P bottles with automatic change-over regulator. The driver and passenger seats will be of the Chieftan-style covering (gold) with arm-rests. 1-mattress, 2"D x 30"W x 74"L. Exterior consists of enamel coating over aluminum. The name of the Organization will appear outside and Medical Maintenance Unit.		
			VEHICLE ACCESSORIES:		
1			6500 Watt (220V/50Hz) Generator		
2			10M BTU Air Conditioners		
1			220AMP Battery & Gauges		
1			Windshield Curtain		
1			Screen Door		
1			Convex Mirror		
1			Auxiliary Gas Tank		
1			Glide-a-way Bunk (exchange)		
1			Water & Sewage Gauges		
1			L/P Automatic Regulator		
1			Spare Tire		
			INTERIOR SUPPLIES:		
			Formica Counters & Cabinetry		
4			48" Double Tube Fluorescent Lites		
4			220V Outlets to Work Benches		
1			Fold-up Cot. plus bed over driver's seat		
2			Sets Bed Linens, Blankets, Pillows & Cases		

QTY	MO	MODEL NO	DESCRIPTION	PRICE INDUST EACH	PRICE INDUST MOUNT
			Bath Towelling & Wash Cloths		
			Set Cookware & Utensils		
			Place Settings - Dishes & Silverware		
			Propane Liter for Stove & Water Heater		
			50' Non-Toxic Water Fill Hose		
			Extra 25' length 220V Extension Cord		
			Extra 10' Sewage Hose		
			Packages Holding Tank Chemical		
			Extra 48" Fluorescent Tubes		
			Emergency Road Flare Kit		
			Emergency Bulb Kit		
1			Set Engine Drive Belts (2)		
			Set Engine Filters (4)		
			Fire Extinguisher (Standard Equipment)		
			First Aid Kit		
			Trouble Light		
			TEST INSTRUMENTS, TOOLS, SUPPLIES:		
2			Dual Beam Oscilloscope w/Probes		
1			VOM Meter		
1			Frequency Counter, 10-60MHz.		
1			Function Generator, 1-1MHz.		
1			Transistor FET Tester		
1			Tube Tester		
1			Capacitor Meter, Digital; .1-1Farad		
1			Digital Multimeter w/Accessories		
1			Dual Power Supply 0-50VDC		
1			Clamp-on Ammeter		
1			Wheatstone Bridge		
1			VOM Multimeter		
1			R.C. Circuit		
1			Meggar Tester; Battery Operated		
1			10MHz Counter		
1			AC Line Charger		

QTY	UNIT	PART NO.	DESCRIPTION	UNIT	UNIT PRICE	AMOUNT
			Rechargeable Battery			
			Input Cable Set			
			RF Probe			
			Carrying Case			
			HOSPITAL EQUIPMENT TESTERS:			
			ECG Generator			
			Biomedical Electrical Test Set			
			Hospital Safety Meter, Digital			
			Line Leakage Resistance Meter			
			Hospital Power System Test Set			
			Defibrillator, Energy Meter			
			Electrode Impedance Analyzer			
			Equipment Labels, 100 Lot			
			Multicorder w/Chart Paper (02614)			
			TOOLS AND MATERIALS:			
			Electronic Tool Kit			
1			3/8" Chuck Drill, 220V/50Hz			
1			Drill Press; Bench Mount, 220V, 3/8" Chuck			
1			Bench Vise, Drill Vise			
1			Fractional Drill Set			
1			All Purpose Tool Set			
1			Tap & Die Set			
1			Bench Grinder w/2 Wheels			
1			Hex Wrench Set			
1			Metal Snips			
1			Industrial First Aid Kit			
1			Silicon Lubricant Spray			
1			Clear Spray			
2			Industrial Flashlight			
3 Lbs			Solder, 60/40 Resin Core			
2			Silver-Bearing Solder 1/16"			
1			Soldering Flux			
2			Oxweld Goggles			

QTY	MFG	DESCRIPTION	PRICE IN U.S.$ EACH	AMOUNT
		Hacksaw		
		Hacksaw Blades		
		Flame Soldering Kit		
		Solder Gun Set, 220V/50Hz		
		Soldering Wick		
		2½ lb. Dry Chemical Extinguisher		
		2 lb. Rechargeable Fire Extinguisher		
		Recharge Kit		
		Electrical Safety Progress Guide		
		REFRIGERATION - A.C. TOOLS AND INSTRUMENTS		
		Hermetic Compressor Tester/Electrical Tester		
		Motor Analyzer		
		Capacitor Analyzer		
		Hermetic Unit - Component Analyzer		
1		Sound Level Meter		
1		Clamp-on Ammeter		
1		Test Leads and Case for 7710		
1		Relay Tester		
1		H-10 Leak Detector		
1		H-10 Spare Plug-in Element		
1		Vacuum Gauge		
1		Air Flow Meter		
1		Electronic Sound Tracer		
1		Carrying Case, Power Pack for 5200		
1		Evacuator, Portable		
1		Manometer, 12"		
1		Leak Detector Liquid		
1		Belt Tension Tester		
1		Terminal Eyelet Kit Tool		
1		9/32" Eyelet Kit		
1		7/32" Eyelet Kit		
1		5/32" Eyelet Kit		
1		Hex Key Pocket Set		

QTY			DESCRIPTION		PRICE IN U.S.$ CH.	AMOUNT
			Terminal			
			Tube Cutter			
			Swaging Tool Set			
			Standard Style Swaging Tool			
			Papco Flaring Tool			
			Flaring Tool			
			Tubing Gauge			
			Pinch-off Tool			
			Tube Bender			
1			Pop Rivet Gun, 1/8"-3/32"			
1			Fan Hub Puller Kit			
1			Tool Box with 76 of most often used tools for Refrigeration & Air Conditioning			
1			Tool Case for general electrical and mechanical maintenance, includes over 60 tools and sub-sets, ohmmeter, parts box.			
1			Metric Conversion Kit of Wrenches and Gauges, 48 pieces in box.			
1			Air Conditioning Service Tool Panel (Cabinet) includes generally used tools (see picture cut for tool listing)			

Machine grinding bench	$ 120
Drill Masonary hd star 1in	20
Drill set masonary	50
Riveter, blind, hand	25
Wrench set socket 1/2 in	60
Wrench set metric	90
Wrench set metric socket	40
Drill masonary rotar 1/2	20
Drill masonary rotar 1/4	15
Drill electr 3/4 in	80
Drill set twist	45
T/K med eq main and repair-jensen w/milti meter	3,500

Tool set med eq. maint-rep shop-roll-a-around to include items not requested hereon:

Solder, nuts, bolts, etc.	500
Ladder step alum 6 ft	30
Kit terminal	25
Tape insulation ele 85 T.	20
10x50 ohm attenuator	60
Power sup DC reg/20V var	300
Tester defibrillator ener	460
Calibrat-generat Egg simulator 12 channel	270
Attenuator 1000 X ohms	
Tectronics 10 MH storage Scope SC 503	5,100
Medical instr calibration system mix - system with power supply	8,000
Resistor-decade	80
Voltmeter digital	240
Tachometer vib read dual	300
Table work plastic lamina	2,280
Tension tester outlet	10
Outlet analyser	50
Hospital electrical analyser neurodyne	1,000
Patien isolator	80
Audiometer test	
Drill 1/2 inch elec	90
Drill 1/4 inch elec	60
Drill press 1/2 inch cap elect. bench model	200
50 lb. vise, 6 inch jaw	60
Vise small parts, bench	30
Solder gun light duty	60
Solder gun medium duty	40
Drill set for 1/2 inch drill	50
Light bench hi-intensity	90
nuts, bolts, solder, tape, rivets, etc.	300
100 lb. acetelyne welding apparatus	600
150 lb. air compressor	600
Kit, individual, repair for trainees	1,500
	28,050

ATTACHMENT 5

This is a representative list of various types of spare parts required for different makes and models of equipment.

ATTACHMENT 5

LIST OF SPARE PARTS FOR REFRIGERATION AND A.A. EQUIPMENTS.

10	Galón refrigerant oil No. 150, Trade Mark Zuniso
10	" " " No. 300, Trade Mark Zuniso.
10	Star capacitor 45-53 MED, 220 voltios Trade Mark G.E.
10	" " 61-72 MED, 250 voltios Trade Mark G.E.
10	Capacitor 72-82 MED (Micro-farade) G.E.
5	" 72-88 MED Trade Mark, G.E.
5	" 88-108 MED Trade Mark G.E.
10	" 108-130 MED, Trade Mark G.E.
10	" 124-156 MED. Trade Mark, G.E.
10	" 145-175 MED, Trade Mark, G.E.
15	" 124-189 MED " " "
15	" 161-193 MED " " "
15	" 200-240 MED, " " "
15	" 215-259 MED; " " "
15	" 216-259 MED, " " "
10	" 243-270 MED, " " "
15	" 270-324 MED, " " "
10	" 270-324; 340-408 MED for ¼ HP. Trade Mark, General Electric.
10	Capacitor 270-328 MED for ½ HP. Trade Mark. G.E.
10	" 324-389 MED, Trade Mark G.E.
10	Star capacitor 340-408 MED; Trade Mark G.E.
10	Capacitor 400-480 MED; Trade Mark, G.E.
10	" 460-552 MED, Trade Mark, G.E.
10	" 540-648 MED, Trade Mark G.E.
5	90° Elbows of copper tubing, Trade Mark, Imperial.
3	Hermetic compresers 1/3 HP; 220 v; 3 Phase, hight and low torque; for freón 12, Trade Mark Tecumse.
1	Hermetic compresers for freon-22; 9000 BTU/hr; 110 v; Trade Mark Tecumse.
1	Hermetic compresers for freon-22; 9000 BTU/hr; 220 v; Trade Mark Tecumse
3	Hermetic compresers, one phase 1/8 HP; 110 voltios for R-12.
2	Hermetic compresers for freon-22; 12000 BTU/hr; 220 voltios, Trade Mark Tecumse.
2	Hermetic compresers for freón 22; 15000 BTU/hr; 220 - voltios, Trade Mark Tecumse.
3	Hermetic compresers for freon-22, 18000 BTU/hr. 220 voltios, Trade Mark Tecumse.
1	Hermetic compresers, one phase; ¼ HP; 110 voltios for Freón 12; Trade Mark Tecumse.
3	Hermetic compresers one-phase; 1/5 HP; 110 voltios for freon 12, Trade Mark Tecumse.
4	Hermetic compresers one phase; 1/6 HP; 110 voltios for freón 12; Trade Mark Tecumse.

20	Standard cool control for refrigerator, Trade Mark Delco.
5	Standard cool control for freezer, Trade Mark Delco.
10	Standard temperature control for cool-room 0 a 50°F Trade mark Delco.
10	Standard temperatura control for air conditioned trade mark Delco.
100	Gasket for hose manometers for gas freón charge.
300	Ft. Refrigerator magnetic door gasket No. 2004.
30	Air conditioned aluminum filters 25" x 15"
30	Air conditioned aluminum filters 25" x 17".
50	Filters-drier ¼ x ¼" for refrigeration.
10	Caus flux for silver weld electrode.
300	Pds. gass freon 12.
300	Pds. gass freon-22.
5	Klixon ¼ HP General Electric.
5	Motors, one-phase; 115 voltios, 1725 RPM; ¼ HP; trade mark G.E.
2	Motors one phase; 115 voltios; 1725 RPM; 3/4 HP; Trade mark G.E.
5	Relays 1/3 HP; type knife; 110 voltios, trade mark G.E.
5	Relays ½ HP; 110 voltios, trade mark G.E.
10	Relays 1/5; 110 voltios; trade mark G.E.
15	Relays 1/6 HP m/Delco; trade mark G.E.
25	Pds. Silver Weld electrode.
10	Higth pressure switch 0-300 PSI cool room.
10	Low pressure switch 0-200 PSI, cool room
5	Refrigerator switch ligth 9' higth.
200	Plug ¼" tube copper.
10	Cons tawsone.
10	Gold ribbon thermometer- 40° to 120°F (Mercury).
300'	Ft. Tube copper heave 3/16"
300'	Ft. tube copper heave ¼"
300'	Ft. tube copper heave 5/16"
300'	Ft. Tube copper heave 3/8"
100'	Ft. Tube copper heave ½"
50	Refrigeration flared cap. nut 5/16.
50	Refrigeration flared cap nut 3/8"
5	Cons cleaners- Unic X-12 (Unichem).
100	Refrigeration unions and couplings.
10	Expansion valve GF ¼ tons; R-12 (air conditioned)
10	Expansión valve GF ½ tons; R-12 (air conditioned).
10	Expansión valve GF 10 tons; R-22 (air conditioned).
10	Expansión valve M/sporland 1 tons; modelo GFE-Z
10	Expansión valve " 1½ tons model GFE-Z.

SPARE PARTS FOR DENTAL UNITS - RITTER 180

10 Coal for low speed motors

30 Seal for handle part, high speed

3 Extractor for handle part, high speed

5 Ejector of saliva

10 bulb for Ritter lamp

5 bulb for dental unit 100 volt

3 Syringe three ways

3 Syringe three ways with hose

7 Lubricate for high speed

7 Lubricate for low speed

200 meters 1/4" hose rubber for protective cloth

5 Rough hose for handpiece of high speed

5 Hose for three ways syringe

5 Handpiece for high speed. TITAN

5 Handpiece for low speed. TITAN

30 shop for handpiece

5 Spray clips for handpiece

5 High speed turbine for handpiece

5 Turbine start flite futura 2 Chayes Virginia FM-1502

10 Seal for handpiece start flite

10 100 watt, 24 volt bulb Chayes Virginia

10 24 volts, 100 watts bulb Pelton

10 Spray clips for start flite futura 2

15 Hose for start flite futura 2

15 Turbine start flite concentrix Weber, Mod. P-62

6 Syringe three ways

6 Saliva's ejector

10 20 amperes, 10 volts class elbow switch

20 1/4" hose with cover cloths (meters)

8 20 amperes 110 watts Micro switch.

PARTS FOR LABORATORY, STERILIZATION EQUIPMENT AND TENSION-METER

345 Air bag (bracelet) for sphygmomanometer

100 Seal for autoclave's door

80 100 watts. 110 volts bulbs for photocolormeters

80 Photocold for photocolormeters "Clett"

Leather cover for sphygmomanometer

345 Rubber cover for sphygmomanometer

345 Cover for baumanometer sphygmomanometer

100 0-30 PSI manometer for sphygmomanometer

100 Manometer for sphygmomanometer aneroid

100 0-400 of temperature meters

345 Rubber bulb with air control for sphygmomanometer

100 0 to 30 PSI pressostat

100 0 to 400 of thermostat

100 260 mm glass pipe for column sphygmomanometer

100 25 i. 1/2" steam's safety valve

100 110 volt AC 1/2"

100 Solenoid valve with 110 VAC coil for cold and hot water. Coil's diameter 1/2" (inlet-and outlet)

OXIGEN'S PARTS

100 1.5 lts. respiratory bag

100 2.3 lts. respiratory bag

100 3 lts. respiratory bag

100 Elbow for death mask

50 Connector, 1/8" class thread for hose

50 Connector, 3/4 class. thread for hose

50 Position's control for circulation, turn off and temperature control of oxigen's chamber

25 Anesthesia's chronometer

100 Water filter for the oxigen's chamber

100 Oxigen's filter for the oxigen's chamber

300 700 mm sleeve

300 1000 mm sleeve

300 1500 mm sleeve

100 1/8" transparent plastic hose for oxigen tank conection with the oxigen's chamber

114

100 3/4" transparent plastic hose for oxigen tank conection with the oxigen's chamber

50 1/4 H.P. monophasic electric motor for the recirculation system of cooling of oxigen's chamber

100 1/8" thickness transparent plastic to make the oxigen's chamber cover

Exhalation's valve

Inhalation's valve

100 Oxigen's regulation valve

100 NO_2 regulation valve

15 PSI regulation valve class relay

100 110 v. resistance for incubator

ATTACHMENT 5

ACCESORIOS PARA UNIDADES DENTALES PARA RITTER 180

CANTIDAD	PRODUCTO	P/unt.	P/total
10	Carbones para motores baja velocidad.....	¢ 5.00	
30	Empaques para pieza de mano,alta velocidad.....	¢ 3.00	
3	Extractores para pieza de mano, alta velocidad.....	¢25.00	
5	Eyectores de saliva	¢125.00	
10	Focos para lámpara ritter	¢150.00	
5	Focos para unidad dental, 100 voltios	¢100.00	
3	Jeringa triple.....	¢350.00	
3	Jeringa triple con manguera	¢450.00	
7	Lubricante para alta velocidad.....	¢ 35.00	
7	Lubricantes para baja velocidad.....tubo	¢ 20.00	
2 rollos	Manguera de hule de ¼ para sedad metro.....	¢ 6.00	
5	Manguera para pieza de mano alta velocidad corrugada...	¢150.00	
5	Manguera para jeringa triple	¢100.00	
5	Pieza de mano para alta velocidad TITAN.....	¢120.00	
5	Pieza de mano para baja velocidad TITAN.....	¢1200.00	
30	Shop para pieza de mano	¢ 40.00	
5	Spray clips para pieza mano	¢ 170.00	
5	Turbinas para pieza de mano velocidad		

ACCESORIOS PARA UNIDADES DENTALES PARA LA RITTER CHAVES VIRGINIA FM-1502

Cantidad	Producto	P/unitario	P/total
5	Tubinas ster flile futura 2	¢ 250.00	
10	Empaques p/pieza de mano ster flile	¢ 3.00	
10	Focos 24 voltios 100 watts - Chayes Virginia.....	¢ 175.00	
10	Focos pelton 24 voltios 100 Watts	¢ 150.00	
10	Spray Clips para ster flile futu re 2.....	¢ 75.00	
15	Mangueras para ster flile futu re 2	¢ 175.00	
15	Tubinas ster flite concentrix	¢ 200.00	

REPUESTOS PARA UNIDADES DENTALES MARCA WEBER MODELO P-62

CANTIDAD	PRODUCTO	P/Unitario	p/Total
6	Jeringas Triples completas.....	¢ 350.00	
6	Eyectores de saliva - completos	¢ 125.00	
10	Interructores tipo codo 20 amperimetros y 110 v.	¢ 110.00	
20	Metros de manguera de ½" forrada de sedazo.....	¢ 30.00	
8	Micro Swthis de 20 amperios 110 watts.....	¢ 40.00	

FM-1502

ACCESORIOS PARA EQUIPO DE LABORATORIO, ESTERILIZACION Y TENSIOMETROS

345 - Brazaletes para tensiómetros c/u.

100 - Empaque para compuerta de autoclave c/u.

80 - Focos para fotocolorímetros , c/u.

80 - Fotoceldas para fotocolorímetros c/u.

~~345~~ - Funda de cuero para tensiómetro c/u.

345 - Funda de hule para tensiómetro c/u.

345 - Funda para tensiómetro baunanometer c/u.

100 - Manómetro de carátula de 0-30 PSI. c/u.

100 - Manómetro para tensiómetro - c/u.

100 - Medidores de temperatura 0-400ºF c/u.

345 - Perillas de hule con control de aire para tensiómetro c/u.

100 - Presostatos de 0 a 30 PSI c/u.

100 - Termostatos de 0 a 400°F c/u.

100 - Tubo de vidrio de 260 mm para tensiómetro tipo columna c/u.

100 - Válvulas de seguridad de vapor de consolidated, 20 PSI de presión, para autoc. modelo 1471 de ½" de diámetro c/u.

100 - Válvulas de seguridad de vapor de consolidated, 25 PSI de presión, para autoc. modelo 1471 de ½" de diámetro c/u.

100 - Válvulas selenoides ACL, para agua fría y caliente con bobina de 110 Voltios AC, 1/2" de diámetro en la entrada y salida c/u.

ACCESORIOS DE OXIGENO

100-	Bolsas respiratorias 1.5 lts. $150	c/u.
100-	Bolsas respitatorias 2.3 lts. $150	c/u.
100-	Bolsas respitorcias 3 lts. $150 —	c/u.
100-	Codos para mascarillas $55	c/u.
50-	Conectadores tipo rosca de 1/8", para las mangueras $50 —	c/u.
50-	Conectadores tipo rosca de 3/4", para las mangueras $100 —	c/u.
50	Controles de posiciones para controles de circulación, apagado y temperatura de la tienda de oxígeno $75	c/u.
25-	Cronómetros de anestesia $300 —	c/u.
100-	Filtro de agua para las tiendas $50 —	c/u.
100-	Filtro de oxígeno para las tiendas $80 —	c/u.
300-	Mangas de 700 mm. $25	par
300-	Mangas de 1000 mm. $35	par
300-	Mangas de 1500 mm. $35	par
100-	Manguera de 1/8", plástica transparente de conexión de tanque de oxígeno con la tienda $15	Yda.
100	Manguera de 3/4", plástica transparente de conexión de tanque y tienda de oxígeno	Yda.
50 -	Motores eléctricos monofásicos de ¼ H.P, para el sistema de recirculación de enfriamiento de las tiendas de oxígeno $700 —	c/u.
100-	Plástico transparente de 1/8" de espesor, para hacer las cubiertas de las tiendas. $10	Yda.
- -	Válvulas de exhalación	c/u.
- -	Válvulas de inhalación	c/u.
100-	Válvulas reguladoras de oxígeno $350 —	c/u.
100-	Válvulas reguladoras de oxido nitroso $350 —	c/u.
-	Válvulas reguladoras tipo relay de, 15 PSI. —	c/u.
100-	Resistencia para incubadora 110 V, 60 c. $400 —	c/u.

[illegible]

ACCESORIOS PARA CALDERAS

10 UNIDADES -	Arrancadores magnéticos, de 3 polos para 2 H.P., 3 TIEMPOS 220 voltios, ~~modelo 86365-802~~ bobina de 220 voltios	c/u. $30
10 PLIEGOS -	Asbesto plano espesor de ½"	c/u. $25
3 UNIDADES -	Bombas diesel derecho de 12.1 G.P.H, 80-120 PSI	c/u. $10
10 UNIDADES -	Bombas inyectoras de diesel para calderas de 60 H.P. modelo J4 PA - 100-3 derecha - MARCA INDUSTRIAL	c/u. $10
10 UNIDADES -	Bombas inyectoras de diesel para calderas de 60 H.P. modelo J4 PA - 100-3 izquierda, MARCA INDUSTRIAL	c/u. $100
10 UNIDADES -	Bombas inyectoras de diesél para caldera de 60 H.P. modelo ~~[illegible]~~; 22R2210-3AA14, derecha MARCA WEBSTER	c/u. $10
10 UNIDADES -	Bombas inyectoras de diesel para caldera de 60 H.P. modelo ~~[illegible]~~; 22R2210-3AA14, izquierda MARCA WEBSTER	c/u. $10
8 UNIDADES -	Contactores 3 polos, para 5 H.P. con bobina ~~modelo 8502582~~ 110 V ó 220 V	c/u. $20
50 UNIDADES -	Empaque asbesto, para registro de hombre de caldera	c/u. $5.6
50 UNIDADES -	Empaque para registro de mano de caldera (3½" x 2½" x ¼")	c/u. $4.5
20 UNIDADES -	Filtro tipo "Y" de 3/4" para vapor de 150 psi.	c/u. $50
20 UNIDADES -	Filtro tipo "Y" de ½" para vapor de 150 psi. ~~modelo 961~~	c/u. $40
20 UNIDADES -	~~Fotocelda~~ modelo C7015A (14¼" x 11" x 1¼" x ¼")	c/u. $4[illegible]
10 UNIDADES -	Transformadores 120 V a 10,000 V de salida hacia abajo ~~para cocina modelo [illegible]~~	c/u. $30
15 UNIDADES -	Válvulas de purga de 1"	c/u. $20
15 UNIDADES -	Válvulas de purga de 1¼"	c/u. $[illegible]
15 UNIDADES -	Válvulas de purga de 1½"	c/u. $[illegible]
15 UNIDADES -	Válvulas de prueba de ½"	c/u. $40
15 UNIDADES -	Válvulas de prueba de 3/4"	c/u. $50
15 UNIDADES -	Válvulas globo para vapor de 150 psi. de 1¼"	c/u. $30
15 UNIDADES -	Válvulas globo para vapor de 150 psi. de 1½"	c/u. $35
15 UNIDADES -	Válvulas globo para vapor de 150 psi. de 2"	c/u. $40
25 UNIDADES -	Válvulas reguladora de presión vapor, 0-60 psi. de ½"	c/u. $[illegible]
25 UNIDADES -	Válvulas reguladora de presión vapor, 0-60 psi. de 3/4"	c/u. $90
25 UNIDADES -	Válvulas selenoide de 3/8, para dicha a 300 lbs/pulg2. tipo eléctrico a 115 V. MARCA I.T.T.	c/u. $30
25 UNIDADES -	Válvulas selenoide, 110V para quemador 120 psi, modelo 8210 GI de 3/8" (MARCA XSCA)	c/u. $30
25 UNIDADES -	Válvulas selenoide, 220V. para quemador 120 Psi. modelo 82 62023 de ¼" (MARCA XSCA)	c/u. $30

MATERIAL DE REFRIGERACION.

HOJA No 17

CODIGO	DESCRIPCION DEL ARTICULO	UNIDAD DE MEDIDA	OBSERVACIONES
	Aceite refrigerado # 150.	galón.	tiene movimiento
	Aceite refrigerado # 300.	galón.	" "
	Capacitadores de arranque 45-53 MED 220 v.	%	" "
	Capacitadores de arranque 61-72 MED 250 v.	%	" "
	Capacitadores 72-82 MED	%	" "
	Capacitadores 72-88 MED (material de refrigeración).	%	" "
	Capacitadores 88-108 MED (material de refrigeración).	%	" "
	Capacitadores 108-130 MED (material de refrigeración).	%	" "
	Capacitadores 124-156 MED (material de refrigeración).	%	" "
	Capacitadores 145-175 MED (material de refrigeración).	%	" "
	Capacitadores 124-189 MED para ¼ HP, (material de refrigeración).	%	" "
	Capacitadores 161-193 MED (material de refrigeración).	%	" "
	Capacitadores 200-240 MED (Material de refrigeración).	%	" "
	Capacitadores 215-259 MED (material de refrigeración).	%	" "
	Capacitadores 216-259 MED (material de refrigeración).	%	" "
	Capacitadores 243-270 MED (material de refrigeración).	%	" "
	Capacitadores 270-324 MED (material de refrigeración).	%	" "
	Capacitadores 270-324, 340-408 MED para ¼ HP.	%	" "
	Capacitadores 270-328 MED para ½ HP.	%	" "
	Capacitadores 324-389 MED (material de refrigeración).	%	" "
	Capacitadores de arranque 340-408 MED.	%	" "
	Capacitadores 400-480 MED (material de refrigeración.)	%	" "
	Capacitadores 460-552 MED (material de refrigeración).	%	" "
	Capacitadores 540-648 MED (material de refrigeración).	%	" "
	Codos de cobre de ½".	%	" "
	Compresores herméticos de 1/3 HP, 220 v.	%	" "

MATERIAL DE REFRIGERACION.

HOJA No. 11

CODIGO	DESCRIPCION DEL ARTICULO	UNIDAD DE MEDIDA	OBSERVACIONES
1	Compresores herméticos para freón 22 de 9.000 BTU, 110 v.	%	tiene movimiento
1	Compresores herméticos para freón 22 de 9.000 BTU/220 v.	%	" "
2	Compresores herméticos para freón 22 de 12.000 BTU/220 v.	%	" "
2	Compresores herméticos para freón 22 de 15.000 BTU/220 v.	%	" "
3	Compresores herméticos para freón 22 de 18.000 BTU/220 v.	%	" "
1	Compresores monofásicos de ¼ HP para refrigeradora.	%	" "
2	Compresores monofásicos de 1/5 HP para refrigeradora.	%	" "
4	Compresores 1/6 HP 115 v. (material de refrigeración).	%	" "
—	Compresores 1 HP, 230 v. para aire acondicionado mod., No. AR 5512 E de 12.000 BTU M/TECUMSEM.	%	" "
—	Compresores para aire acondicionado "COPELAND 18.000 BTU/H"	%	" "
—	Compresores TECUMSEM de 1/3 HP, 115 v. 1/60 CPS.	%	" "
20	Controles de frío para refrigeradora.	%	" "
5	Controles de frío para freezer (material de refrigeración).	%	" "
1	Controles de temperatura para cuartos fríos de 0 a 50° F.	%	" "
10	Controles de temperatura para equipos de aire acondicionado de ventana, de 60° a 70° F.	%	" "
100	Empaques para manguera de manómetros (material de refrigeración).	%	" "
10	Empaques magnético # 2004 para puerta de refrigeración.	%	" "
30	Filtros de aluminio 25" x 15".	%	" "
3	Filtros de aluminio 25" x 17".	%	" "
50	Filtros secadores de ¼" x ¼" (material de refrigeración).	%	" "
10	Flux para soldadura de plata.	bote.	" "
20	Gas freón 12. —— 10 -	libra.	" "
	Gas freon 22. 10	libra.	" "

MATERIAL DE REFRIGERACION.

HOJA No 12

CODIGO	DESCRIPCION DEL ARTICULO	UNIDAD DE MEDIDA	OBSERVACIONES
5	Kelixón de ¼ HP, "G.E."	%	tiene movimiento
5	Motor monofásico 115 v. 1725 RPM 1/3 HP "G.E."	%	" "
2	Motor ¼ HP 1725 RPM 115-230 v. G.E. (material de refrigeración).	%	" "
5	Relay de 1/3 H.P de cuchilla (material de refrigeración).	%	" "
--	Relay de 1/3 H.P M/DELCO (Material de refrigeración).	%	" "
5	Relay de ¼ HP.	%	" "
10	Relay de 1/5 HP.	%	" "
15	Relay de 1/6 HP M/DELCO (material de refrigeración).	%	" "
15	Relay de 1/8 HP M/DELCO (material de refrigeración).	%	" "
[illegible]	Soldadura de plata (material de refrigeración).	onzas.	" "
10	Switch alta presión 0-300 PSI para cuarto frío.	%	" "
10	Switch baja presión 0-200 PSI para cuarto frío.	%	" "
5	Switch de luz para refrigeración. DE 9' DE ALTURA.	%	" "
200	Tapones machos de ¼" (material de refrigeración).	%	" "
10	Tawsone (material de refrigeración).	frasco.	" "
10	Termómetro de bolsillo.	%	" "
300	Tubo cobre suave de 3/16" (material de refrigeración).	pié	" "
[illegible]	Tubo cobre suave de ¼" (material de refrigeración).	pié	" "
200	Tubo cobre suave de 5/16" (material de refrigeración).	pié	" "
[illegible]	Tubo cobre suave de 3/8" (material de refrigeración).	pié	" "
[illegible]	Tubo cobre suave de ½" (material de refrigeración).	pié	" "
50	Tuercas de 5/16" (material de refrigeración).	%	" "
50	Tuercas de 3/8" (material de refrigeración).	%	" "
5	Unis X-12 (limpiador de serpentines A.A)	galón.	" "

MATERIAL DE REFRIGERACION.

HOJA No 13

CODIGO	DESCRIPCION DEL ARTICULO	UNIDAD DE MEDIDA	OBSERVACIONES
	Uniones de ¼" (material de refrigeración).	%	tiene movimiento
	Válvulas de expansión GF ⅓" ton. R-12.	%	" "
	Válvulas de expansión GF ½" ton. R-12.	%	" "
	Válvulas de expansión GF 10 ton. R-22.	%	" "
	Válvulas de expansión M/SPORIAND ½ ton. modelo GFE de ½ Z.	%	" "
	Válvulas de expansión, M/SPORIAND, 1 ton. modelo GFE 1 Z.	%	" "
	Válvulas de expansión, M/SPORIAND, 1½" ton. modelo GFE Z.	%	" "
	Compresores 1/3 HP,-115-v. (material de refrigeración).	%	" "

REPUESTOS DE RAYOS "X".

Precio en dolares

HOJA No 12

CODIGO	DESCRIPCION DEL ARTICULO	UNIDAD DE MEDIDA	OBSERVACIONES
	Bellows Cat. 1005555 P1.	% $ 5.-	tiene movimiento 2 Por año
	Cable alta tensión 8', terminales con céntricos ambos lados Cat. 16 080.	% $100.-	" 4 "
	Cables de alta tensión de 15'con terminales federal Cat. No. T4177AC	% 140.-	" 4 "
	Cables alta tensión 15'con terminal federal tornillos ambos lados, para ubicarse en trasnf. de alta tensión NX11.	% 150.-	" 4 "
	Cables alta tensión 18'terminales federal Cat. No. 16AC180.	% 160.-	" 4 "
	Cables alta tensión 23'terminales federal Cat. No. 16AC230.	% 190.-	" 4 "
	Cables alta tensión de 25'Cat. No. C1665D.	% 200.-	" 4 "
	Cables alta tensión 33'con terminales federal Cat. No. L-AC330	% 250.-	" 4 "
	Cables alto voltaje 18'con terminales t/Sprin y concéntricos lado del tubo Cat. No. LCHK180.	% 160.-	" 2 "
	Cables de alto voltaje 20'terminales federal ambos extremos No. 11-11CAT T4177 PD.	% 170.-	" 2 "
	Compensadores de voltaje de línea de alimentación Cat. No.514A14-7 P1.	% 60.-	" 2 "
	Compensadores de kilovoltaje mayor y menor para control G.E. Modelo KX-21 Cat. 514A 147P2.	% 60.-	" 2 "
	Compensadores de KV mayor Cat. Mo. 82517.	% 60.-	" 2 "
	Compensadores de kilovoltaje mayor (ohmite) para control maricon C. Electric, Mod. 47 Cat. 82517.	% 60.-	" 2 "
	Compensadores de KV menor Cat. No. 82518.	% 60.-	" 2 "
	Compensadores de kilovoltaje ohmite para control maxicon G.E. Modelo 47, Cat. 82518.	% 60.-	" 2 "
	Compensadores de kilovoltios menor Cat. 10376-K.	% 60.-	" 2 "
	Compensadores de arranque 70-(MFD) 80 MFD, 60 ciclos C-125 voltios Cat. No. 59-203.	% 12.-	" 1. "

REPUESTOS DE RAYOS "X". (Pie Rayos)

Precio en dolares $

HOJA No. 1

CODIGO	DESCRIPCION DEL ARTICULO	UNIDAD DE MEDIDA	OBSERVACIONES
	Condensadores 25 MFD por 360 voltios para motor, Cat. Picker.	% 15.-	tiene movimiento
	Contactor de exposición comp. Cat. No. 10126 - K	% 60 -	" 1 por año "
	Contactores de exposición de control M-12, Cat. T07651.	% 65 -	" 1 "
	Contactores de plata para contactor de control KX-12 Cat. T0052S.	% 10 -	" 10 "
	Contactos para contractor de exposición T0052B de control G.E Maxicon 47 Cat. T0052B.	% 10.-	" 6 "
	Contactos para compensadores de línea de alimentación Cat. No.59-395	Juego. 15	" 3 "
	Escobillas para compensador de voltaje Cat. No. 17-471.	Juego. 15	" 3 "
	Escobillas para el selector de técnica Cat. No. T00011.	juego. 15	" 3 "
	Escobillas para el selector KV, Cat. No. 17-310.	juego. 15	" 3 "
	Escobillas para switch de encendido Cat. T00510.	juego. 15	" 3 "
	Focos de 6V. 15 w con base de bayoneta para centraje de bucky Cat. T72-42.	% 1.-	" 5 "
	Casket For CRT Casing No. 12-519.	% 3	" 2 "
	Casket For CRT Casing No. 12-645.	% 3	" 2 "
	Casket For CRT Casing No. 12-1138.	% 3	" 2 "
	Casket CRT Casing No. 12-1141.	% 3	" 2 "
	Casket For IDXC Casing No. 1005550P1	% 3	" 2 "
	Inserto Rayos X, T/HRT, de 1.0, 2.0, Cat. No. D0075A.	% 2000	" 2 "
	Interruptor de mano para preparación y exposición radiográfica Cat. No. 46114133 GL.	% 100.-	" 2 "
	Interruptores de seguridad para movimientos Cat. Picker.	% 150	" 1 "
	Interruptor panel Cat. No. 59-286.	% 40	" 1 "
	Interruptores principal línea de alimentación Cat. Picker.	% 50	" 1 "
	Interruptor principal de líneas (Circuit Proaker) 60 Amps. Cat.T0179	% 50	" 1 "
	Interruptor principal de líneas Cat. No. AT29-11.	% 50	" 1 "

REPUESTOS DE RAYOS "X". Picker -

Precio en dólares

HOJA No 11

CODIGO	DESCRIPCION DEL ARTICULO	UNIDAD DE MEDIDA	OBSERVACIONES
	Miliamperímetros con escala de 0-125 KV para control PH-300, Cat. No. Picker.	% 100	1 por día tiene movimiento
	Miliamperímetro con escala de 0.50 y 0-250 MA, Cat. 3000322P102	% 100	" 1 "
	Miliamperímetro y medidor de M.A.S. con escala de 0-10, 0-100, 0-200 Cat. 3000322P133.	% 100	" 1 "
	Miliamperímetro con escala 0-200 con indicadores, Cat. 3000322 P103.	% 100	" 1 "
	Medidor de miliamperios de 0-5 y 0-200 MA., Cat. No.B-T68-41MA.	% 100	" 1 "
	Medidor de kilovoltaje de 0-110 Kilovatios Cat. No. B-T67110.	% 100	" 1 "
	Motor para movimiento de mesa rayos X, Cat. No. T93A-46.	% 150	" 1 "
	O-Ring PHP 509-10, Cat. 12196.	% 1	" 2 "
	O-Ring PHP 902-15, Cat. 12194.	% 1	" 2 "
	O-Ring 909-3 Cat. 12195.	% 1	" 2 "
	O-Ring 909-17 Cat. 12197.	% 1	" 2 "
	Partes de Adaptación para usar K-SSR-150, Cat. No. 1000028262.	% 15	" 4 "
	Partes de adaptación G.E. para adaptación de válvulas rectificadores (Kenotrones), Cat. 1000282G2.	% 15	" 4 "
	Receptores de películas expuestas de rollo de 70 mm. x 100 para cámara MGS 70-4 Cat. H1B1002.	% 100	" 1 "
	Rejilla para bucky con relación 8.1, 60 líneas 17 ¼" x 19" para distancia focal de 36" a 42", Cat. C2663A.	% 300	" 1 "
	Relay RE-6 VDC No. Part. 6R1259 Cat. N1 81004.	% 40	" 1 "
	Relay de 24 VDC para Unidad de relevos cámara eldelca Cat.NL81006.	% 30	" 1 "
	Relay de 110 VAG 600 Cat., No. 59-464, Selector de técnica radiográfica y Main Switch para 200-L, 100-L, 25-8 y fluoroscopía Cat. 2000226P1.	% 50	" 1 "
	Selector de técnica de rotación OL255 508-100L, 200L, Cat.46121669P3	% 100	" 1 "
	Selector de tiempo de exposición 1/60-10, Seg. Cat. No. 403B96081	% 100	" 1 "

ATTACHMENT 6

EMERGENCY MEDICAL SUPPLIES AND EQUIPMENT

I. Medical Stabilization Kits.

A. 6545-00-999-6446 - Group 3

Med Equip Set Med Fld Rx Facility Surgery Kits

Ea. 1417.82

212.67 - 15% Surcharge

1630.49 x 26 = $ 42,393.00

B. 6545-00-924-4825 - Group 2

Mass Casualty Rx

Ea. 436.18

65.43 - 15% Surcharge

501.61 x 26 = 13,042.00

C. Replacement of Consumables 30,000.00

II. Emergency Surgical Lamps

A. 6530-00-027-5018

Light Surgical Ceiling

Ea. 1057.21

158.58 - 15% Surcharge

1216.09 x 26 = 27,486.46

III. Surgical Instrument Kits

A. 6545-00-914-3480 - Group 2

Chest Med Inst Supply No. 3

Ea. 130.07

1.95 - 15% Surcharge

132.02 x 123 = 16,239.00

B. 6545-00-181-7120 - Group 4

Med Equip Set Med Fld Ortho Evac

Ea. 559.81

83.99 - 15% Surcharge

643.90 x 26 = 16,742.00

C. 6545-00-922-1200

First Aid Kit - General purpose, rigid case

97 (a) $ 50.00 ea., plus 15% surcharge 4,947.00

IV. X-Ray machines, films and cassette.

A. 12 X-Ray machines

300 MA Mobile (GE or Picker) at

$12,500 plus 15% surcharge 177,500.00

B. 3696 film, Radiographic 10 x 12

100 a for hospitals and health centers at

Ea. 68.79

10.32 - 15% surcharge

79.11 = 292,391.00

C. 6525-01-015-4674

3696 Film, Radiographic 8 x 10

100 a at

Ea. 47.33

7.20 - 15 % surcharge

54.53 = 201.543.00

D. 6525-01-015-4671

3696 Film, Radiographic 14 x 17

100 a at

Ea. 132.37

20.86 - 15% surcharge

153.23 = 566,339.00

E. 6525-00-721-9813

200 Cassette, Radiographic

Film 8 x 10 at

Ea. 93.82

14.07 - 15% surcharge

107.89 = 10,789.00

F. 6525-00-721-2014

100 Cassette, Radiographic

Film 10 x 12 at

Ea. 124.20

18.83 - 15 % surcharge

147.03 = 14,283.00

G. 6525-00-721-9816

100 Cassette Radiographic

Film 14 x 17 at

Ea. 198.53

29.77 - 15% surcharge

228.30 = 22,830.00

V. Suction Machines.

A. 6515-00-782-2625

26 Suction Pressure Apparatus

for hospitals and centers at

Ea. 676.77

101.52 - 15 % surcharge

778.29 = 20,235.00

VI. Ambulances

A. 3 Star-line Star

Model III for Emergency

Surgical Teams deployed at

San Salvador and San Miguel

(1 in reserve) at

ea. 36,000

7,200 - 20% for spare parts

6,480 - 15% surcharge

49,680 = 49,040.00

The Star-Line line of ambulances are manufactured by GMC (Chevie) and are the only ones for which specifications include a 72" high ceiling which is necessary for sustained surgical activity anticipated to occur in connection with the use of these units. Procurement from other U.S. manufacturers would be dependent on their meeting the height specification.

B. 24 Jeep Integrated body ambulances
4 patient for hospitals, health
centers and regional centers at
Ea. 25,000
5,000 - 20% for spare parts
4,500 - 15 % surcharge
34,500 = $828,000.00

NOTE: Jeep ambulances specifications include piped oxygen, suction machines, air conditioning, emergency lights and siren plus surgical instruments and consumable supplies. Jeep ambulances are being purchased as part of the standarization policy of the MOH and thus acquisition would be on a basis of proprietory procurement.

Sub Total E M S $2,395,700.00

OTHER PRIORITY MEDICAL EQUIPMENT PURCHASE ITEMS

I. Bio Medical Equipment

A. 6640-00-930-9034

123 Centrifuges, lab, small,

115 V for all hospitals, health centers and

health units at

Ea. 385.33

57.80 - 15% surcharge

443.13 = 54,505.00

B. 123 Sterilmatic-Sterilizers

Model STME14-460 at

Ea. 3,471

69.42 - 15% surcharge

3,540.42 = 435,472.00

C. - 6530-00-783-7903 ---- 123

Litters (Stretcher) with

folding aluminum poles at

all hospitals, health centers

and health units at

Ea. 50.66

7.60 - 15% surcharge

58.26 = 7,166.00

D. 6515-00-550-7199

123 Otoscope and Ophtalmascope sets

for all hospitals, Centers and heal

units at

Ea. 79.22

11.88 - 15 Surcharge

91.10 = 11,206.00

E. 6515-01-039-4884

123 Sphygmomanometer Aneroid for

all hospitals, centers, and

health units at

Ea. 16.58

2.48 - 15 surcharge

19.06 = 2,345.00

Sub Total Other Medical Equipment Purchase $ 510,694.00

133

MINIMUM MEDICAL EQUIPMENT MAINTENANCE AND REPAIR

REQUIREMENT

I. Maintenance and Repair Equipment at San Salvador and San Miguel at $60,000 each =	120,000.00
II. Spare Parts at San Salvador and San Miguel at $220,000 each	450,000.00
Sub Total for Medical Equipment Maintenance and Repair	570,000.00
Gran Total - HMS Other Maintenance & Repair	$3,476,394.00

COMPONENT III-1 MAINTENANCE AND REPAIR - VEHICLES

May 27, 1983

Prepared by
Carlos Pereira

A. Situational Analysis

1. Background

Prior to February 1981, the Transport Department was a section of the General Maintenance Department. At the time the Transport Department was up-graded and separated from the General Maintenance Department. This up-grading and separation was done to give more latitude and responsibilities to the new incumbent, Ing.Jose Granados Arias, in carrying out his duties.

The present organization of the Transport Department (TD) as it relates to the MOH-ES organization is presented in Annex II and III.

The Transport Department is divided into six (6) sections (See Annex III) as follows:

a. Administration (Carlos A. Calles and staff of three) is responsible for compiling all the data related to vehicle operations cost, vehicle inventory and control of personnel.

b. Security (Manuel de Jesus Rosales and a staff of 13) is responsible for the security of equipment and property in the "Matazano" compound.

c. General Warehouse (Romeo Antonio Medina and a staff of 5) is responsible for maintaining a cardex inventory of all vehicle spare parts and supplies of the Transport Department.

d. Purchasing (Jorge A. Garcia, sole staff) is responsible for obtaining prices from three different sources on the market in order to obtain the lowest price for purchases. After the lowest price is determined, purchases can be made from the petty cash fund. Petty cash available at the Transportation Department is limited to 2,000.00 Colones Replenishment of the petty cash fund usually takes 30 to 60 days.

e. Shop Foreman (Julio Artiga) is responsible for supervising the performance of each section chaif. The shop is comprised of the prevention section, corrective section, body repair and painting section, electrical section, battery section, receiving and testing section, analyzing section, motorcycle repair section,and other service sections with a total work force of 46 employees.

f. General Supervisor (Rafael Lopez, sole staff) is responsible for the overall supervision of the compound. He also acts as a Shop Foreman or as section chief of any repair area when the incumbent is absent. In addition, he assists in areas where the workload is excessive.

2. Current Activities

a. Programs:

The purpose of the Transport Department is to provide support to the MOH in carrying out its functions by providing vehicles for its various programs such as environmental sanitation, infant nutrition, health education, epidemiology and to provide support to the Administrative Directorship, Engineering Administration, Planning and other offices.

The Transport Department performs certain standard maintenance activities of its vehicles every 3,000 kilometers. Engine oil is changed. However, it has been the practice not to change the oil filter at this point, although greasing of the chassis and a general inspection of the vehicle is performed.

In principle, the oil filter is changed every 6,000 kilometers. However, since there is no individual vehicle folder, there is no way to check if the oil filter has been changed. The air filter is not changed until the engine begins to malfunction, when the airflow has become completely obstructed. During the casual inspections made of vehicles, it was observed that some air filters had been punctured with a sharp object to allow air to pass through.

Maintenance performed on this mileage basis is standard for all types of vehicles.

Repairs of vehicles are made only when funds are available and also according to the level of the vehicle use. Due to the fact that funds are extremely limited, vehicles often are cannibalized in the attempt to keep at least some of the fleet running.

b. Personnel:

There is a serious problem in keeping trained personnel in the Transport Department because of the low salaries they receive. Some key employees have transferred to the General Maintenance Department because of the higher salaries they receive there. The Transport Department personnel feel that they receive no support and that it is a place to "dump" non-qualified or unwanted personnel. Also there is a difference in the salaries paid to employees with the same experience and schooling in the General Maintenance Department as compared with the Transport Department. The Transport Officer, Ing. Jose Granados Arias, has made a determined effort to increase the salaries of the employees in his department but due to the new law (Ley de Estabilidad), salaries cannot be increased.

There is ample staff to provide the maintenance and repairs on the vehicle assigned to the Transport Department, however, the staff needs training. Some additional professional personnel is needed to improve the performance of the Transport Department.

c. Budget

Apart from the 2,000.00 Colones petty cash the Transport Department utilizes to purchase vehicle parts, purchases can be made in the open market for items that cost over 2,000.00 Colones by submitting a request to the MOH Director of Administration for approval. In the past, such purchases seem to have been approved according to the status of the user of the vehicles, rather than according to the status of the vehicle, as well as according to the availability of funds. At the present time, requests for purchases takes 3 months or more for a normal request.

The funds made available during 1982 for repairs, spare parts, and tires were 179,190.17 Colones. This amount divided by the 172 vehicles being repaired and maintained in the Transport Department (Malaria, PLANSABAR) equals 1,041.80 Colones per vehicle. This amount is barely sufficient to purchase the tires needed.

d. Warehouse (Supplies & Materials)

The Transport Department has adequate warehouse space, but has only limited bin space. The major problem is that the warehouse is full of items currently in stock which are not needed, because they do not fit the equipment being used.

3. Major Constraints and Problems

a. Budget:

The funds allocated to operate, maintain, repair vehicles and to train personnel is completely inadequate. For example, of the 149 vehicles assigned to the Metro Motor Pool (See Annex V), 38 are deadlined for an estimated average time of 6 months. The same problem exists in the regions, the hospitals, the malaria and sanitation programs.

b. Management

Funds requested for the operation of vehicles are not being processed within a reasonable time frame because each responsible person in the department needs tosign the document. This delays the processing of the request by approximately one to two weeks. Also, the limited funds allowed for the operation of the Transport Department are often detained with no apparent justification or explanation. Because of the delay, and the limited amount of funds, vehicles are either deadlined or are being operated in an unsafe condition and uneconomically.

Management is failing completely in the processing of required documents to get rid of useless equipment. The Regional and Metropolitan motor pools are filled with vehicles which have been identified for year as subject to being discarded. This unrepairable equipment is taking up space needed for the storage and repair of vehicles.

c. Commodities

There are 16 different models of vehicles assigned to the hospital and 12 models to the Metro, Regions and Malaria Program (see Annex IV and V). The lack of standardization of equipment, compounded by the problem of limited funds, limited tools, and unavailable spare parts, makes the tasks of providing proper maintenance, repairs, and training virtually impossible

4. MOH Response to Problem and Constraints

a. Resources:

The MOH's present financial situation, is very restricted, and cannot be expected to improve significantly in the near future.

b. Policies:

At the present time the MOH has the Corte de Cuentas which is responsible for analyzing, processing and making determination to dispose of unwanted equipment. This is an internal MOH function and the Minister can use his office to expedite the process.

c. Problems

Since the hospital transport fleet consists of 16 different models of vehicles, and the Transport Department has 12 different vehicle types, it is very impractical and uneconomical to attempt to provide spare parts to all the different types of vehicles. Maintenance becomes impossible since there are no spare parts available for many vehicles, because there is no standarization of vehicles. A great number of vehicles are deadlined. The end result of this situation is the cannibalization of parts and the permanent loss of the use of much of the fleet.

The procurement law allows the MOH to select vehicles that will provide good service by taking into account all factors such as standardization, and, quote: "The awarding of supplies subject to bid will be under the supervision of an awards committee formed by the Procurement Chief, the Director (or Chief of Section) to whom supplies are destined, and a technical delegate assigned by the Minister of Public Health and Social Welfare or his substitute "... "To make an award, all judgemental factors should be considered to guarantee the good and functional quality of goods and services to be acquired, not assuming necessarily, as the best offer that of the lowest price "..."The Procurement Chief is authorized to execute and sign, in the name of the state, contracts referred by the Law, with previous written approval of the Legal Advisor of the Ministry of Public Health and Social Welfare" (Ley de Suministros para el Ramo de Salud Publica y Asistencia Social).

Therefore, with this legal authority, there is no reason why standarization could not be implemented in the MOH-ES.

Another serious problem is the elimination of unrepairable vehicles (See Annex VII) which are taking valuable space that is needed for the storage maintenance and repairs of the operational vehicles.

An official policy is needed within the MOH which provides a mechanism to dispose and replace (See Annex VII) vehicles over 10 years of age by either selling them as junk or in public auction. This will stop the spending of funds in trying to repair vehicles which are beyond usefulness in the health program.

B. Proposed Assistance Strategy

The objective of this assistance is to improve the vehicle fleet to a sufficient level to support the activities of the MOH.

To do this it will be necessary to:

1. Purchase 27 ambulances, 12 jeeps, 19 pick-ups, 10 trucks, one 9-Passenger van, and one 45-Passenger bus. These vehicles will be distributed to the areas listed in Annex VII.

Revisions to the distribution plan presented in Annex VII should be made only with the approval of the Chief of the Transport Department and representatives of A.I.D.

Vehicles assigned in the Metropolitan Motor Pool would be equipped with radios which will be in contact with the Metropolitan Motor Pool officer who will control the dispatching of vehicles. This system will improve the transport support needs in the MOH and will provide savings in gasoline, tires, repairs and assure the better utilization of vehicles and drivers. Also this arrangement will provide support in cases of breakdowns and accident (See Annex XV) for cost of vehicles and radio equipment).

2. To eliminate unnecessary travel to purchase of fuel and to create savings and to maintain control of vehicles a central fuel station will be established by installing two 6000 gallon tanks with 2 pumps (one for gasoline and one for diesel) at the facility already available in the Metro Motor Pool (Matazano).

3. To develop in (Spanish) a mileage based maintenance system for each type of vehicle in accordance with the recommended guidelines set forth by the manufacturers. To support the mileage-based maintenance program, parts, repair and maintenance catalogs will be acquired to ensure the success of the program for vehicles being standarized (See Annex IV and V). Also, to provide the necessary facilities for the maintenance and repairs of vehicles, a fund will be provided by the project subject to the review of the Chief of the Transport Department and a representative of AID in the amount of 300,000 Colones (See Annex VIII for recommended distribution).

4. Technical assistance will be provided (after the vehicles and equipment have arrived) in the development of a mileage-based maintenance program, permanent records with follow-up forms in Spanish based on approved maintenance methods. These records will be used to assist in the distribution and proper usage of tools and in the overall operation of the Transport Department Motor Pool. Technical assistance will also be provided in organizing the regional garages. (See Annex IX for scopes of work)

5. To insure the continuity of a functional Metro Motor Pool, the staff of the Transport Department must be increased by four (4) key positions (See Annex IX for scope of work) to increase the level of supervision, control and training of the Transport Department Personnel. Also, to improve the utilization of MOH drivers, supervision and training of drivers should be assigned under the dispatcher (Jefe de Transportes) in the Transport Department (See Annex XI for the organizational chart). To provide needed administrative services, a computer terminal and minimal office equipment will be provided, and to improve the repair of vehicles, additional tools will be purchased amounting to $128,500 (See Annex XII or a list of tools, bins, and office supplies). A sum of $25,586 Colones will be set aside to cover fuel needs for two years (See Annex XIII for details) and a sum of $140,000 will be set aside for routine maintenance and spare parts and new tires for new vehicles. $225,000 will be provided for the spare parts for existing vehicles. A sum of $136,000 will be set aside for tires for existing vehicles. (See Annex XIII for a detailed list).

A summary of the Annexes referred to in the text of this report is presented in Annex I. Also note that Annex I summarized the costs associated with material acquisitions and monitoring costs for this component.

C. <u>Project Sub-Component Description</u>

1. <u>Outputs</u>

a. <u>Administrative</u>

With the recommended changes described in this paper, MOH Transportation Department (MOH/TD) vehicle maintenance will be greatly improved and the cost involving repairs minimized.

b. <u>Commodities, Supplies and materials transfers:</u>

Old unrepairable vehicle will be discarded and new vehicles will be purchased to compliment the fleet.

c. <u>Construction</u>

The installation of 2 - 6,000 gallons tanks with pumps will provide support and savings in the operation of the MOH/TD. Also, the Regional garages will be updated and the San Miguel garage relocated since the city of San Miguel is requesting the motor pool to be vacated.

d. Deployed Personnel

Training of personnel will be done in the country. Training will be performed in work-shop (on the job training) of the job related.

D. Project Component Input

Sec. B. Proposed Assistance and Annex I.

E. Implementation Schedules

1st year 85% of the funds directed to the Transport Department will be purchased during the first year. Vehicles, tools, spare parts, maintenance supplies, manuals. The remodelling of the facilities, half of the funds provided for the gasoline and 78% of the T.A.

2nd year 15% of the funds will be used to order some tools vehicle spare parts needed, and the balance of the T.A. equaling 22%.

F. Evaluation

At the end of the first year deadlined vehicle should amount to no more than 15% of the fleet.

At the end of the project, deadlined vehicle would amount to not over 10% of the fleet.

G. Conditions Precedent

I. MOH

a. Standardization of vehicle must be implemented.

b. A policy must be established to discard vehicles that are not economically repaiable and vehicles that are older than 10 years.

c. Minimize the time required to dispose of a vehicle after the vehicle has been reported to be unrepairable or too old. The time limit should not exceed 3 months.

d. The approval of the Transport Department reorganization placing drivers under the direction of a dispatcher, and the approval of new key position requested and needed in the Transport Department.

e. The removal of the parts that are not suitable from the warehouse of the Transport Department.

141

H. Recommendations for Project Follow-Up

1. Policy Dialogue

An agreement must be reached between the MOH and AID concerning solving the problems of standardization, disposal of non-repairable vehicle or too old, and the approval of the new position in Transport Department.

If no solution to the problems stated above are found, the Transport Department will continue to be plagued with deadlined vehicles.

2. Need for institutionalization

Regulations governing the management of the MOH/TD must include the guideline to disposed old vehicles or vehicles that are economically unrepairable. A manual governing the operation of the Transport Department should be created listing the responsibilities and administrative guidelines.

3. Resources budget, manpower, supplies

After project is implemented and the administrative capabilities of the Transport Department are increased, a mile cost per vehicle should be determined taking into consideration of maintenance, repairs, cost of personnel needed for the operation, and replacement of equipment. With this an operational budget can be justified creating a transportation program which minimizes costs.

I. References

Data obtained to determine the percentage of vehicle deadlined, type and model was obtained from information collected by the Transport Department. Copies of study are on file in the office of the Chief of Transport Department.

ANNEX I

LIST OF ANNEXES

II Organization chart of MOH

III Organization chart of General Administrative Services

IV Analysis and Standardization of Vehicles Country Wide.

V Analysis and Standardization of Vehicles in the Capital

VI List of non-repairable vehicles

VII New Vehicle distribution 1,500,000 Dollars

VIII Construction of maintenance facilities 300,000 Colones

IX Technical Assistance for vehicle maintenance 153,000 Dollars

X MOH-TD position description

XI Proposal Organization Chart for Transport Department

XII List of tools and bins 128,500 Dollars

XIII Fuel Cost for new vehicles (2 yrs.) 823,586 Colones

XIV Tires 136,500 Dollars

Maintenance for Spare Parts 140,000 Dollars

225,000 Dollars

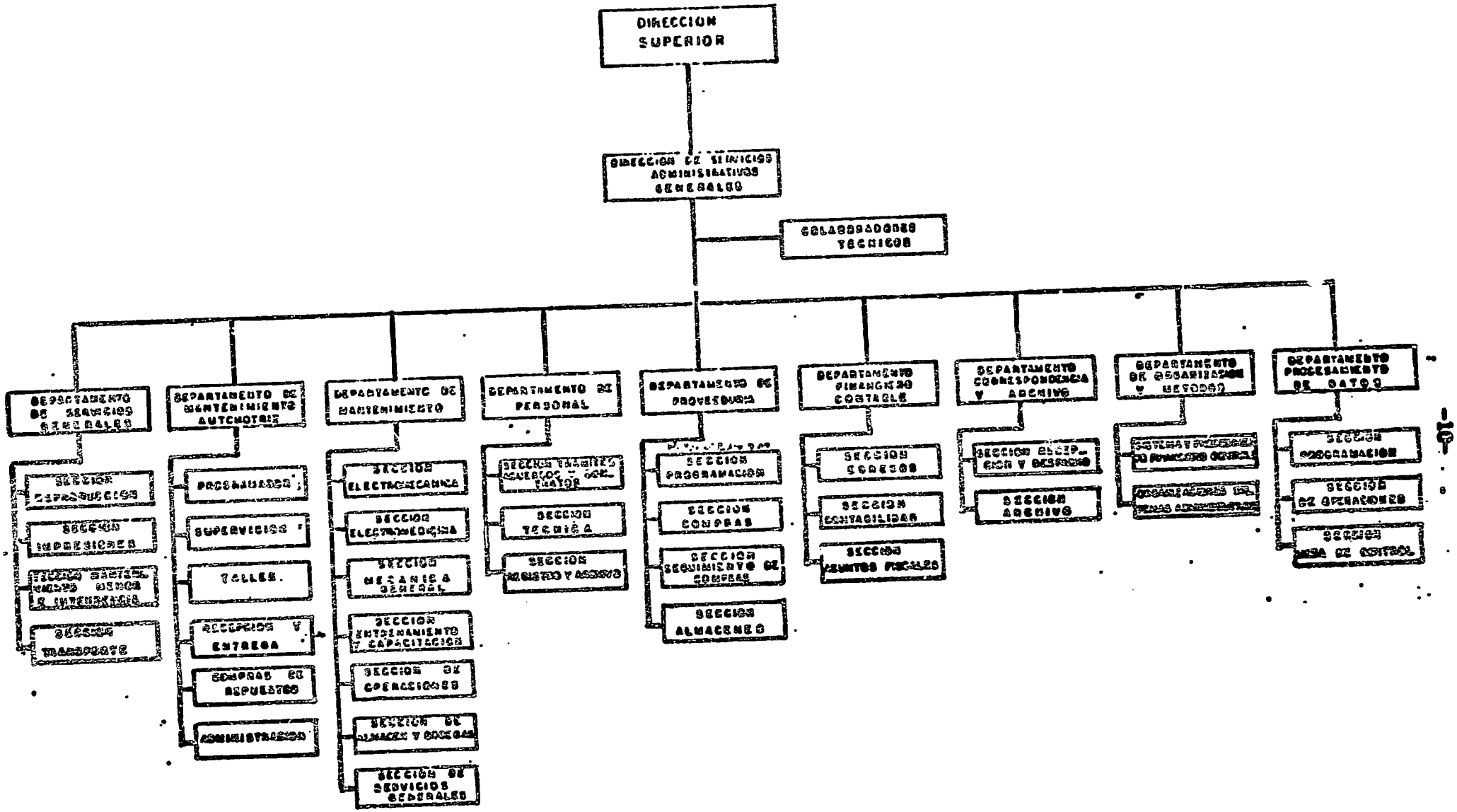
XV Radios (20 units, plus control) 32,000

2,090,000 Dollars

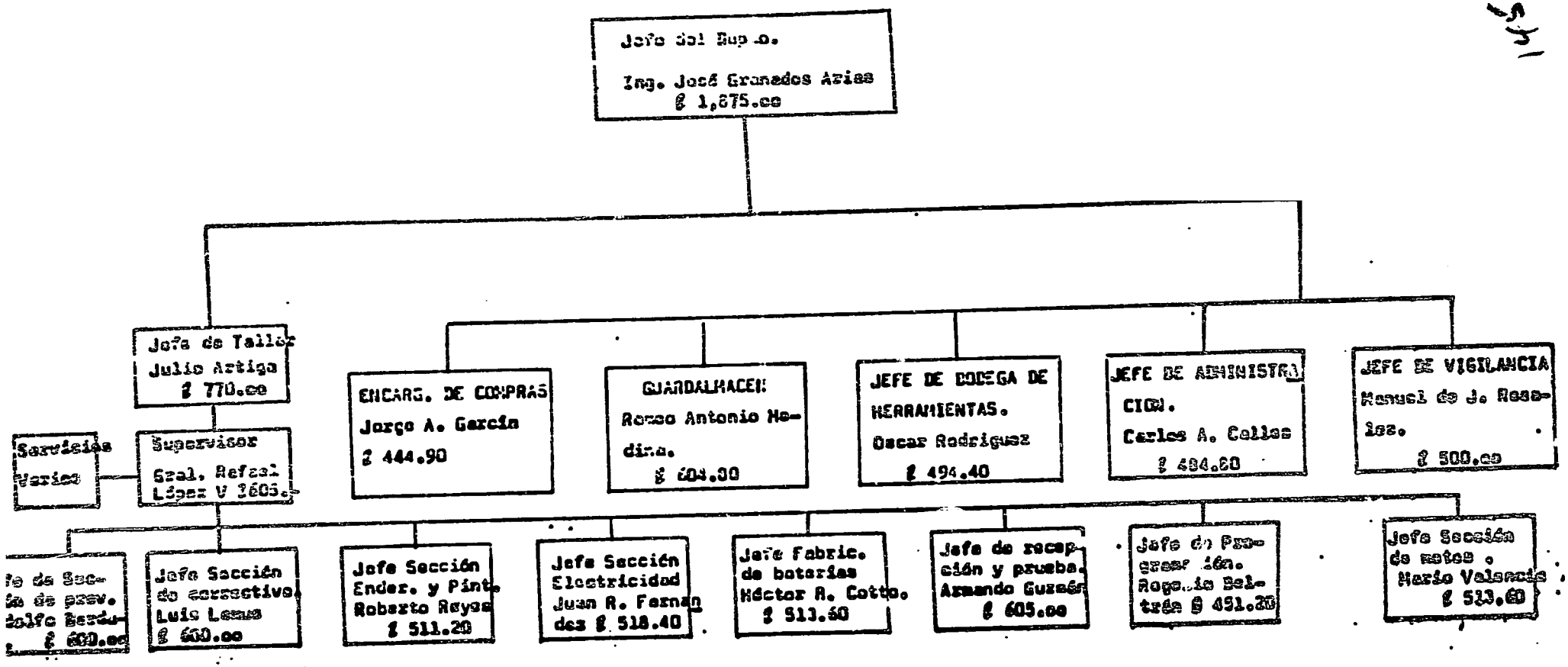
1,125,000 Colones

143

ESTRUCTURA ORGANIZATIVA ACTUAL DE LA DIRECCION SERVICIOS ADMINISTRATIVOS GENERALES



ANNEX III


Jefe del Sup.o.
Ing. José Granados Arias
$ 1,875.oo
Jefe de Taller
Julio Artiga
$ 770.oo
Servicios Varios
Supervisor
Gral. Rafael López V 3605.
ENCARG. DE COMPRAS
Jorge A. García
$ 444.90
GUARDALMACEN
Romeo Antonio Medina.
$ 604.00
JEFE DE BODEGA DE HERRAMIENTAS.
Oscar Rodríguez
$ 494.40
JEFE DE ADMINISTRACION.
Carlos A. Collas
$ 484.60
JEFE DE VIGILANCIA
Manuel de J. Rosales.
$ 500.oo
Jefe de Sección de prev.
Adolfo Berdú
$ 600.oo
Jefe Sección de correctivo
Luis Lemus
$ 600.oo
Jefe Sección Ender. y Pint.
Roberto Reyes
$ 511.20
Jefe Sección Electricidad
Juan R. Fernandez $ 518.40
Jefe Fabric. de baterías
Héctor A. Cotto.
$ 513.60
Jefe de recepción y prueba.
Armando Guzmán
$ 605.oo
Jefe de Preparación.
Rogelio Beltrán $ 491.20
Jefe Sección de motos.
Mario Valencia
$ 513.60

ANNEX IV

ANALYSIS AND STANDARDIZATION OF VEHICLES COUNTRY WIDE

MARCA	TIPO No.		MODELO No.	HOSPITAL	Ambulancia O	Ambulancia E	OPERANDO	EMBARCADOS	% OPERANDO	% EMBARCADOS	PROMEDIO MESES EMBARCADO
American Motors	Jeep	5	1981 = 2	Benjamin Bloom	0	0	4	1	80	20	16
Chevrolet	Pick-up	21	1980 = 2	Chalatenango	1	1	1	1	50	50	8
Datsun	Camioneta	11	1979 = 10	Ahuachapan	1	1	4	3	57	43	16
Daihatsu	Microbus	11	1978 = 3	Maternidad	0	1	1	2	33	67	37
Dodge	Camión	4	1977 = 4	Neumológico	0	0	3	3	50	50	47
Ford	Sedan	3	1976 = 2	Psiquiátrico	0	0	3	5	37	63	37
G M C	Ambulancia	16	1975 = 3	Rosales	2	1	7	6	54	46	16
Honda			1974 = 4	San Juan de Dios	2	0	4		100		
International			1973 = 6	San Rafael	1	0	2		100		
Isuzu			1972 = 3	San Vicente	1	1	2	1	67	33	9
Land Rover			1971 = 7	Santa Ana	0	0	3	2	60	40	18
Mazda			1970 = 2	Sonsonate	0	0	2	2	50	50	20
Mercedes			1969 = 1	Usulutan	0	0	3	1	75	25	25
Toyota			1966 = 6	Zacatecoluca	0	3	2	3	40	60	53
V.W.			1965 = 3								
			1962 = 2								
			1961 = 2								
			1958 = 2								
			1957 = 1								
			1956 = 1								
			1955 = 2								
			1951 = 1								
			1950 = 1								
			1948 = 1								
		71	71	Totales	8	8	41	30	61%	39%	26 meses

ESTANDARIZACION

	Jeeps	Pick-up	Camionetas	Micro-bus	Camion	Ambulancia	Totales
Toyota	2	12	1	4	1	4	24
American Motors	3	1	4			3	11
Totales	5	13	5	4	1	7	35
	100%	62%	45 %	36 %	25 %	44 %	40 %

ANNEX V

ANALYSIS AND STANDARDIZATION OF VEHICLES IN THE CAPITAL

CA	TIPO No.		MODELO No.	AREA	OPERANDO	EMBANCADOS	% OPERANDO	% EMBANCADOS	PROMEDIO DE TIEMPO EMBANCADO (meses)
erican Motors	Jeep	179	1982 = 3	Metro	93	56	62 %	38 %	6 meses
evrolet	Pick-up	105	1981 = 3 1980 = 4	Area Occidental	29	19	60 %	40 %	7 meses
ksun	Wagoneer (Camioneta)	42	1979 = 47 1978 = 46 1977 = 11	Area Central	18	19	49 %	51 %	22 meses
dge	Microbus	15	1976 = 91 1975 = 19	Para Central	36	6	86 %	14 %	14 meses
ord	Bus 45 pax	1	1974 = 45 1973 = 39	Area Oriente	44	26	73 %	27 %	13 meses
H C	Sedan	13	1972 = 12 1971 = 5	Malaria	38	34	53 %	47 %	14 meses
ternational	Coupe	15	1970 = 11 1969 = 10	TOTALES	258	160	64 %	36 %	13 meses
ssan	Camiones		1968 = 19 1967 = 13						
and Rover	8 ton	31	1966 = 6						
	3 ton	1	1965 = 4 1964 = 1						
ercedes	Ambulancias	13	1963 = 6 1962 = 10						
Toyota	Diseño especial		1961 = 7						
V. W.	Dump	1	1960 = 3						
	Pipe	1	1958 = 1						
	Tow	1	1957 = 1 1954 = 1						
	Total	418	418						

ESTANDARIZACION

MARCA	TIPO Jeep	Pick-up	Wagoneer	Ambulancia	Camiones	Micro-Bus	Sedan	Totales	
Toyota	59	14		1	12	4	5	95	
American Motors	107	43	39	9				198	
Totales	166	57	39	10		4	5	293	
%	93%	54 %	93%	77 %	38 %	27 %	38 %	70% vehicle available	

ANNEX VI

VEHICLES THAT ARE NOT REPAIRABLE

ZONA CENTRAL

PLACA	MARCA	TIPO	AÑO	OBSERVACIONES
3120	V. W.	Carro 1200	62	
3143	Datsun	Pick Up 1300	66	
3008	V. W. 1200	Carro	62	
3680	Isuzu	Carro Florian	70	
5500	Mercedes Benz	Carro	62	
2456	Land Rover	Jeep	68	
3108	Land Rover	Jeep	67	
3109	Land Rover	Jeep	60	
3858	Datsun	Pick Up	71	
2099	Jeep J20.	Pick Up	81	Quemado
4151	Dodge	Camion Volteo	70	
4081	Willys J-7	Jeep	79	Quemado
4877	Willys J-20	Pick Up	73	
3679	Isuzu	Carro	70	
3293	Toyota	Carro	58	
2129	Willys	Pick up	62	
2163	Willys	Camioneta	65	
3128	V. W. 1200	Carro	63	
7326	GMC 8T	Camión	76	Quemado
7004	Isuzu	Pick Up	79	Quemado
1263	Willys J-4	Jeep	69	
3361	Ford Transci	Microbus	68	
7327	GMC 8T	Camión	76	Quemado
7321	GMC	Pick Up	76	Quemado
2120	Willys	Pick Up	62	
2155	Willys	Camioneta	62	
2803	Toyota	Pick Up	72	Robado
3011	Willys	Camioneta	61	
3111	Mercedes Benz	Microbus	58	
3113	Chevrolet	Carro	62	
3159	International	Camión	66	
3178	Kaiser	Camioneta	66	
3208	Toyota	Pick Up	66	

VEHICLES THAT ARE NOT REPAIRABLE

.....1

ZONA CENTRAL (cont.)

PLACA	MARCA	TIPO	AÑO	OBSERVACIONES
3289	Dodge	Bus	54	
3294	Toyota	Carro	68	
3584	Willys	Jeep	69	
3635	Totyota	Carro	68	
4141	Willys	Jeep	69	
3105	Willys	Pick Up	61	
3116	Chevrolet	Pick Up	57	
3142	Datsun	Pick Up	66	
3455	Kaiser	Camioneta	68	
3422	Kaiser	Camioneta	68	
3423	Kaiser	Camioneta	68	

ANNEX VI

VEHICLES THAT ARE NOT REPAIRABLE

REGION OCCIDENTAL

PLACA	MARCA	TIPO	AÑO	
2185	International	Panel	65	
3099	Willys	Ambulancia	60	
3118	Willys	Ambulancia	63	
3175	Willys	Ambulancia	63	
3374	Kaiser	Jeep	68	
3572	Kaiser	Jeep	68	
3579	Chevrolet	Camión	72	Costo muy elevado
3158	Kaiser	Ambulancia	67	
3374	Kaiser	Jeep	68	
3572	Kaiser	Jeep	68	
3114	International	Camion	63	
4143	Kaiser	Jeep	69	
4438	Kaiser	Jeep	72	Costo Muy elevado
3574	Kaiser	Wagoneer	71	
2526	J 20	Pick Up	67	
3295	Toyota	Carro	68	
3580	Kaiser	Pick Up	70	
2048	Isuzu	Carro	70	
3071	Dodge	Pick Up	74	Repuestos no en plaza y Costo muy elevad
4979	International	Pick Up	74	Repuestos no en plaza y Costo muy elevad

ANNEX VI

VEHICLES THAT ARE NOT REPAIRABLE

REGION PARACENTRAL

PLACA	MARCA	TIPO	AÑO	OBSERVACIONES
3102	Willys	Camioneta	60	
3169	Willys	Ambulancia	62	
3172	Willys	Ambulancia	62	
3372	Kaiser	Camioneta	68	
3373	Kaiser	Camioneta	68	
3375	Kaiser	Camioneta	68	
3421	Kaiser	Camioneta	68	
3636	Chevrolet	Pick Up	70	
3640	Chevrolet	Pick Up	70	
4144	Kaiser	Jeep CJ6	69	
4440	Kaiser	Pick Up	72	
4443	Toyota	Ambulancia	71	
4445	Toyota	Jeep	70	
4145	Kaiser	Jeep	69	
8105	Kaiser	Jeep	67	
2184	Willys	Camioneta	65	
4444	Toyota	Pick Up	71	
4135	Kaiser	Jeep	69	
2879	Ford	Pick Up	61	

ANNEX VI

VEHICLES THAT ARE NOT REPAIRABLE

REGION ORIENTAL

PLACA	MARCA	TIPO	AÑO	OBSERVACIONES
2155	Willys	Ambulancia	59	
3079	V. W.	Automovil	72	
2804	Toyota	Pick Up	72	
5074	Dodge	Pick Up	74	Repuestos no en plaza Costo muy elevado
3210	V.W.	Automovil	66	
4881	Jeep J4000	Pick Up	73	
3582	Chevrolet	Camion	72	
3160	Jeep J2000	Pick Up	66	
5076	Dodge	Pick Up	74	Costo muy elevado
3104	Willys	Pick Up	61	
4139	Willys CJ4	Jeep	69	
3420	Willys	Camioneta	68	Quemado
4957	International	Pick Up	74	Repuestos no en plaz Costo muy elevado
2791	Land Rover	Ambulancia	67	
4117	Cherokee	Ambulancia	79	Quemado
5954	Jeep CJ5	Jeep	75	Chocado cambio chas y carrocería
6940	Toyota	Jeep	76	Quemado

ANNEX VI

VEHICLES THAT ARE NOT REPATRABLE

MALARIA

PLACA	MARCA	TIPO	AÑO	OBSERVACIONES
2133	Willys	Pick Up	62	
2137	Willys	Pick Up	63	
2143	Willys	Pick Up	62	
2175	Willys	Pick Up	62	
3145	Willys	Jeep	73	
4139	Willys	Jeep	69	
4876	Kaiser	Pick Up	73	Costo muy elevado
6147	Willys	Camioneta	63	
1102	Willys	Camioneta	63	
1222	Kaiser	Jeep	67	
2134	Kaiser	Jeep	67	
2136	Kaiser	Jeep	67	
1237	Kaiser	Jeep	67	
1244	Gladiador	Pick Up	68	
8124	Gladiador	Pick Up	68	
1251	Gladiador	Pick Up	68	
1252	Gladiador	Pick Up	68	
1253	Gladiador	Pick Up	68	
8135	Kaiser	Jeep	69	
1266	Kaiser	Jeep	69	
2117	Willys	Pick Up	62	
1240	Kaiser	Jeep		
8128	Gladiador	Pick Up	68	
8122	Gladiador	Pick Up	68	
8102	Kaiser	Jeep	67	
2157	willys	Camioneta	61	
7220	Toyota	Pick Up	76	Quemado
4146	Kaiser	Jeep	69	
3583	Kaiser	Jeep	70	
7139	Kaiser	Jeep	76	Quemado
2553	Willys	Jeep	67	
1242	Kaiser	Jeep	67	
7212	Toyota	Jeep		Quemado
4980	Willys	Camioneta	76	Quemado
1495	Willys	Camioneta	76	Quemado

ANNEX VII

VEHICLES DISTRIBUTION
MODELS AND QUANTITIES

LOCATION	TYPE OF VEHICLE	$ PER VEHICLE	QUANTITY	TOTAL
Malaria	Pick up J-20	13,000	5	65,000
Occidental Region	Pick up J-20	13,000	2	26,000
Santa Ana	Truck 4 ton	25,000	1	25,000
Chalchuapa	Ambulance	30,000	1	30,000
Metapan	Ambulancia	30,000	1	30,000
Central Region	Pick up J-20	13,000	2	26,000
Santa Tecla	Truck 4 Ton	25,000	1	25,000
Nueva Conception	Ambulance	30,000	1	30,000
Para Central Region	Pick Up J-20	13,000	2	26,000
	Truck 4 ton	25,000	1	25,000
Suchitoto	Ambulance	30,000	1	30,000
Ilobasco	Ambulance	30,000	1	30,000
Sensuntepeque	Ambulance	30,000	1	30,000
Cojutepeque	Ambulance	30,000	1	30,000
Metro Region	Pick Up J-20	13,000	2	26,000
San Salvador				
Oriental Region	Pick Up J-20	13,000	2	26,000
	Truck 4 ton	25,000	1	25,000
Santiago de María	Ambulance	30,000	1	30,000
Ciudad de Barrios	Ambulance	30,000	1	30,000
San Francisco Gotera	Ambulance	30,000	1	30,000
Santa Rosa de Lima	Ambulance	30,000	1	30,000
La Unión	Ambulance	30,000	1	30,000
Hospital Maternidad	Ambulancia	28,000	1	28,000
Hospital Rosales	Ambulancia	28,000	1	28,000
Hosp. Neumológico	Ambulancia	28,000	1	28,000
Hosp. Psiquiátrico	Ambulancia	28,000	1	28,000
Hosp. Sta. Tecla	Ambulancia	30,000	1	30,000
Hospital Veteranos	Ambulancia	30,000	1	30,000
Hosp. Santa Ana	Ambulancia	28,000	1	28,000
Hosp. San Vicente	Ambulancia	30,000	1	30,000
Hosp. Chalatenango	Ambulancia	30,000	1	30,000
Hosp. Zacatecoluca	Ambulancia	30,000	1	30,000
Hosp. Ahuachapan	Ambulancia	28,000	1	28,000
Transport Department				
PLANSARAR	4x4 Dump truck	30,000	2	60,000
PLANSARAR	4x4 Truck 8 Tons	30,000	2	60,000
Adviser	Jeep CJ-7	10,000	2	20,000
Metro	Truck 3 ton	26,000	2	52,000
	Bus 45 Pax	25,000	1	25,000
	1/2 Pick Up 2x4	11,000	2	22,000
	Jeep CJ-7	10,000	10	100,000
	Chev. Van 9 Pax	16,000	1	16,000
	1 ton Pick Up 4x4 Mobile	13,000	2	26,000
	Ambulance 4 [illegible]	30,000	4	120,000
	TOTALS		70	1,474,000

ehicle Distribution....

SUMMARY

Ambulance:	2 x 4 = 6 4 x 4 = 21	27	27
Pick Up:	2 x 4 1/2 ton = 2 4 x 4 3/4 ton = 17		19
Trucks:	4 x 4 8 tons = 2 4 x 4 Dump = 2 2 x 4 8 tons = 2 2 x 4 4 tons = 4		10
Chevrolet Van 9 Pax 2 x 4			1
Bus 45 Pax j			1
C J - 7 Diesel			12
			70

SPEC's ON VEHICLES

ea. 12 Jeep, 1983, CJ-7, Diesel, 4x4, hard top w/doors, color white, spare size of Tires H78x15, black , standard transmission 4 speed, stabilizer bar front axle, with rear seat, warm lock-out hubs. Tools for changing tire, spare wheel lock.

ea. 2 Pick-Up, J-10, 2 x4, 6 cylinder, 258CID spare tires, color white, tires black si 750:16 tube type. Standard transmission 4 speed. HD radiator, HD shocks, HD springs front & back, power steering. Tools for changing tire, spare wheel lock.

ea.7 Pick-Up, J-20, 4 x4, 6 cylinder 258CID, 2BBL, spare tire, color white, tires black size 750:16 tubetype. Standard transmission 4 speed, HD radiator, HD shocks, HD spring front & rear. warm lock-out hubs, stabilizer bar , front axle, power steering, tools for changing tires, spare wheel lock.

ANNEX VXII

CONSTRUCTION OF MAINTENANCE FACILITIES

I. Transport Department (Matasanos)	
6000 gallons of gasoline at ₡5.13 per gallon	= 30,780.000
6000 gallons of Diesel at ₡4.13 per gallon	= 24,780.00
Installation of 2 tanks 6000 gallons each plus 2 pumps to dispense diesel and gasoline. (See estimates attached).	= 87,708.75
II. Transport Department (Matasanos)	
Construction of shade areas (see estimate attached)	= 45,007.47
Labor and incidentals	= 11,723.78
	₡200,000.00
III. Oriental Region - San Miguel	
Construction of a garage compound	= 60,000.00
IV. Occidental Region - Santa Ana	
Improvement of garage facilites	= 20,000.00
V. Central Region - Santa Tecla	
Improvement of garage facilities-	= 20,000
	₡300,000

ANNEX IX

T. A.

Title: Transport equipment maintenance

Specialist:

Education: B.A. degree on Business Administration or Mechanical engineering, and fluently in spanish language.

Experience: Must have not less than 4 years of experience in the development of vehicles maintenance systems, operation of motor pools, vehicle control, toll control, parts inventories.

Previous activities: Must have worked at least 3 years with international agencies, such as AID or similar.

TA will arrive in country at the arrival of equipment and vehicles for the duration of one year. $ 120,000

To reinforce previous work he will returne every 3 months for one month.
3 x 11,000.... $ 33,000

$ 153,000

ANNEX X

Title: Assistant Chief of T. D. (Sub-Jefe del Departamento)

Education: Mechanical Engineer graduate

Experience: Must have not less than two years experience in the operation of a Motor Pool or similar.

Previous Activity: Must have good recommendations from previous employment.

Title: Administrative Chief (Jefe de Administración)

Education: Business Administration graduate with AA Degree (Licenciado)

Experience: Must have not less than two years of experience in administration and accounting.

Previous activity: Must have good recommendations from previous employment.

Title: Motor Pool Officer (Jefe de Transporte)

Education: High School Diploma (Bachiller) with background on vehicles.

Experience: A minimun of 2 years in the administration of personnel. Must possess a valid driver licence, and a knowledge of vehicle operation.

Previous Activities: Must have good recommendation from previous employment specially in the inter relation with employees.

~~Titlez~~

Title: Gasoline Attendant

Education: High School Diploma (Bachiller) with background on Accounting and Business Administration.

Experience: A minimum of 1 year in performing accounting work.

Previous Activity: Must have good recommendations from previous employees specially in the area of honesty.

ORGANIGRAMA DEL DE

SECC. DE PROGRA MACION, RECEP CION Y PRUEBA

SECCION PREVENTIVO

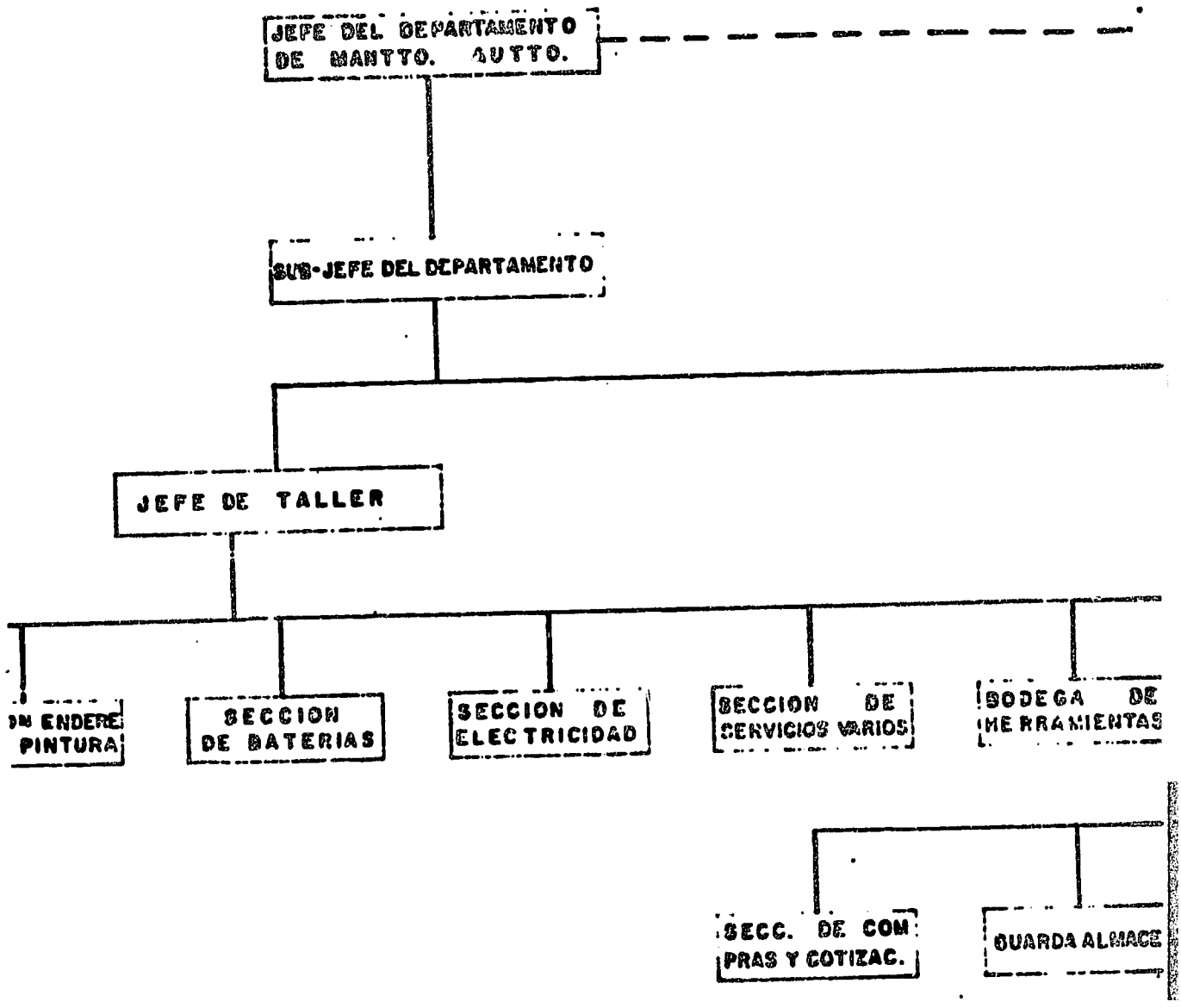
SECCION CORRECTIVO

SECC ZADO

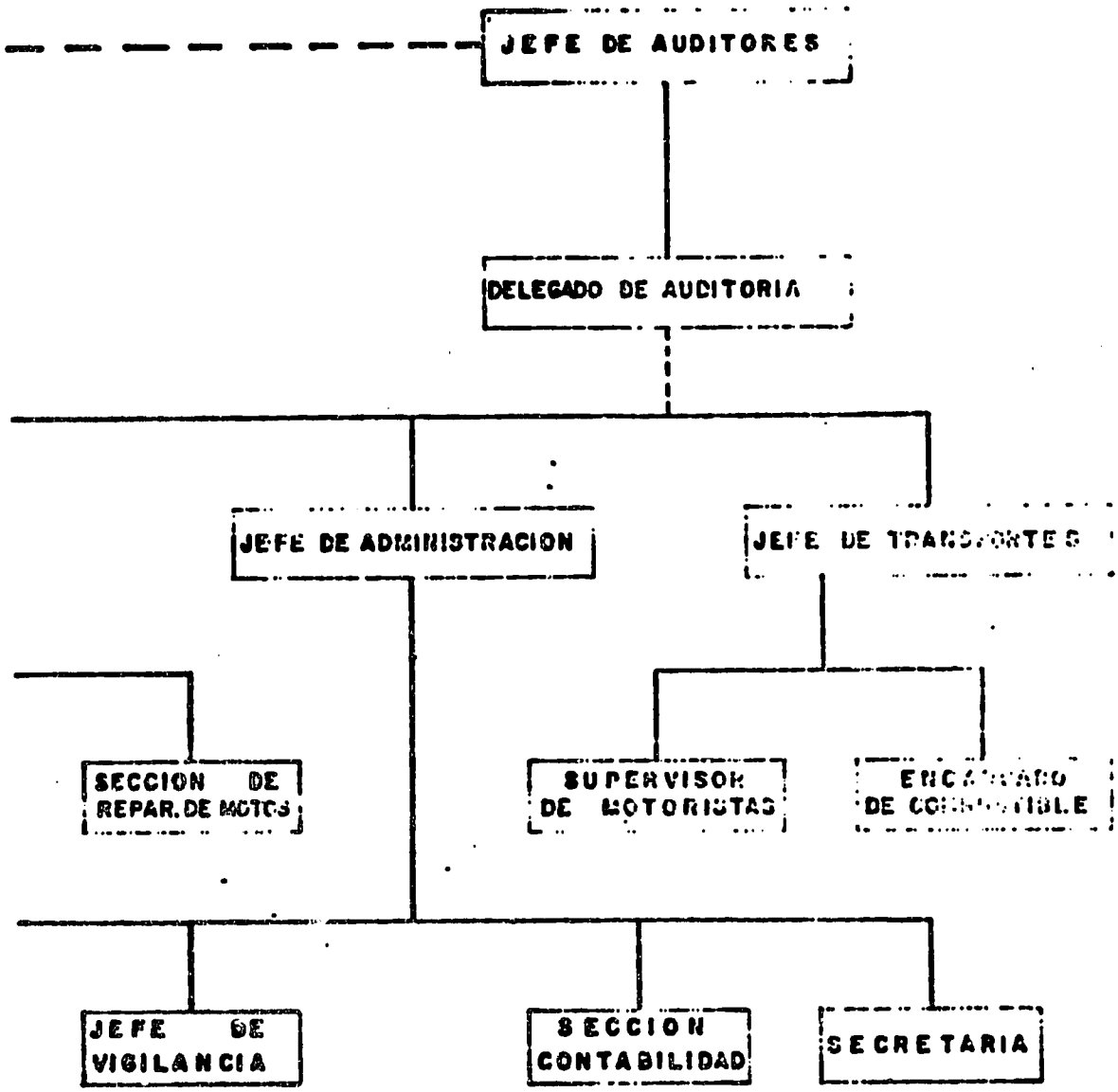
SERVICIOS VARIOS

- REPARACION DE LLANTAS.
- FABRICACION DE SILENCIADORES.
- ALBAÑILES.
- FONTANEROS.
- CARPINTEROS.
- ENCARGADO DE LIMPIEZA.
- ENCARGADO DE GUARDAR HERRAMIENTAS Y VEHICU

PARTAMENTO DE MANTENIMIENTO AUTOM



OTRIZ M. S. P. A. S



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ANNEX XII

TOOLS FOR TRANSTORY DEPARTMENT OF MOH. ES or EQUAL

The following tools are being order from McMASTER-CARR Supply Co.; P.O.Box 4355, Chicago, Ill 60680, U.S.A.

PAGE	No.	DESCRIPTION	CAT.#	COST/UNIT	UNIT	TOTAL $
1281	2374D3	Presses & Brakes	86	2596.77	1	2596.77
1281	2374A1	Presses & Brakes	86	1467.74	4	5870.96
438	1066K11	Wheel bearing packers	87	193.67	5	968.35
439	1103K1	Self-tapping lubrication	87	0.27	200	54.00
1693	6713A12	Brake Cylinder Hones	87	13.14	6	78.84
1693	6713A14	Replacement Stones	87	3.38	12	40.56
1693	6552A37	Body Repair Tools	87	157.52	2	315.04
292	2897T16	Ram & Pump Assemblies	87	250.00	1	250.00
293	2988T14	Wedge Type Hidraulic Set	87	249.67	1	249.67
1691	6856A11	Tire Changing Stand	87	398.08	4	1592.32
1691	6691A1	Tire tool Service	87	163.24	4	652.96
1691	6691A2	Tire Tool Service	87	239.92	1	239.92
1691	6003A14	Tire Changing Impact Tool	87	85.43	4	341.72
1691	6868A11	Wheel Weight pliers	87	13.78	1	13.78
1691	6854A11	Wheels Balancer	87	215.92	1	215.92
1690	6115A12	Tire Tools	87	1.58	7	11.06
1291	2461D18	Forges	86	1024.09	1	1024.09
1290	2481D23	Anvils	86	1683.33	1	1683.33
1290	2481D38	Stand for Anvils	86	444.44	1	444.44
1295	2679A4	Ridgid Pipe Cutters	86	84.90	1	84.90
1295	2680A23	Replacement Pipe Cutters	86	4.30	25	107.50
835	7831T	Duck Tarpaulins 20x30 Size 1241	86	168.00	12	2016.00
835	7881T	Duck Tarpaulins 24x36 size 1241	86	107.52	5	537.60
510	3340T5	Eyeglass Loupes	86	8.25	6	49.50
1687	6877A11	Valve Seat Grinder Set	87	845.24	1	845.24
1687	6735A12	Valve Spring Compressor	87	10.29	2	20.58
1687	6702A12	Valve Grinders	87	11.48	2	22.96
1687	6729A12	Valve Grinders	87	9.42	2	18.84
1687	6890A11	Valve Spring Compressor	87	17.52	2	35.04
					SUB-TOTAL	20,381.89

MASTER-CARD-... (2)

87	6889A21	Valve Face Grinding	87	1490.46	1	1490.46
90	6959A53	Torx Keys Set	87	13.88	1	13.88
04	2629A16	Tap & Die	86	486.43	1	486.43
840	7850T14	Spray Guns	86	90.40	3	271.20
524	5248T1	Aprons	86	12.64	2	25.28
527	5278T13	Gloves	86	2.31	2	4.62
203	1729T25	Weight Sets	86	65.00	1	65.00
161	9845T1	Battery Service Kit	86	31.36	1	31.36
161	9847T3	Battery Fillers	86	290.00	1	290.00
1674	6623A13	Roller Cabinets	87	180.50	20	3610.00
1238	6848A61	Tape Rules	87	2.58	10	25.00
439	1103K2	Selftapping Lubrication	87	0.49	100	49.00
439	1103K3	Selftapping Lubrication	87	0.49	50	24.50
439	1103K4	Selftapping Lubrication	87	0.27	100	27.00
439	1103K6	Selftapping Lubrication	87	0.49	50.	24.50
439	1351K11	Extension Adapter	87	21.50	2	43.00
335	3256T15	Folding Boom Crane	87	1331.00	1	1331.00
297	2896T15	Truck Transmission Jack	87	1241.04	1	1241.04
230	2539T24	Steel Platform Trucks	87	428.02	1	428.02
1690	6750A11	Sparkplug tester/Cleaner	87	91.13	6	546.78
1690	6750A12	Adapter Kit	87	1.22	2	2.44
1690	6750A13	Abrasive Refill	87	1.37	50	68.50
1468	7095A11	Metal Shears 36"	89	654.37	1	654.37
591	6022T7	Watch Clock	87	392.00	1	392.00
591	6023T2	Record Dials	87	14.73	2	29.46
591	6022W4	Stations of 1 to 5	87	30.67	5	153.35
					SUB-TOTAL	31,710.88

164

MASTER-CARR.....(3)

285	2479A14	Pipe Benders	86	1144.00	1	1144.00
712	6132A12	Brake Deliner & Riv.	88	1484.13	1	1484.13
362	2952A5	Drill Blank Sets	88	110.43	1	110.43
362	2940A13	Drills	88	8.04	10	80.40
712	6672A14	Ridge Reamers	88	24.34	5	121.70
712	6672A17	Extra Carbide Cutter	88	7.76	10	77.60
713	6686A10	Piston Ring Compressor	88	6.60	6	39.60
713	6686A60	" " "	88	14.10	1	14.10
284	8587A11	Precision Metric	88	144.44	1	144.44
443	3470A20	Punch	88	67.12	1	67.12
615	7162A31	Key Sets	88	4.91	1	4.91
615	62A18	Key Sets	88	5.78	1	5.78
615	7162A21	Key Sets	88	3.43	1	3.43
615	7162A22	Key Sets	88	6.31	1	6.31
350	2999A14	Expansion Reamers	87	338.50	1	338.50
					TOTAL	35,353.33

165

SEARS 1982

CATALOG No.	DESCRIPTION	UNIT PRICE	QUANTITY	TOTAL
32K60258N	5-tier wall shelf	19.90	20	399.80
9K33129C	Machanics tool set	399.00	15	5,985.00
9K6512	Tool box	21.99	15	329.85
9K44968	Wrench sets	79.99	15	1,199.85
42K6402N	Fans	219.99	5	1,099.95
28K1244	Jack stands	9.99	40	399.60
28K1226L	Steel ramps	49.99	10	499.90
28K1205N	Floor jacks	289.99	6	1,739.94
28K12505L	Creeper seat	27.99	12	335.88
28K12023	Jacks	16.99	25	424.75
28K12014C	Jacks	29.99	5	149.95
9K5808C	Fire extinguishers	84.99	8	679.92
9K24272N	Table saw	249.99	1	249.99
9K32783	Table sew accessory kit	74.99	1	74.99
9K4257	Vernier	26.99	6	161.94
9K44478	Torque wrench	59.99	6	359.94
9K44479	" "	54.99	1	54.99
9K43892	Socket set	16.99	6	101.94
9K43893	" "	16.99	6	101.94
9K43487	Socket wrench set	34.99	15	524.85
9K44092	" " "	29.99	15	449.85
30K40195N	Ladders	29.99	3	89.97
3A3459('83)	Rotary dial wall phone	39.99	1	39.99
			TOTAL	15,454.78

C. S. A.

PAGE	CATALOG NUMBER	DESCRIPTION	UNIT PRICE	QUANTITY	TOTAL
62	3750-00-243-2408	Bow style iron garden rake	6.40	1	6.40
63	3750-00-086-7690	Rake, Lawn	2.80	1	2.80
63	3750-00-978-6159	Shears, Grass-cutting	2.65	1	2.65
64	3750-00-203-3933	Sprinkler, lawn	4.10	1	4.10
71	4240-00-542-2048	Shield, face	3.25	3	9.75
70-	4240-00-052-3776	Goggles	0.77	10	7.70
70	4240-00-998-6418	Goggles	3.15	10	31.50
70	4240-00-203-3804	Goggles	3.20	10	32.00
70	4510-00-580-2958	Faucet, single	5.70	10	57.00
141	7920-00-269-1259	Brush	1.85	20	37.00
246	5120-00-943-9929	Spreader	5.10	2	10.20
251	5120-00-203-6436	Clamp, C	10.20	5	51.00
272	5120-00-596-8092	Lifter	1.50	6	9.00
272	5120-00-239-8686	Lifter	17.40	6	104.40
272	5120-00-239-0326	Lifter	6.00	6	36.00
272	5120-00-529-2283	Lifter	29.00	6	174.00
275	5120-00-268-3579	Pliers	1.85	5	9.25
275	5120-00-184-9403	Pliers	2.30	2	4.60
276	5120-00248-9407	Pliers	3.10	3	9.30
277	5120-00-801-0958	Pliers	4.00	3	12.00
277	5120-00-595-9551	Pliers	4.15	8	33.20
279	5120-00-288-7714	Puller	116.00	5	580.00
280	5120-00-009-3660	Puller	119.00	1	119.00
284	5120-00-017-2849	Riveter	14.50	1	14.50
285	5120-00--60-2004	Screwdriver	0.55	10	5.50
285	5120-00-240-8916	Screwdriver	0.38	10	3.80
285	5120-00-529-3101	Screwdriver	1.05	10	10.50
286	5120-00517-6906	Screwdriver	2.75	2	5.50
286	51-20-00-278-1267	Screwdriver	0.63	10	6.30
286	5120-00-227-7356	"	0.43	10	4.30
286	5120-00-280-4837	"	0.56	10	5.60
286	5120-00-227-7334	"	0.77	10	7.70
286	5120-00-596-8633	"	0.57	10	5.70

P..... (2)

	5120-00-293-0314	Screwdriver	0.78	10	7.80
	5120-00-180-0708	"	0.92	10	9.20
	5120-00-555-2063	"	1.90	5	9.50
	5120-00-223-6963	"	1.33	5	6.65
	5120-00-240-5232	"	0.92	10	9.20
	5120-00-241-3170	"	1.05	6	6.30
7	5120-00-242-3268	"	1.35	6	8.10
3	5120-00-224-3146	Wrenchbox	1.50	30	45.00
3	5120-00-596-8556	"	1.15	30	34.50
3	5120-00-277-3364	"	1.70	20	34.00
3	5120-00-224-3148	"	1.25	20	25.00
3	5120-00-293-0081	"	2.05	10	20.50
3	5120-00-277-1438	"	2.75	10	27.50
3	5120-00-293-0082	"	7.20	8	57.60
3	5120-00-222-1593	"	2.60	8	20.80
03	5120-00-277-1588	"	4.55	6	27.30
03	5120-00-277-1591	"	19.50	6	117.00
03	5120-00-228-9521	"	4.10	6	24.60
03	5120-00-184-8676	"	9.00	6	54.00
03	5120-00-184-8677	"	13.60	6	81.60
03	5120-00-184-8678	"	19.10	6	114.60
04	5120-00-892-6089	Wrench	2.00	20	40.00
04	5120-00-288-9997	"	0.75	20	15.00
04	5120-00-288-9671	"	1.05	20	21.00
04	5120-00-228-9503	"	0.75	20	15.00
04	5120-00-278-0342	"	1.05	10	10.50
04	5120-00-228-9504	"	0.74	10	7.40
04	5120-00-228-9505	"	0.78	10	7.80
04	5120-00-228-9506	"	0.80	10	8.00
				TOTAL	2,277.60

169

TOOLS FOR TRANSPORT DEPARTMENT OF MOH, KS or EQUAL

The following tools are being order from Pacifit International
P.O. Box 63281, Los Angeles, CA 90063, U.S.A. (1983 Edition)

GE	No.	DESCRIPTION	COST/UNIT	UNIT	TOTAL $
0	2W459	Key Control Cabinets	131.50	6	789.00
4	1Z991	Single Stage Compressors	973.90	4	3893.60
5	2W413	Calculators	160.00	6	960.00
0	1P868	Centrifugal Pumps	394.00	1	394.00
8	5H516	Music Amplifier	447.50	1	447.5
8	2W485	Conductor Speaker	33.00	5	165.00
0	5H456	Paging Speaker	27.50	10	275.00
9	5H455	Paging Speakers	39.95	5	199.75
9	5H452	Desk Microphone	82.95	1	82.95
6	6X251	Timing light	63.70	8	509.60
7	3Z634	Battery Testers	144.95	2	289.90
2	4Z587	Electric Drills	138.00	6	828.00
7	1Z750	Electric Solder	28.80	5	144.00
7	4X172	Replacement Solder	0.96	25	24.00
7	2Z174	Brand Solder	9.45	50	472.50
6	2W458	Rolling warehouse	84.45	3	253.35
8	6X756	Light Reels	43.89	10	438.90
8	2W049	Jumper Cables	46.98	6	281.88
6	2Z204	Electric Engraver	19.50	6	117.00
7	1W819	Platform Truck	132.45	2	264.90
5	3H261	Water Cooler	432.15	1	432.15
				TOTAL	11,264.98

The following tools are being order from Buying Guide,
Bo45 Export Corp., 48 N.W. 29th Stree, Miami, Fl 33127

E	No.	DESCRIPTION	COST/UNIT	UNIT	TOTAL $
	2Z984	Acetyline Welding Single Stage	288.50	4	1154.00
	5H395	Single-Stage	67.50	4	270.00
	5X396	Single-Stage	73.50	4	294.00
	2Z987	Heating Assemble	49.50	2	99.00
	3Z335	Welder Outfit	155.00	5	775.00
	2Z529	Wheel Kit	8.50	6	51.00
	3Z832	Pressure Washer	1150.00	1	1150.00
	4Z125	Bench Grinders	325.00	4	1300.00
	2Z555	Hoists	253.60	5	1268.00
	4X258	Solderless Terminal Kits	34.00	5	170.00
5	6X808	Grease Gun	13.39	6	80.34
3	6X809	Grease Hose	7.44	6	44.64
9	2W309	Oiler	12.64	7	88.48
1	2Z736	Sander-Grinder	192.00	2	384.00
1	2Z742	Disc Assembly	14.90	2	29.80
1	2Z742	Disc Assembly	17.10	2	34.20
01	2Z740	Safety Guards	15.10	1	15.10
01	2Z741	Safety Guards	17.30	1	17.30
39	7W056	Parts Storage Units	358.15	1	358.15
49	2Z003	Portable Steam Cleaner	1035.00	1	1035.00
69.	3Z004	Steam Solvent	39.50	5	197.50
60	4X395	Spray Cleaner	18.88	6	113.28
60	4X304	Pliers	5.92	6	35.52
73	2X909	Measuring gauge	25.56	1	25.56
				TOTAL	8,989.87

ANNEX XIII

FUEL NEEDS FOR NEW VEHICLES

I.	**Ambulance** 24,000 Km. per ambulance Gasoline 15 Km per gallon or 1600 gallon per vehicle 1,600 gallon x 27 ambulances = 43,200 gallons 43,200 x 5.13 colones per gallon	221,616
II.	**Trucks: (8 ton)** 30,000 Km per truck Diesel 10 Km per gallons or 3,000 gallon per vehicle 3,000 x 2 trucks = 6.000 gallons 6,000 x 4.13 colones =	24,780
III.	**Trucks: (4 ton)** 24,000 Km per truck Diesel 12 Km per gallons or 2,000 gallons per vehicle x 4 = 8,000 gallons 8,000 gallons x 4.13 colones =	33,040
IV.	**Pick-Up (4 x 4)** 30,000 Km per vehicle Gasoline 18 km per gallon or 1,667 gallon x 12 vehicles equal 20,004 20,004 gallons x 5.13 colones =	102,621
V.	**Jeeps CJ-7** 24,000 Km per jeep Diesel 40 km per gallon or 600 gallons per vehicle 600 gallons per vehicles (12) = 7,200 7,200 x 4.13 colones =	29,736
	ONE YEAR GASOLINE CONSUMPTION	411,793 col.
	2ND YEAR GASOLINE COMSUMPTION	411,793 col.
	TOTAL	823,586 col.

ANNEX XIV
GOOD YEAR
THE GOODYEAR TIRE & RUBBER COMPANY
Government Sales Dept.
1144 East Market Street,
Akron, Ohio 44316

PRODUCT		PRICE	F.E.T..	EA.	QUANT.	TOTAL
102-618-150	Tire Suburbanite, Polyester, B4, Size 678-15, Black	32.97	2.60	35.57	1000	35,570.00
120-044-331	Tire, Light Truck C, Tubetype, Black, size 700:15	41.28	2.81	44.09	1000	44,090.00
120-099-331	Tire, Light Truck, Load D Tubetype, Black Size 7:50/16	51.43	3.51	54.94	300	16,482.00
122-209-339	Tire, Truck, Load F, Tubertype Black, Size 900/20	143.27	8.09	151.36	140	21,190.40
193-354-200	Tube, Size 900/20	12.17	0.72	12.89	140	1,804.60
192-591-200	Tube, Size 750/16	7.65	0.38	8.03	300	2,409.00
192-230-200	Tube, Size 700/15	8.29	0.34	8.63	1000	8,630.00
192-212-200	Tube, Size 678-15	5.99	0.28	6.27	1000	6,270.00
						$136,446.00

In addition:

1.	Spare parts for new vehicles	$140,000.00
2.	Spare parts for existing vehicles	$225,000.00
		$365,000.00
	Total of tires and parts	$501,446.00

ANNEX XV

RADIOS

1.	20 Units @ $1000 =	$20,000.00
2.	Control @ $12,000 =	$12,000.00
	TOTAL RADIOS	$32,000.00

DRUG QUALITY CONTROL SYSTEM

May 30, 1983 Dr. Marcelo Vernengo

A. SITUATIONAL ANALYSIS

1. Background and Present Situation

a. Relevant History

The drug supply system of El Salvador is regulated by the Ley de Farmacias of July 9, 1927; the Ley del Consejo Superior de Salud Publica (CSSP) as Juntas de Vigilancia de los Profesiones Medica, Odontologica y Farmaceutica of September 2, 1958; the Reglamento de Especialidades Farmaceuticas (Decreto No. 96 of November 27, 1959); the Reglamento de Productos Farmaceuticos Oficinales (Decreto No. 1 of January 11, 1963); and the Reglamento de Estupefacientes (Decreto No. 30 of June 12, 1962).

The functions and responsibilities of the CSSP are, among others,

i- Licencing of the pharmacies, distributors and manufacturers of drugs.
ii Registering pharmaceutical products locally produced or imported.
iii Regulating the importation and legal consumption of drugs ~~of abuse~~.
iv Controlling the promotion of pharmaceutical products.
v. Enforcing the regulations.

The Juntas de Vigilancia de las Profesiones (J.P.V.), besides a number of other activities, primarily enforces the regulations concerning the purchasing of drug establishments, and specifically through the Junta de Vigilancia de la Profesion Farmaceutica, the surveillance of pharmaceutical manufacturers.

Registration of any new drug in El Salvador by the CSSP is based on assessment of the quality, efficacy and safety of the product by the J.P.V.

The Ministry of Public Health and Social Assistance (MSPAS) is engaged in drug procurement and distribution activities. The Cuadro Basico de Medicamentos was last reformulated in 1978 including at that time some 650 pharmaceutical products. Since then it has been annually reviewed but a new list recently has been approved. The drug procurement list of 1983 includes some 227 items. Some of these are with specifications related to those products included in the WHO revised Model List of Essential Drugs.

The Instituto Salvadoreno de Seguridad Social (ISSS) is also engaged in drug procurement and distribution activities for its client population. The Cuadro Basico de Medicamentos of the ISSS includes about 550 items divided up in 18 groups according to use in medical practice.The drug consumption within the ISSS is monitored by processing the prescriptions coded according to that classification. In the fiscal year of 1981 a total of 3.553.272 prescriptions were processed for a client population of around 450.000 (182.115 paid members).

b. Present Policies

The above mentioned laws and regulations are at present the legal requirements for marketing of drugs in El Salvador. Vendors to government drug procurement activities must comply to these regulations whether the drugs are locally produced or imported.

The MSPAS is drafting a "Reglamento de Control de Medicamentos y de Drogas Enervantes Estupefacientes y Alucinogenas" to ammend present regulations. Concerning the drug registration regulations included in this draft, they consist of more up-dated regulations than the ones now in effect. However, some of the items in the proposal should be accurately studied in order to make them more consistent with the modern phylosophy of drug surveillance.

c. Current Resources and Activities

The CSSP has available, at the present, one pharmacist and two administrative assistants for the registration of drugs, licencing of manufacturers and for controlling the legal flow of drug subject to abuse. The administrative procedures for the licencing of manufacturers and the registration of drugs are conducted without due assessment of the quality, therapeutic efficacy and safety of the products and of the compliance of manufacturers' production to good manufacturing practices.

The participation of the Junta de Vigilancia de la Profesion Medica and of the Junta de Vigilancia de la Profesion Odontologica is limited to a simple bureaucratic examination of the registration documents.

The Junta de Vigilancia de la Profesion Farmaceutica has three pharmacist Inspectors doing inspections of about 1350 pharmacies, 260 clinical laboratories, 30 pharmaceutical manufacturers and 160 establishments dedicated to different drug distribution activities. In relation to the inspection of manufacturers establishments they are following a very simple formulary describing the different sections of a factory. However, there are no regulations or guidelines related to good manufacturing procedures such as those recommended by the WHO.

175

According to regulations, prior to registration manufacturers submit samples of products for examination by the drug quality laboratory of the Junta de Vigilancia de la Profesion Farmaceutica. The laboratory has two pharmacists working part-time and it is not in conditions to perform any valuable analytical work. Accordingly, analytical results from Laboratories Especiallizados (LEA) of the University of Panama and other private organizations are accepted.

It should be stressed that according to the purpose of the constitutional scheme (Constitucion Politica de El Salvador, Titulo XI, Capitulo IV, article No. 208), the activities of the CSSI and the Juntas are to regulate the professional activities of the medical, odontological and the pharmaceutical professions rather than to regulate the pharmaceutical industry and other drug activities which in the opinion of the author should be included within the activities of the MSPAS.

The CSSP and the Juntas are autonomous bodies integrated by elected representatives of the three professions. The representation of the Ministry of Health (MSPAS) is limited to the designation of the President and Secretary of the CSSP which are nominated from outside the involved professions.

The drug procurement activities of the MSPAS and the ISSS are performed without proper quality control surveillance. Before 1982 some analytical results were obtained from the LEA laboratory in Panama, and from a private organization in California. The ISSS has also a limited program of visits to local manufacturers to ascertain their production conditions.

The Ministry of Health (MSPAS) has one laboratory for clinical analysis and preparation of some vaccines (rabies), with one section devoted to food analysis. These laboratories are not in appropriate condition at the present to perform food and drug quality analysis. These laboratories require extensive remodeling. There is almost a complete absence of quality control procedures for the preparation of extemporaneous products and pharmacopoeial preparations at the pharmacy hospital level.

The laboratory of the Division of Ciencias y Tecnologia de Alimentos of the Instituto Salvadoreno de Investigacion Agraria y Pesquera (ex-CENTA) of the Ministry of Agriculture located outside the city of San Salvador is now engaged in the development of projects for food conservation for small farms within the program of agrarian reform.

The pharmaceutical industry of El Salvador is operating a limited program of quality control concerning production activities. A recent review of the industry has shown that out of 20 manufacturers, only 10 have some quality control program. According

to their own estimation, six could be considered effective and only one is up to the level of international standards. There is not yet an effective quality assurance program or evidence of good manufacturing procedures within the local pharmaceutical industry.

MAJOR CONSTRAINTS OR PROBLEMS

a. Budget

There is, at present, no program for drug quality surveillance at the MSPAS, and there are no established positions for drug selection, evaluation, inspection or analysis.

The budgetary allocations of the CSSS for manufacturers licencing, drug registration and surveillance of legal drugs susceptible to drug abuse are limited to the salaries paid to a pharmacist and two administrative assistants.

The Junta de Vigilancia de la Profesion Farmaceutica has three positions of inspectors and two at the laboratory. However, budgetary allocations for the remodeling of the premises and supply of equipment and reagents are almost non-existant.

The Instituto Salvadoreno del Seguro Social has no on-going program for drug quality control activities.

b. Management, Policies or Philosophy

As indicated in the discussion of present policies, the program of drug supply and control is dispersed within different government agencies with insufficient human and financial resources.

The legal and regulatory system is outdated, requiring an urgent up-dating in response to the needs of the envisioned program and in accordance with the modern philosophy of managing drug supply. The Ministers of Health of the Americas have expressed in several occasions the need to up-grade the legal and regulatory system and PAHO has advanced a model for a national law of drug surveillance which can be adapted to the needs of El Salvador.

The administrative procedures for drug registration, manufacturer licencing, factory inspection and sample analysis for registration purposes are conducted at the present under the auspices of the Juntas Vigilancia de la Profesion Farmaceutica and de la Profesion Medica, and the Consejo Superior de Salud Publica. By the very nature of these bodies, comprised of elected members of the professions (including those who own or manage pharmaceutical firms and pharmacies), they are subject to conflict of interest. This practice should not continue, and the regulatory branch of the government should be incorporated as an activity of the MSPAS, and although it should be granted authority, flexibility and resources.

The organization of a thorough, complete, and modern regulatory program of this type and the establishment of a drug quality control laboratory including remodeling and the design of premises, procurement and delivery of equipment, reagents, etc.would take much time. Therefore, it is suggested that until such a time as it is possible to establish a modern laboratory, analytical surveillance of drugs procured under the public system of MSPAS should be contracted with an independent external laboratory such as the Laboratorio Especializado de Analisis (LEA) of the University of Panama; the Instituto Centro Americano de Investigacion y Tecnologia Industrial (ICAITI) in Guatemala City or the Laboratorio Unificado de Alimentos of the Instituto de Nutricion de Centro America y Panama (INCAP/PANO) also in Guatemala City.

3. MOH Responses to problems and constraints

Several studies conducted to determine conditions and necessary resources necessary for the establishment of a quality control laboratory were performed in the past since the initial assessment by PAHO in 1971.

In May 1982,a pre-factibility study, prepared by a private consulting firm under contract with the Fondo Salvadoreno para Estudios de Preinversion (FOSEP), of a laboratory which would be engaged in drug analytical control (as well as food and cosmetic) activities and other regulatory activities such as registration, inspection and sampling was presented to the MSPAS (Comite del Proyecto "Laboratorio de Control de Calidad de Medicamentos y Alimentos") . The scope of this study is much wider than those mentioned in this project, hence only comments relevant to drug quality control will be made here.

The size of the proposed laboratory and the description of activities and functions is based on the calculation of an analytical load produced almost exclusively by the incoming of samples for registration purposes. It clearly should be indicated that the analyses of samples prior to the registration procedures is not necessarely recommended procedure. Analysis by a government laboratory should obey a series of different priorities. The registration of a new drug follows a evaluation of pre-clinical and clinical studies presented by the interested manufacturer. It consists of determining the acceptability of the product based on considerations of the benefit-risk ratio in regard to efficacy/safety data and cost/benefit considerations. In that sense, analytical methodology validation rather than analysis of a sample should be considered as an acceptable procedure for an advanced government drug quality laboratory. It should not be considered in the early stages of the establishment of a drug quality laboratory as in the case of the laboratory proposed in this project.

A program of sampling and analysis should be based on characteristics of the market in terms of health and sanitary problems (drug utilization studies), and optimizing laboratory resources. Consequently the projected laboratory should be established in a series of stages of development of which the initial ones are indicated for purposes of this project.

178.

In 1981, INQUIFAR (Asociacion de Industriales de Productos Quimicos y Farmaceuticos de El Salvador) made an inquiry in relation to the situation of the pharmaceutical market and recommended the creation of a drug quality control laboratory . It was suggested that it should be established as a joint effort on the part of the government and the pharmaceutical industry, with financial support of the Fondo de Desarrollo Economico of the Banco Central de Reserva de El Salvador. The nature of the regulatory activities conflicts with advisory and services activities simultaneously attributed to the drug control laboratory proposed by the industry.

A PAHO consultant conducted last year a review of the food analysis section of the MSPAS central laboratory, and recommended actions for its improvement and equipment. Since food and drug analysis are closely related activities these recommendations should be considered in the development of the establishment of the drug quality laboratory.

B. PROPOSED ASSISTANCE STRATEGY

1. Objective or purpose of sub-component assistance

The purpose of the drug quality sub-component is to provide the MSPAS with the resources needed to establish an effective national program of drug quality control and with the legal and technical components necessary for a well established regulatory scheme.

An effective program of drug quality control should be based on the:

- Selection of adequate drugs and the prediction of drug requirements.
- Procurement of efficacious and safe drugs.
- Distribution and inventory control and design of storage facilities to assure the quality of products.
- Rational use by means of good prescribing and dispensary practices as well as promoting compliance to drug regimen, etc.

The supply of drugs of high quality should be achieved by:

- Procurement from reliable sources.
- Requirement to the vendor of analytical certificates or production protocols.
- Requirement to the manufacturer of compliance to good manufacturing practices.
- Laboratory analysis. This analytical testing could be performed by, the laboratory of the national drug regulatory agency.
  - An independente laboratory of another country or of a private organization.
- A sampling scheme could be set up to establish pre-purchase sampling, pre-acceptance sampling by purchaser, testing by exception at the request of any responsible officer (pharmacist, physician, etc.) in the distribution network, post-acceptance sampling according to a determined schedule, and testing to as to stability in regards to local climatic conditions. In all these cases the sampling program should obey a scheme of rational use of the laboratory facilities.

The components of a well established regulatory scheme are the following:

- Legislation and regulations. It is essential that regulations be based on international recognized standards and be flexible to allow for permanent up-dating. The administrative and technical elements to assure compliance to regulations and enforcement should clearly

determine clear responsibilities of every organic unit, appropriate levels of authority and coordination within the organization, and the availability of sufficient financial and administrative resources. It is highly recommended that the regulatory program should be an integrated program within a unique agency of the Ministry of Health.

- Evaluation of new drugs. This requires the availability of human resources of high caliber and may be conducted with the participation and collaboration of ad-hoc external consultants.

- Registration of new drugs and the licencing of manufacturers to assure to the national regulatory program the availability of data regarding the drug supply system. This also must include the surveillance of drug promotion.

- Inspection system based on appropriate good manufacturing regulations.

- Sampling and analysis of drugs on the market. The size and capabilities of the laboratory should be based on adequate priorities to assure compliance to regulations.

- Enforcement activities according to drug regulations, and the general legal system of the country.

2. Strategy

There are three different strategies available to resolve the present constraints tothe development of a drug supply and regulatory system.

1. To rely on analytical resources drawn from an external laboratory such as those indicated under 2.b (Major Constraints - Management, policies or philosophy).

2. To install a drug quality laboratory in El Salvador, limited in scope t the beginning and with a planned program for its gradual development and up-grading until reaching completely independent analytical capabilities.

3. To develop and intermediate strategy by which some analytical surveillance could be performed through contracting services with external laboratories as indicated before. At the same time creating a small drug quality laboratory in El Salvador with a plan for up-grading it to a development stage in which it will be capable to execute analysis of sufficient high level of complexity. This laboratory will be part of a network of laboratories with a central reference laboratory for quality assurance activities.

There are strong arguments in favour of the first solution which in the short-run probably will permit the disbursement of the quality control activities in more economical terms and in a simplified form. It is the experience of the author that to relay on independent laboratories located in other countries for the analysis of routine samples involves long delays due to the different administrative systems of the countries, postal problems,

involvement of the external laboratories with its own national control program and technical problems involving necessary preservation of the integrity of samples, etc.

A country of the size of El Salvador with about 5 millions of people and a estimated consumption of drugs at the wholesale level in 1980 of 201.098.00 colons equivalent to US$ 10 per capita, and with an estimated prescription output only for ISSS (target population 400,000) of 3.553.272 in 1981) should have a independent facility to carry out analysis of drugs at the local level. It is only by having an analytical nit at the national level taht an integrated program of drug regulation and supply could be organized for the health protection of the population. The national pharmaceutical industry could be up-graded to a level of quality that would enable it to increase its output to cover the health needs of the country and increase the export of drugs (36.640.000 colons in 1980).

It is envisaged that this new laboratory should be engaged at the beginning with simple basic tests for identification and stability determination such as the one being developed by the WHO for the drugs included in the List of Essential Drugs. This small unit could later be developed into a more complete laboratory necessary for purity, content and performance characteristics according to procedures outlined in several pharmacopeias. In the case of El Salvador, specialized analysis and quality assurance functions could well be performed by a laboratory in Central America or Panama with longer experience in the field, such as LEA or ICAITI. It is suggested here that the intermediate strategy that is to say, a small but gradual up-graded laboratory in El Salvador and a central reference laboratory outside the country, is the prefered strategy, both for the short-run and for an integrated policy approach for the countries in this area (Central America) which surely will evolve in the future.

3. End of Project Status

At the end of Project (two years) the MSPAS of El Salvador should have trained personnel complement consisting of high level management, inspection, and analytical control activities, personnel working within an integrated program of surveillance and procurement of drugs for the public sector. The drug regulatory program will be based in up-dated laws, regulations and guidelines including those of good manufacturing practices that would permit enforcing quality assurance activities in the local pharmaceutical industry. The laboratory unit will be in an initial phase of its activities performing basic tests for identification, solid oral dosage forms testing, antibiotic microbiological determinations, etc, and established coordinated activities with an external reference laboratory.

C. PROJECT SUB-COMPONENT DESCRIPTION

1. Outputs

182

a. Administrative, management, operational policies and procedures

It is anticipated that this sub-component of the Project would assist the Government in identifying more precisely existing constraints and in establishing in planned stages the future development of an integrated drug regulatory and supply program for the country for both the public and private sectors.

The results of the assisted program will be:

i. Improvement of the quality of the drugs procured by Government agencies.

ii. Up-dating of the legislation and regulations, and reorganization of the technical-administrative system for the registration, inspection and analysis of drugs.

iii. Establishment of a small quality conrol laboratory.

iv. The training of personnel in numbers sufficient for an appropriate operational level of the system.

b. Commodities, supplies and materials transfer

The drug control laboratory will be equipped at the end of the project with apparatus, chemicals, reagents, and laboratory elements sufficient to carry out basic tests for the analysis of drugs (See Annex).

c. Construction, remodeling and upgrading

At the beginning of the project (2nd month) a final decision about the location of the premises of the new drug laboratory would be made. Remodeling will be undertaken, and it is expected that the laboratory physical facilities will be ready by the end of the first year of the Project.

The design of the laboratory should be such as to allow for further expansion.

d. Deployed personnel

The professional staff working now at the inspection service of the Junta de Vigilancia de la Profesion Farmaceutica, the Consejo Superior de Salud Publica, and the Almacenes of Depto. de Suministros of the MSPAS engaged in drug reglated activities should be transferrred to a new government unit as soon as the legal, and administrative modifications regarding the drug control program take effect.

D.

PROJECT/SUBCOMPONENTS INPUTS

1. Technical Assistance

i.	Management of a drug control program including identification of legal problems, inspection procedures, registration program etc.	12 m/m	Beginning 1st month
ii.	Laboratory management including facilities design and remodeleting, equipment selection, etc.	6 m/m	2nd month
iii.	Analytical methodology including advice on the use of modern laboratory and instrumental techniques.	4 m/m	13th month

2. Training

i.	Management of a drug surveillance program	1 m/m	To be selected
ii.	Inspection techniques	1 m/m	"
iii.	Laboratory methodology and management	4 m/m	"

3. Commodities

i.	Equipment for drug quality laboratory	400
ii.	Acquisition/ construction/Upgrading	250

E. Implementation Schedule

1. Year I - (July 1st - 1983 - June 30th - 1984)

Activity	
Identify detailed legal, regulatory and administrative constraints of the present drug regulatory and supply system.	July 1983 to Dec. 1983
. Select appropriate laboratory premises	August 1983
. Design premises of the laboratory	August 1983
. Establish a program of analytical certification.	October 1983
. Propose initial legal, regulatory and administrative measures to reform the system	Dec./83-June/84
. Selection of laboratory equipment, glassware, etc, and procurement procedures	Dec/83-Feb/84
. Training of the Director of the Program in an outside drug control agency.	Nov/83
. Training of an inspector in an outside drug inspection service.	Dec/83
. Establishment of an integrated plan of laboratory management, analytical load, certification and quality assurance program, etc.	Feb - April/84
. End of receiving equipment and materials financed under the project	June 1984
. Establishment of a program of inspection, inspectional guidelines and good manufacturing practices regulations	March - June 1984

2. Year II. (July 1st 1984 - June 30th, 1985)

. On the job training of laboratory personnel.	July-Oct/84
. Development and establishment of analytical methodology for basic tests.	July-Oct/84

• Establishment of a program of follow-up activities of the drug quality laboratory	Sept/Oct/84
• Training of laboratory personnel in outside laboratories	March/June 1985

F. EVALUATION

1. Baseline

As outlined in part A, the situational analysis has shown that the MSPAS has no unit devoted to drug control activities while there is no special unit for the selection of drugs to be requested through the MSPAS procurement procedures.

The CSSP and the Junta de Vigilancia de la Profesion Farmaceutica have very limited resources for registration, inspection and laboratory services, and most of the work is of a bureaucratic nature. Inspection activities are not based on proper good manufacturing regulations or similar appropriate guidelines.

The drug procurement activities of the ISSS are not coordinated with those of the MSPAS.

2. End of Project

It is evident that the practically non-existance of a government program in terms of modern philosophy of drug control requires a gradual approach to build up structural, physical, financial, and human resources.

Consequently, it is suggested that a short evaluation report should be prepared at the end of the 13th month of the Project by the TA and a final evaluation, with the participation of the TA on Management of a drug program, should be prepared at the end of the project. This evaluation should not only measure the implementation of project recommendations, improvement in personnel capabilities but also the possibilities and needs of the follow-up activities.

The final evaluation should consider all variables to estimate the possibilities of institutionalizing the activities of this subcomponent of the Project.

G. Condition Precedent, Convenants, Special Conditions, Assumptions

1. MSPAS

The following government commitments are necessary for the success of this sub-component:

a) A willingness to consider legal, regulatory and administrative reform as necessary measure to establish an integrated drug program.

b) The establishment of the government positions indicated in Annex J part 3, with competitive salaries in relation to similar salaries prevailing in the pharmaceutical industry.

c) The remodeling, as necessary, of the new laboratory premises.

d) A commitment to maintain installations, laboratory equipment and other items purchased under this sub-component.

2. AID Involvement

a) The personnel designated by the Government under this sub-component should not be nominated and name-changed without consultation of AID.

b) The personnel trained under this project sub-component should enter into an agreement so as to ensure repayment for the cost of the training and appropriate services commensurate with that training.

H. Recommendations for Project follow-up

1. Policy dialogue

Since this Project sub-component implies structural and legal changes as well as physical remodeling of instalations, training of personnel and an important procurement element for laboratory resources it is suggested that the MSPAS should enter into an agreement with AID to keep it informed of all government drug activities

2. Need for institutionalization

It is necessary for each country to develop and maintain a drug quality assessment system which should be an integral part of the public health program including procurement and maintenance of the quality of drugs. Programs should be designed to prevent the production, importation, export and distribution of non-effective, harmful or low quality drugs. Such a system must be based upon appropriate legislation and managed by a suitably qualified and empowered authority supported by inspection and laboratory services.

It is evident that financial constraints as well as political, and other pressures such as those originating from the pharmaceutical industry, could hinder the institutionalization of this sub-component. Efforts should be made to assure the permanence and stability of well paid personnel, and the maintenance of adequate physical facilities for all activities.

3. Resources - budget, manpower, supplies, etc

PAHO has estimated that the activities of a drug surveillance system would require about 0.5% of the sales value of the drugs in a country. That value, which is calculated to be of the order of Colones 1,050.000 in El Salvador, could be established as a target figure and as an appropriate goal that should be gradually pursued overtime.

It has also been estimated that the minimum personnel for a well integrated drug agency in a developing program should be of about 8 university graduates 7 technical assistants and required administrative support personnel.

It has also been recommended that the drug program should have ad-hoc advisory committees formed by leading specialists and by university teachers.

The drug program should also rely on cooperative activities of similar agencies of other countries such as those in the CA area, as well as other international cooperation.

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190

1 EQUIPMENT

Since the equipment, glassware, books and other commodities are going to be procured only after eight monthly of the Project, here it is mentioned only some of the specialized equipment which should be considered for the establishment of the drug quality laboratory.

Analytical balances

*	1.	Semi-micro, Analytical Metter Model H54AR 16-2381-01.	$3,480.00
*	1.	Analytical, Digital, Metter Model H80 16-2386-01	$1,695.00
*	1	Semi-micro, Electronic Analytical Metter Model H252 16-2800-01	$5,190.00
*	1.	Electronic Metter Model PE200 with data output 16-2396-05	$1,345.00

* Thin Layer chromatographic kit, consisting of

Basic set - Preiser catalog.	17-1660-02	$ 600.00
Developing Chamber 2 x 8 inc.	17-1666-39	$ 18.00
Glass Plates, ground 20 x 20 cm.	17-1666-40 (4 sets)	$ 120.00
Baker-Flex TLC sheets (J.T. Baker)	17-1695-01 (1 pack)	$ 41.70
	17-1695-02 (1 pack)	$ 44.00
	17-1695-03 (1 pack)	$ 69.40
	17-1695-10 (1 pack)	$ 44.00
	17-1695-11 (1 pack)	$ 69.40
	17-1695-20 (1 pack)	$ 69.40
	17-1695-30 (1 pack)	$ 80.20
	17-1695-40 (1 pack)	$ 80.20
17-1478-20 Kieselguhr. (2)		$ 66.00
17-1478-26 Silicagel 60G (1)		$ 317.00
17-1478-32 Silicagel 60GF-254(1)		$ 317.00
17-1486-28 Silicagel 60 (2o x 20) 2 pack. 2 x		$ 48.85
17-1486-34 Silicagel 60 F-254 (2o x 20) 2 pack 2 x.		$ 48.85
17-1488-02 Silicagel 60 (20 x 20) 2 pack 2 x.		$ 43.30
17-1488-05 Silicagel 60 F254 (20 x 20) 2 pack. 2 x.		$ 43.30
17-1488-08.Silicagel 60/Kieselguhr F254 (20 x 20)2 pack.2 x		$ 71.05
17-1468-14.Cellulose (20 x 20) 2 pack. 2 x		$ 75.50
17-1489-02.Silicagel 60,(20 x 20) 2 pack.		$ 48.85
17-1489-04.Silicagel 60F-254 (20 x 20) 2 pack. 2 x		$ 48.85

191

*	Compact Chromato-Vue, Cabinet for Flourescent analysis, Model CC-206		
	Repl. Parts.	17-1710-01	$ 515.00
		17-1710-15	$ 11.75
		17-1710-17	$ 9.00
		17-1710-19	$ 3.75
		17-1710-25	$ 98.00
		17-1710-27	$ 33.00
*	Dessicating Cabinet, storage, Stainless	17-1648-01	$ 215.00
	Oven-Vacuum - High Temp. Forma Model 6512	20-7532-01	$ 1.950.00
	Dessicator - Vacuum, Labconco.	12-1050-01	$ 475.00
	Karl-Fisher Tibrator	22-3915-01	$ 2.789.00
		22-3913-01	$ 42.50
		22-3914-01	$ 361.00
		22-3951-04	$ 120.00
*	Spectrophotometer Perkin - Elmer Model Laudde 3 Catalog C613-0900		$ 9.110.00
	Acc. Cat. C030-0310 4 x 56		$ 224.00
	C030-0300 2 x 155		$ 310.00
	C055-0500 3 x 36		$ 108.00
	C055-505		$ 400.00
	C055-0403		$ 185.00
*	Spectrphotometer difrared - Perkin Elmer Catalog not available	Estimated price	$.15,000.00
	Kbr. Pellet Press.	21-3301-01	$ 272.40
		21-3302-01	$ 80.00
		21-3302-02	$ 80.00
		21-3302-03	$ 75.00
*	Polarimeter. Full Circle Kern.	21-3085-01	$ 1,495.00
		21-3140-53	$ 56.00
		21-3142-53	$ 101.00
		21-3142-67	$ 105.50
*	Digital phmeter Cornny Model 125	21-2142-01	$....925.00
	Gas-Chromatoph, Cat. unavailable - Estimated price		$ 15.000.00
	Syringes	17-1141-01 (2)	$ 60.00
		17-1141-02-(2)	$ 60.00
		17-1141-03-(2)	$ 60.00
		17-1141-05-(1)	$ 35.00

Columus - from the same manufacturers as the equipment.

Support for gas dermatograph. idem.

*	Equipment to determine desintegration time of tablets according to U.S. Pharmacopréia - Cat. not available. Cost estimated...	$ 800.00
	Waters QA-1 High Pressure liquid chromatography Analizer - or similar Operating supplies as recommended by Waters. Estimated value	$ 3.500.00
	Including Recorder/Plotting integrator	
	Spectro flouremeter Estimated value	$ 2.000.00
	Differential Thermal Analyzer. Estimated value (Mettler)	$25.000.00
*.	Demineralizer - Bautam, Barnstead	
	17-8000-01 (2)	$2 x 300.00
	17-80005-01 (15)	$15 x 46.00
	17-8005-02 (5)	$5 x 46.00
	17-8005-03 (5)	$5 x 51.00
	17-8005-04 (5)	$5 x 39.00
	17-8005-05 (5)	$5 x 33.00
	17-8005-06 (5)	$5 x 76.00
	17-8005-07 (5)	$5 x 77.00
*.	Barnstead water purificator System	
	17-8009-01	$ 1.590.00
	17-8009-05 (2)	$12x 110.00
*	Distilling Apparatus Batam, Automatic. Barnstead 17-8260-12	$ 1.495.00
	Flash Evaporator - Rotavapor Model R-110 Brichi	
	18-1441-12	$ 1.395.00
	18-1453-01(5)	$5x 13.25
	18-1456-01	$ 86.50
	Micro-Kjeldahl Destillation Unit- 20-6120-01	$ 1.050.00
	" " Digestion Unit	$ 635.00
*	Kjeldahl Distillation - Digestion Unit M-3800-12 American Hospital Supply ( )	$ 8.255.00
*	Melting Point Apparatus - Model 510K - Bridri	
	19-2015-01	$ 1.495.00
	19-2017-01 (100)	$100 x 62.00
	19-2017-02 (10)	$10 x 45.00
	19-2017-04 (1)	$ 22.00

193

Melting Point Apparatus. Thermolyne

19-1980-01	723.00
19-1981-01	21.95

Refractometer- Abbe with Digital Readout

21-5457-04	2,515.00
21-5457-05	39.50
21-5457-07	8.00

194

2. Scopes of Work

2.1. New Government Positions

a. Program Director. To manage of the elements of the integrated drug supply and regulatory program including reviewing and up-dating regulations, establishing guidelines for evaluation and selection of drugs, manufacturers inspection plan and sampling schedules. It will overview the activities of the analytical laboratory and set-up programs for the analytical certification of pharmaceutical products in outside independent laboratories while the laboratory is being organized and up-graded. Medical Doctor, Pharmacologist, pharmacist or chemist with regulatory experience or university teaching and administrative experience

b. Registration and Evaluation Branch Chief. To establish and organize an effective program of drug evaluation establishing guidelines for the reviewing of pre-clinical and clinical studies. It will also be engaged in the future in the organization of a program for adverse effect od drugs surveillance plan, and for the promotion of rational utilization of drugs, including drug promotion/Medical doctor pharmacologist or clinical pharmacist with administrative experience in government, industry or teaching jobs.

c. Evaluation Officers (2) To review scientific documentation requested of pharmaceutical manufacturers for the registration of new products; to evaluate the drugs already in the market for relevance to needs of the public health program; to review drug promotion; to study data on adverse effects, propose programs of information to doctors and to the public in general, and to participate in the selection of drugs for the official procurement systems such as those of MSPAS and ISSS. Officers should be medical doctor, phamacologists or clinical pharmacists with administrative experience in government industry or teaching jobs.

d.. Laboratory Director. To develop a program for the gradual establishment of the drug quality control laboratory including remodeling and design of physical facilities, equipment selection, technical personnel selection, analytical procedures selection, safety program, sampling schedules, etc. To establish and organize an effective inspection plan and to propose the adoption of good manufacturing regulations and guidelines for inspection and industry quality assurance programs. Pharmacist or chemist with substantial experience in analytical chemistry or microbiology wither at government industry or university teaching job..

e. Inspectors (3). To be engaged exclusively in the inspection of drugs producers (3), wholesalers and central and regional government drug houses, and in the sampling of pharmaceutical products for analysis purposes Pharmacists with experience in pharmaceutical production positions or regulatory inspection work for government agencies.

f. Analyists. Pharmacists, chemists, microbiologists, biologist and technical assistants to perform the laboratory analytical task in a number to be determined according to the plans to be laid out in the 1st year of the Project. It is suggested that for the establishment of government drug control agency and the selection of personnel for the new positions the MSPAS could follow the guidelines recommended by PAHO in document "Pautas para el Establecimiento de un Programa Nacional de Control de Medicamentos" and other relevant documents included in the references of this Project/ Pharmacists or chemists with experience in analytical chemistry or microbiology

.2.2. Technical Assistance (Short-Term)

a. Management of a drug program. Medical doctor, pharmacist, chemist or similar university education with relevant experience (up to 10 years) in the area of drug program management or inspectional and drug evaluation services, drug laboratory management, etc. Fluent in Spanish or English, and with sufficient communication capabilities in the other language. He will have to identify precisely all the legal, regulatory and administrative constraints of the present drug regulatory and supply system, and to propose corrective measures, new regulations and administrative procedures in close cooperation with the Government Program Director. He will also outline in detail the training program of the Project and participate in the selection of the training locations. He will make detailed recommendations for follow-up of the Program at the end of the Project with a view to institutionalize the activities within the government functions. He will take up the position as soon as possible at the beginning of the first year of the Project for a 12 m/m period and will eventually participate in the final evaluation at the end of the Project.

b. Laboratory management. Pharmacist or chemist with post-graduate education in drug analysis or instrumental or microbiological testing with relevant experience (up to 5 years) in managing the activities of a drug control laboratory or similar laboratory (food, environmental analysis, chemical or microbiological analysis of commodities in general, etc.) Fluent in Spanish or English. He will participate in the planning or design of the premises selected for the establishment of the laboratory during the second month of the first year of the Project (1 m/m), in the selection of the necessary equipment, glassware and reagents necessary for the activities of the laboratory for at least two years of work, and in the laboratory organization (5 m/m, beginning at the 8th month of the first year).

c. Analytical Methodology Pharmacist or chemist with either post-gruaduate education in drug analysis or extensive experience in a drug laboratory regulatory agency (up to 5 years). Fluent in Spanish or English, He will participate in the organization of the drug control activities of the laboratory, in-job training of the personnel in analytical methodology, and in the establishment of a program for the follow-up activities of the laboratory at the end of the Project (4 m/m, starting at the end of the activities of the previous consultant).

K. COUNTERPARTS

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197

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ADDENDUM

Procurement System

1. The above recommendations refer to the establishment of a drug regulatory system in El Salvador. The drug quality laboratory would be an element of this system, and it would also serve as an analytical unit for the government procurement activities.

The build-up of a drug regulatory system implies legal and regulatory changes. The registration activities should be moved from the CSSS to the MSPAS. The inspection branch and the drug quality laboratory unit of the Junta de Vigilancia de la Profesion Farmaceutica would be transfered to the MSPAS. The clinical evaluation function of the Junta de Vigilancia de la Profesion Medica would be also transfered to the MSPAS.

The proposal consists of establishing a new government unit within the MSPAS with evaluation, registration, inspection and laboratory activities within a regulatory system with expanded authority. Such system must be based on new legislation and regulation creating a suitably qualified and empowered authority.

2. There will be financial and political constraints to the organization of this new system. However, there is the need to assure the quality, efficacy and safety of the drugs purchased by the government agencies, specially the MSPAS.

It is proposed in this addendum that an alternative what has been proposed in the body of the text above, it would be possible to organize a drug quality program within the official procurement system with the following elements,

- Requirement to the vendor of appropriate analytical certificates and /or of production protocols.

- Physical inspection of each shipment. Establishing accurate checking routines serving quality control functions as well as sample analysis.

- Laboratory analysis, initially through an agreement with an external laboratory. Due to the problems associated with this, it is suggested that a small quality laboratory gradually be established for the following type of analysis, 1) Pre-purchasing sampling requiring every supplier to submit samples with their offers; 2) Pre-acceptance sampling requiring the presentation of samples prior to the acceptance of the shipment by the central government warehouse; 3) Testing by exception when a responsible officer raises a question about drug quality; 4) Post acceptance sampling doing testing on a systematic basis with a pre-determined sampling schedule, and recalling faulty batches from the distribution chain; 5) Stability testing to ascertain the quality of the drugs in local warehouses or storerooms due to extreme climatic conditions (humidity and temperatures).

199

available.. The average cost was estimated to be colones 120 per sample. Given this bench mark , operating expenses would be on the order of colones 360,000 annually.

Operating expenses include salaries renewal of equipment, reagents and chemicals, maintenance, power supply, insurance depreciation, etc.

The inspections and laboratory analysis could be billed to the supplier, and included in the cost of the procurement system. The aim of this system is to assure high quality drugs in the official procurement system by purchasing from reliable sources.

A significant part of the government procurement is of imported drugs. Purchasing of imported vaccines and other drugs should be based on assurance of compliance to good manufacturing practices, and that could be certified by requiring to the vendors the submission of production protocols and the WHO Certificate of Pharmaceutical Products, and/or WHO Batch Certificates.

A second objetive of the drug quality program within the official procurement system is to establish guidelines for shipping, transportation, warehouses, storage, and dispensing conditions to assure the distribution of efficacious and safe drugs of high quality, and for patient handling to assur the integrity of the used drugs, and the compliance to drug regimen. A drug quality laboratory could be an important element for the achievement of this objective.

Inputs: It is suggested that in this case Technical Assistance for management of a drug control program (Section D.1.i) should not be included i the project as well as the related activities

B. Integration of food quality activities

The MSPAS is also engaged in food control activities. The program is being directed by the Direccion de Saneamiento Ambiental. The food laborator activities are conducted by a section of the MSPAS Central Laboratory within the Direccion de Servicios Operativos. The laboratory is not in an acceptabl working condition. A study made by a PAHO consultant in October 1982 recommended remodeling physical installations or selection of a new site as well as purchasing of equipment, and training of key personnel. A chemist is being now trained under scholarship at the food laboratory of INCAP. Since the food laboratory activities are related to those of a drug control laboratory it is suggested that both activities should be incorporated in the same facility. This would result in considerable savings in installations, equipment, training and recurrent expenses.

C. Recurrent Expenses

The number of registered drugs in the market is about 7,000. New drug should be analyzed within the first year of marketing, and at a later stage within two years. Old drugs should be analyzed at least every five years.

That gives an analytical load of 2,500 - 3,000 samples a year with an average of 4 determinations per sample.

There is no study made in El Salvador about the cost of food and drug analysis. Calculations of recurrent expenses, which were based on data presented by the Estudio de Prefactibilidad made in 1982 by the consulting firm "Investigaciones de Poblacion y Mercado" for the MSPAS to propose the establishment of a food and drug quality laboratory are the only ones

200

WESTINGHOUSE

EL SALVADOR HEALTH SYSTEMS UTILIZATION STUDY

May 1983

General Order WGD - 47232 - AA

Volume II

WESTINGHOUSE HEALTH SYSTEMS
WESTINGHOUSE ELECTRIC CORPORATION
P.O. BOX 866
COLUMBIA, MARYLAND 21044

I. COMPONENT No. 1. Health Supplies Management/Water and Sanitation.

A. Situational Analysis.

1. Background and Present Situation

a. Relevant History - Two governmental agencies - the MSPAS and the National Water and Sewer Administration (ANDA) - manage the nation's water supply and sanitation sub-sector. ANDA was created in 1961 to manage the national water supply and sewerage program. In 1967 an agreement was signed between ANDA and MSPAS placing rural water and sanitation programs under the MSPAS. The Department of Rural Aqueducts (DAR) was created within the Directorate of Health Engineering to carry out these programs. In October 1980, the MSPAS established the Basic Rural Sanitation Plan (PLANSABAR) as a semi-autonomous agency of the MSPAS charged with specific rural water supply and sanitation objectives. (See Annex I, Organization Chart). Coordination of the urban program of ANDA and the rural program of PLANSABAR is handled by the National Committee of Potable Water and Sanitation Institutions (CONIAPOS).

The MSPAS has three offices which have water supply and sanitation responsibilities. These are the Directorate of Health Engineering (DIS), The Division of Environmental Sanitation (DSA) within the Directorate of Normative Technical Services, and PLANSABAR.

The DIS provides traditional A & E services for the design and construction of health facilities including water supply and sanitary systems. The operation and maintenance of these facilities once completed become the responsibility of the Directorate of General Administrative Services and the Directorate of Operational Services. The DIS does not provide any health related services to the population, and will not be a recipient of assistance from this project.

The DSA manages the environmental sanitation activities of the MSPAS. There are 240 sanitary inspectors working at regional and local levels. At present these inspectors operate only in urban area. This is due partly to the security problem in certain rural areas but, to a greater extent, it is due to the lack of a well-defined national rural sanitation program. The sanitary inpectors are charged with a wide range of responsibilities, from promoting and assisting in the installation of house connections for water, construction of latrines, garbage disposal, to food sanitation, health education and vector control, however they lack program guidance and institutional support. (See Annex II for environmental sanitation functions.)

The DSA chief appears to be completely demoralized and only reluctantly entered into a discussion of his program and the specific problems he is facing in carrying out his responsibilities. His perception is that the nation's sanitary codes and regulations are so antiquated that it is useless to even try to enforce them. He views the need to update these codes and regulations as a top priority to be followed by the development of programs in food sanitation and solid wastes/garbage disposal. He believes that the technical assistance provided by donor agencies such as A.I.D. has not helped the nation and he does not want any consultants unless the overall assistance approach is changed from the present hands-off type to a more hands-on style. While one can sympathize with the chief's frustrations, perhaps what is really needed in the MSPAS is a change in leadership in this office. After years, if not decades, of neglect, this office is in desperate need of some younger, energetic and imaginative leaders. Under present conditions it would be futile to bring in short-term or long-term consultants to break this management impasse.

PLANSABAR manages two vertical programs [1] - rural water supply and latrine construction - which provide direct services to the population. While both programs suffer from delays and/or program cut-backs PLANSABAR, for a young agency (less than three years old, is beginning to make a name for itself in the countryside because of its presence in the filed and because its customers value the service, especially that of piped water, they recieve. The quality of technical design is adequate if not overly conservative but construction techniques suffer because of the heavy reliance on voluntary labor. In spite of this, the end product is satisfactory. On the other hand, the latrine program has a major problem with its hardware - the reinforced concrete latrine slab and riser seat. The finished latrine is offensive to the users and is difficult to keep clean because of the rough exposed concrete surfaces. A new porcelain-finished, pour-flush latrine with an air-trap manufactured in Colombia will be introduced in this project to try to solve these existing problems. (See Annex IV for installation details).

PLANSABAR will need to redesign its latrine program to take into account the need for a nominal quantity of water to flush the Colombian type of latrine. The new latrine program which will utilize the pour-flush design must be coordinated closely with the completion schedule of water supply systems in order

1. PLANSABAR also drills wells and installs water systems at MSPAS health facilities. See Annex III for list of sites.

A temporary agency has been established outside of the MSPAS to execute a loan from the Interamerican Development bank to build health facilities. This agency known as GOES/BID is responsible for supervising the construction of health structures ranging health center down to health posts. The orginal number of facilities included, 8 health centers, 15 health units and 93 health posts. Due to problems of violence and inability to obtain suitable building sites, the numbers have been reduced to 6 health centers, 5 health units and 56 health posts. Even at these reduced number of site, the GOES/BID has encountered unforeseen water supply and infrastructure disposal problems. (See Annex V for list of sites with problems.) PLANSABAR is providing technical assistance to GOES/BID in resolving these problems. Although resolution of these water and wastewater problems were not included in the BID loan and will add to the construction cost at each site, it is recommended that this extra work be funded from the BID Loan and no funds from this proposed project be set aside for this purpose.

c. Current resources and activities.

I. Programs - PLANSABAR was established to execute a rural water supply and sanitation program to provide potable water to the 1,360 communities without water service and install approximately 326,000 latrines during the period 1981-1988.

II. Manpower - PLANSABAR has a total staff of 455 employees which is comprised of 22 professionals, 104 technicians, 15 clerical and 314 laborers.

III. Budget - For calendar year 1983, PLANSABAR has been assigned an operating budget of Colones 4.1 million. It has received program loans and grants which now total Colones 10.07 million. (See Annex VI and VI-A for budget and donor contributions.)

V. Supplies and materials - PLANSABAR procures and stockpiles, in advance, specific commodities (mainly pipe, reinforcing steel and cement) required to construct the water supplies and latrines planned for the current period to avoid construction delays. It has a fleet consisting of 7 trucks, 13 pick-ups and 11 passenger (mostly jeeps) vehicles assigned from the MSPAS.

Major constraints or problems:

a. Budget - While PLANSABAR's budget is miniscule (a fraction of the estimated operating cost of the new San Miguel hospital), it does not appear to be the key operational constraint under present conditions.

to assure a convenient source of water. The pour-flush latrine simply will not operate without water and the program of introduction without water would be a certain disaster.

PLANSABAR's managers are well aware of the advantages and disadvantages of each system and are capable of designing a program to introduce the pour-flush latrine with the participation of USAID/ES and PAHO engineers. During the two-year introduction and testing program, it is recommended that the contruction of two additional slab/riser latrine production facilities now planned be postponed until the results are in on the acceptability and use of the pour-flush model. If the success of this model in neighboring Honduras is any indication, the additional production facilities may not be needed. Meanwhile, latrine production in the present facility should be increased to meet the existing demand for its product.

PLANSABAR is also conducting experiments in the design and use of a locally produced household water filter. Several models of household filters have been on the market for many years but are beyond the reach of most rural families because of cost. The development of a successful filter design will take many months if not years, but the development of a successful program of installation and proper use will take even longer. The long-term nature of this activity places it outside the scope of this project.

b. Present Policies - PLANSABAR's operational policy is to provide water supply and sanitation services to the rural population through a combination of government grants, voluntary labor and nominal tariff charges to build, operate and maintain rural water systems and a similar grant and self-help approach to provide latrines.
In its water supply program PLANSABAR contributes all of the material and equipment including drilled wells or spring catchment boxes, pumps, pipe and accessories. It also provides the technical supervision during construction. The beneficiaries provide all of the manual labor to dig the trenches and install the pipes. They also pay the cost of their individual house connections for which they receive a interest-free loan with a five-year repayment schedule. The beneficiaries are charges a nominal monthly fee which is collected by the potable water board elected in each benefiting community. These revenues are deposited in a special government fund and are used to cover the operating and maintenance costs of the systems.

In the latrine program, PLANSABAR contributes the latrine kit consisting of a reinforced concrete slab, a raised seat and a cover. The beneficiary provides the manual labor and materials to dig the pit and build the superstructure

b. Management Policies - Present internal management practices of PLANSABAR are satisfactory and is not a major constraint in accomplishing its good

c. Commodities, supplies, and materials - PLANSABAR's current construction program is being hampered by three major constraints: (1) delays in the procurement process, (2) undependable transport service and (3) delays in providing funds for current expenditures, i.e. procurement of localcommodities.

3. MOH Response to problems and constraints.

PLANSABAR's problems are not peculiar to just its own operations. The problems of procurement, logistics, maintenance and funding are general for the MSPAS and form the basic for this project. MSPAS response to these problems must also be general and all-encompassign for the whole organization and not just for PLANSABAR.

D. Proposed Assistance Strategy.

1. Objective or purpose of Sub-Component Assistance.

INSERT "A"
(For page 5, Section B proposed Assistance Study)

1. Objective or Purpose of Sub-Component Assistance.
The purpose of providing material assistance to PLANSABAR is to increase its operation capacity for building water systems and latrines and to rehabilitate and improve its well-drilling equipment and transport fleet.

2. End of Project Status.

PLANSABAR completing its program activities as scheduled (see current activities in A.1.c. above) and institutionally capable to expand its program.

3. Technical Analysis

Because of the "quick-fix" nature of this project, it carries with it certain high risk features. The greatest risk comes from its focus on providing curative medical services through the government's public health agency. The bulk of the project budget will be expended on rehabilitating health facilities and providing equipment, supplies and medicine to vitalize curative services. While this type of response to the present insurgency situation has great popular appeal, it will have a negative long-term impact on the basic public health problems of the nation for two reasons. First, it consumes a large amount of scarce capital (both FX and LC)

for short-term, ephemeral gains in curative services. Secondly, it shifts the focus of the MSPAS away from its main long-term raison d'etre which is to address the basic health problems of the population as a whole. In the long-run, this project will be seen as a diversion from the main task of the MSPAS. The road back from curative to preventive medicine can only be an ardous one. Table "A" below lists the Major Communicable Diseases in El Salvador and Table "B" lists the Ten Major Causes of Death.

TABLE A

TEN MAJOR COMMUNICABLE DISEASES

1980

No. of importance	DISEASES	No. of Cases	Morbidity rate by 100,000 inhabitants
1	Diarrheal Disease	145,801	3039.4
2	Intestinal Parasitism	129,775	2705.3
3	Malaria	95,385	1988.4
4	Common Colds	93,431	1947.7
5	Syphilis all forms	5,821	121.3
6	Acute gonnococal infections	5,269	109.8
7	Amoebic Disentery with hepatic abcess	4,243	88.4
8	Chicken pox	3,254	67.8
9	Infectious Hepatitis	2,307	48.1
10	Tuberculosis	2,255	47.0

DATA SOURCE FROM: Division of Epidemiology

TABLE B

TEN MAJOR CAUSES OF DEATH BY DISEASE

El Salvador, 1980

	Description	Number of Deaths	% of Total Deaths
1.	Homicide and intentionally inflicted lesions by other persons	6133	16.2
2.	Perinatal Infections	2831	7.5
3.	Intestinal Infections	2288	6.0
4.	All Other Accidental Causes	1417	3.7
5.	Motor Vehicles Accidents	1016	2.7
6.	Bronchitis, Emphysema and Asthma	996	2.6
7.	Malignant Tumors, All Locations	958	2.5
8.	Isquemic Heart Diseases	913	2.4
9.	Cerebrovascular Diseases	792	2.1
10.	Other Heart Diseases	665	1.8
	TOTAL DEATHS	37956	100.0

SOURCE: Salud Publica en Cifras 1980. Department of Statistics and Planning, Ministry of Health, El Salvador

As shown above, diarrheal disease and intestinal parasitism constitute the first two major communicable diseases in the nation while homicide and intentionally inflicted lesions is the leading cause of death. This project will expend most of its budget in addressing the leading cause of death. In the short-term there is a sound basis for focussing attention here. However, for the intermediate and long-term, it is expected that homicides and intentionally inflicted lesions will not remain at the top of the list of causes of deaths. It is predictable that the second and third leading causes of deaths, perinatal and intestinal infections will move back to their traditionally predominant positions. When this realignment takes place, and it will, the MSPAS and the nation will find itself ill-prepared to address these basic, long-existing public health problems unless it continues to maintain and support its cadre of professional and technical health workers who are presently addressing these long-existing problems.

It is a well-known and well-established fact that the best way to address the problems of diarrheal disease and intestinal parasites is through the provision of dependable and easily accesible water supply and sanitation services. In El Salvador where only 40% of the rural population is served by potable water systems and 30% have excreta disposal facilities, the provision of these services is of utmost importance.

These are precisely the two programs being implemented by PLANSABAR in rural areas. As noted earlier, these programs are being delayed by the same constraints affecting the rest of MSPAS--lack of the timely availability of operating funds, procurement delays (e.g. the purchase of imported cast iron pipe for the Izalco project took a total of three years), and lack of available transport vehicles. The investment of a relatively small amount of project funds would significantly improve PLANSABAR's project implementation capacity and accelerate its construction activities.

To date USAID/San Salvador has done a good job of coordinating its water supply and sanitation activities with PAHO/San Salvador which acts as the executing agent for IDB loans and grants in the health and sanitation sector. USAID has funded surveys, training, tools and equipment under Project 519-0209. PAHO is providing the long-term services of a hydrogeologist to train PLANSABAR technicians in hydrogeology and well-drilling. PLANSABAR hired two local engineers to conduct an operation and maintenance survey of 49 rural water systems.

In the food sanitation field, PAHO has provided the services of a consultant last year who prepared a preliminary food sanitation plan. They also provided a consultant who reviewed the food sanitation legislation in 1982. Last October, PAHO brought in a laboratory consultant who analyzed the existing food and water laboratory facilities and developed a plan to improve the physical facilities and its operations. USAID/San Salvador should take advantage of the groundwork already completed on the central laboratory by integrating this information into the drug quality control aspects of this proposed project.

Later this year, PAHO plans to bring in short-term consultants to review existing legislation dealing with milk and milk products and to develop recommendations for a food sanitation program.

On the subject of solid waste a PAHO consultant reviewed existing legislation dealing with garbage and solid wastes and repared a preliminary plan of action. A second short-term consultant will arrive later this year to prepare final recommendations for a solid wastes program.

During the past few years PAHO has sponsored training courses for sanitary workers in solid wastes, for supervisors in charge of municipal sanitation, held a workshop on solid wastes management and sent tainees to Costa Rica, Brazil and Colombia.

PAHO is also preparing consumer education programs in conjunction with the U.N. Water Supply and Sanitation Decade (1981-1990). It contracted with a local public affairs company who prepared a program on the subject of potable water. Similar education campaigns will be prepared on the subjects by solid wastes and food sanitation in 1983 and 1984.

As the elevated mortality rates from homicides and intentionally inflicted lesions begin to subside, USAID/San Salvador should re-focus its attention on the long-standing health priorities of the nation. This shift will require continued close coordination of A.I.D. programs with the activities of the other major health sector donors, especially PAHO. The present Acting Director of PAHO, Engineer Luis Sanchez S., has assured the complete and close cooperation of his office in working with USAID/San Salvador and its staff toward the mutual goal of improving the health of the Salvadoran people. This support can make USAID/San Salvador's public health programming efforts somewhat easier and, at the same time, more effective.

C. Project Sub-Component Description

1. Outputs

a. Administrative, management, operational policies and procedures-- The present management and operational policies and procedures of PLANSABAR are judged to be adequate to implement a significantly increased construction program. Expansion of the program will depend on the success achieved in improving the procurement, logistics and maintenance systems.

b. Commodity, supplies and materials transfers-- New vehicles will be added to supplement PLANSABAR's inadequate fleet, spare parts will be used to rehabilitate and facilitate the use of drillilng rigs, local commodities (cement, re-bars, hand-tools, and wire) will be used to return the operation of the existing latrine plant back to its normal capacity, and pour-flush toilets will be installed at rural health posts and rural schools to introduce a significatly improved appropriate technology in excreta disposal.

c. Construction, remodeling and upgrading-- With improved and efficient logistics and maintenance systems in place, PLANSABAR expects to raise it water supply systems construction rate from approximately 50 systems per year to 120 systems per year and return the latrine plant to its normal production capacity of 25,000 unit per year.

d. Deployed Personnel - Although PLANSABAR's staffing level is modest, it could manage a significantly increased water system construction schedule because of its operational policy of using volunteer labor from benefiting communities for all manual labor work, i.e. digging trenches and installing pipes. No additionaltraining of personnel in addition to that already programmed under other projects is included in this project.

D. Project Sub-Component Inputs

1. Technical Assistance - none

2. Training - none

3. Commodities (See Annex VI and VII for details).

		FX	LC
a.	. Water Supply Program Drilling and related equipment	$25,000	
b.	Latrine Program Colombian pour-flush toilets	$32,000	
	Cement, rebars, wire, tools		182.500
c.	Vehicles (4 trucks)*	$120.000	
		$177,000	182,500 C or $ 73,000
	TOTAL...	$250,000	

*These 4 trucks are included in the list of new vehicles to be purchased under the maintenance component of this project.E. Implementation Schedule

All commodities will be ordered in the first quarter of Project Year One. No further sub-component inputs are conteuplated. Deliveries of commodities will vary according to procurement procedures and suppliers constraints.

F. Evaluation

1. Baseline

a. Water systems construction rate of approximately 50 per year.

b. Latrine production rate of approximately 5000 per year.

2. End of Project

a. Water systems construction rate of approximately 120 per year.

b. Latrine production rate of approximately 25,000 per year.

G. Conditions, Precedent, Covenants, Special Conditions, Assumptions

1. MSPAS - Special Condition: That vehicles assigned to PLANSABAR not be diverted to other Ministry uses under normal and routine operating conditions and that any diversion from this plan be cleared by the PLANSABAR manager and the Project Executive Committee or its official designate for transportation affairs.

2. USAID - HCN or local hire direct AID engineering staff be increased to provide 6 person-months per year to manage AID-supported water supply and sanitation projects and to monitor GOES agencies involved in water supply and sanitation activities, i.e. MSPAS (Division of Environmental Sanitation, Directorate of Engineering and PLANSABAR), ANDA, CONIAPOS, and GOES/BID and to coordinate AID activities with major sub-sector donors (BID, CIDA, PAHO, UNDP, UNICEF, etc.).

H. Recommendations for Project Follow-Up

1. Policy dialogue - Assuming that the number of deaths due to homicide and intentionally inflicted lesions are drastically reduced in two years, there will be a need for a major restructuring of the internal public health system. As deaths from severe trauma begin to decrease, USAID/El Salvador will need to begin a policy dialogue with the MSPAS concerning planning for its eventual return to its main task of addressing the long-standing basic health problems of the nation. This will mean re-opening discussion on primary health care, water & sanitation, malaria, and other programs.

2. Need for institutionalization - If by the end of the project PLANSABAR is not receiving adequate logistic and budget support from the MSPAS, USAID/El Salvador should consider assessing the need for an autonomous institution, perhaps an expansion of ANDA, to manage both the urban and rural water supply sub-sectors on a self-financing basis using a system of cross subsidies for the rural sub-sector. This would essentially mean returning the rural water responsibility to ANDA as originally planned in 1961. It is unlikely that rural water and sanitation program could survive as an independent entity, however, it must also receive more support than it is presently getting from the MSPAS if it is to accomplish its assigned tasks.

3. Resources - budget, manpower, supplies, etv.- Unrelated to the progress of this project, an environmental sanitation expert with strong legal and regulatory experience should be brought in to make an overview assessment of the nation's sanitation laws, codes and regulations in conjunction with PAHO consultants and develop a program for bringing them up to date. This consultancy should be followed, at the appropiate time (See I.B.3 Technical Analysis, Paragraph 4.) by a long-term environmental

sanitation consultant who would develop the program proposed by the [illegible] consultant and in coordination with PAHO assist in implementing it.

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K. Counterparts

1. Rigoberto Vitelio Melara Chief, Division of Environmental Sanitation, MSPAS.

2. Juan Coronado Olmedo Garcia, Manager, PLANSABAR.

L. Persons contacted

1. Jose Lisandro Cortes Valiente; Deputy Manager, PLANSABAR

2. Rodolfo Barraza, Chief Construction and Supervision Department, PLANSABAR..

3. Jose Alfonso Estevez, Chief Hydrogeology anad Well-drilling Department,PLANSABAR

4. Horacio Rodriguez; Engineer/USAID

5. Julio Mena; Engineer/USAID

6. Luis Sanchez Sanchez; Sanitary Engineer & Acting Chief PAHO/El Salvador.

7. German Cortes Andrino; Director Directorate of Health Engineering, MSPAS.

8. Juan Antonio Letona, Chief of Design Section, Directorate of Health Engineering, MSPAS.

9. Carlos Rafael Ramirez Portillo, Assistant Sectoral Specialist, IDB/El Salvador.

10. Lotario Bayardo Gomez; Manager Technical Management, ANDA.

11. Reynaldo Villeda; Chief, Technical Studies, ANDA

12. Julio Gutierrez; Technical Secretary, CONIAPOS

13. Luis Alonso Vasquez; Technical Secretary, CONIAPOS

14. Luis Ernesto Rivera; Chief Training and Program Development Section, Maintenance Department, MSPAS.

15. Manuel de Jesus Mulato Ramirez; Chief, Electro-Mechanical Section.

16. Carlos A. Velasco; Chief, Electro-Mechanical Section, Directorate of Health Engineering, MSPAS.

17. Roberto Benjamin Guillen; Sanitary Inspector, Health Unit, Izalco.

18. Fermino Lopez; Chief, Electro-Medicine Section, Maintenance Department, MSPAS.

19. Jose Domingo Sosa Orellana; Director, Executive Office, GOES/BID.

20. Miguel Edgardo Arevalo Moran, Chief, Design Section, GOES/BID.

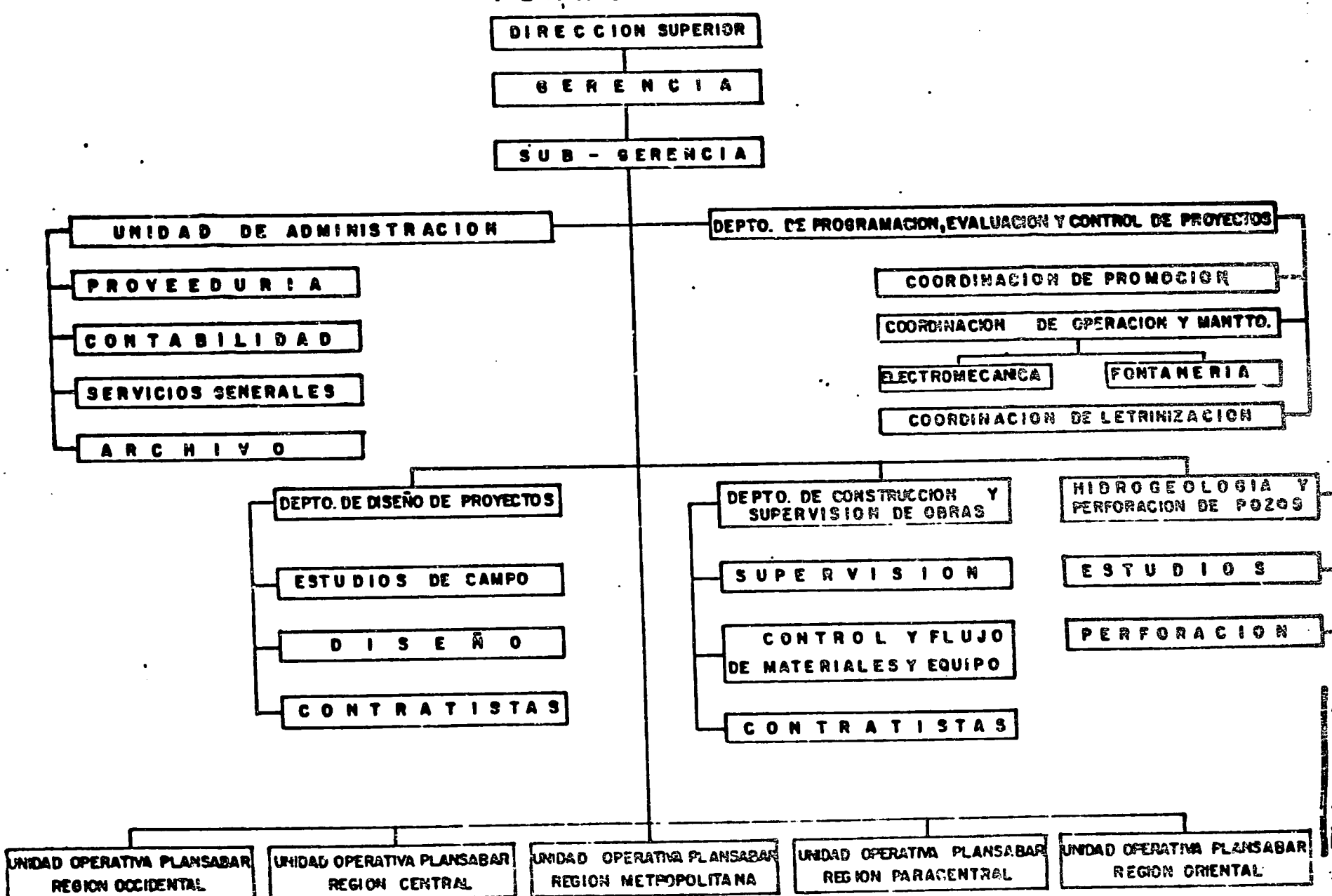
21. Jose Rodrigo Peraza; Chief, Technical Department, GOES/BID.

22. Jose Alonso Rodezno; Supervisor, PLANSABAR.

13.- Organización

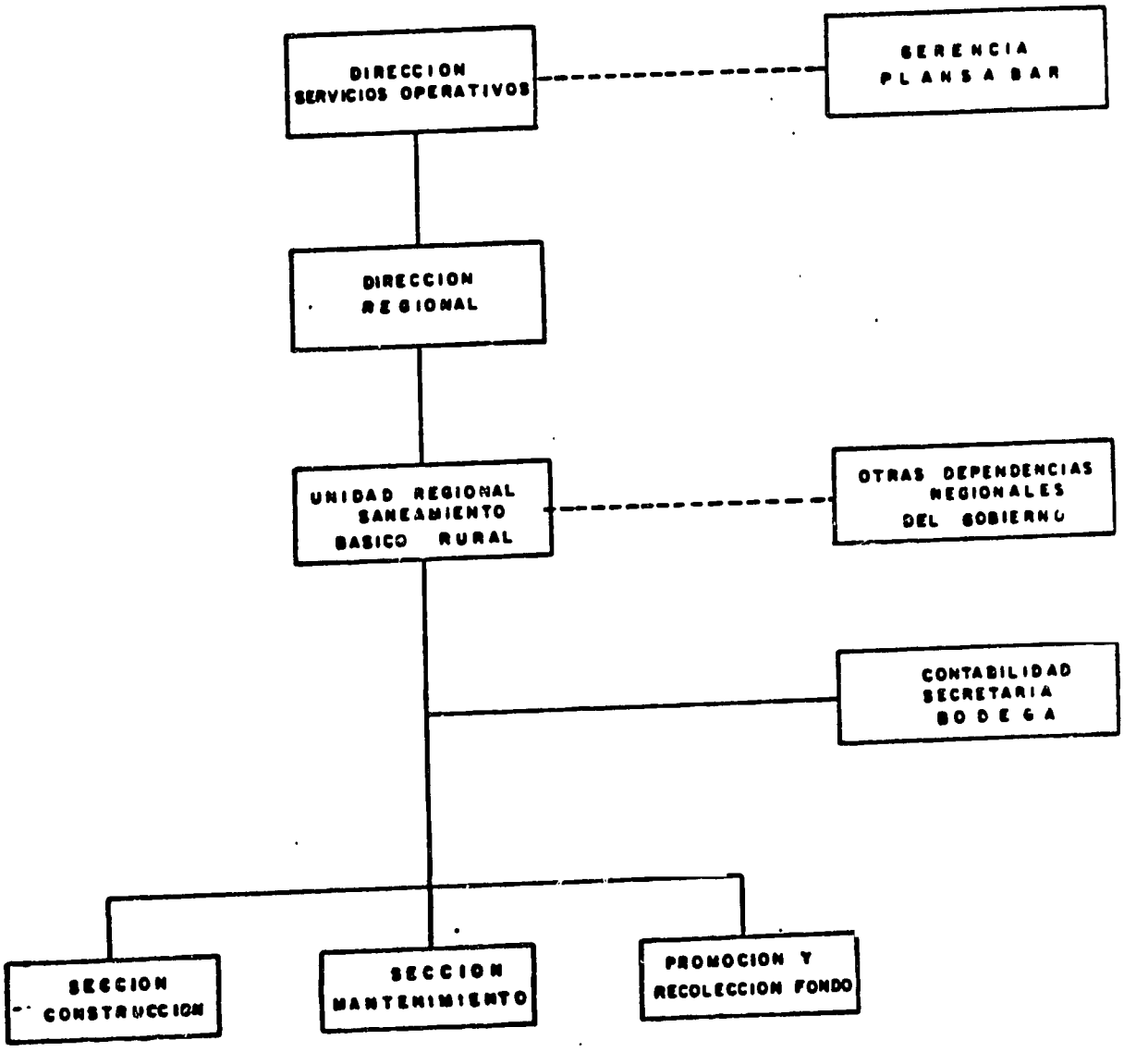
1) La Unidad Ejecutora del PLANSABAR para su mejor funcionamiento, tanto a nivel central como regional, dispone del Organigrama general siguiente que detalla los canales administrativos a seguir:

ORGANIZACION DE LA UNIDAD EJECUTORA DEL PLAN NACIONAL DE SANEAMIENTO BASICO RURAL -PLANSABAR-



ii) La Gerencia del PLANSABAR para canalizar las acciones a las regiones de salud sigue el Organigrama siguiente:

ORGANIGRAMA REGIONAL



HOJA Nº 1

PROGRAMA DE SANEAMIENTO AMBIENTAL

MO

REGION ..... SERVICIO LOCAL ..... DE ..... ZONA ..... INSPECTOR .....

INSPECCIONES	PROG ANUAL	ENERO		FEBRERO		MARZO		ABRIL		MAYO		JUNIO		PRIMER SEMESTRE			JULIO		AGOSTO		SEPTIEMBRE		OCTUBRE		NOVIEMBRE		DICIEMBRE		SEGUNDO SEMESTRE			TOTAL ANUAL		
		PROG	ALCAN	PROG	ALCAN	PROG	ALCAN	PROG	ALCAN	PROG	ALCAN	PROG	ALCAN	PROG	ALCAN	%	PROG	ALCAN	PROG	ALCAN	PROG	ALCAN	PROG	ALCAN	PROG	ALCAN	PROG	ALCAN	PROG	ALCAN	%	PROG	ALCAN	%
I.- EN LA VIVIENDA (1+2+3+4+5+6)																																			
1. AGUA INSPECCIONES PARA (A+B)																																			
A) PROPECCION PARA INSTALAR SERV.																																			
B) CONST.,REP.,AMPLIAC.,INSTALAC. SANIT.																																			
2. EXC. Y AGUAS SERV.,INSP. PARA (A+B+C)																																			
A) CONSTRUCCION DE EXCUSADOS																																			
B) CONEXICNES DE DESAGUES																																			
C) CONST.,REP., O AMPLIAC.DE SERV.SANIT.																																			
3. BASURAS Y VECTORES INSP. PARA (A+B)																																			
A) MANEJO CORRECTO Y ELIM. DE BASURAS																																			
B) CONTROL DE ZANCUDOS																																			
4. CONSERV. ANIMALES SOSPECHOSOS RABIA																																			
A) PERROS																																			
B) OTROS ANIMALES																																			
5. ATENCION DE DENUNCIAS Y SOLICITUDES																																			
6. OTROS																																			
II.- EN ESTABLECIMIENTOS (1+2+3+4)																																			
1. ALIMENTOS INSP.A(A+B+C+D+E+F+G+H+I+J)																																			
A) PLANTAS LECHERAS Y DERIVADOS																																			
B) RASTROS GANADO BOVINO Y PORCINO																																			
C) RASTROS DE AVES																																			
D) PLANTAS DE DERIVADOS DE LA CARNE																																			
E) PLANTAS Y BARCOS PESQUEROS																																			
F) OTROS LUGARES PROCES. ALIMENTOS																																			
G) BODEGAS DE ABARROTES Y OTRAS																																			
H) MERCADOS Y SUPERMERCADOS																																			
I) EXPENDIOS																																			
J) RESTAURANTES Y SIMILARES																																			
2. ESTAB. PUBLICOS INSP. A (A+B+C+D+E)																																			
A) ESCUELAS Y COLEGIOS																																			
B) HOSPITALES Y SIMILARES																																			
C) HOTELES Y PENSIONES																																			
D) BALNEARIOS																																			
E) OTROS																																			
3. ESTAB.INDUSTRIALES INSP. A (A+B)																																			
A) INS.,REP.,RECIB. Y SIMIL.																																			
B) OTRAS INDUSTRIAS																																			
4. LUGARES VARIOS INSP. A (A+B+C)																																			
A) PANTANOS, QUEBRADAS Y SIMILARES																																			
B) ESTABLOS, PORQUERIZAS, GALLIN. ETC.																																			
C) OTROS																																			
III.- EN SERVICIOS PUBLICOS (1+2+3)																																			
1. SERV. PUB. ABAST. DE AGUA INSP.A.(A+B)																																			

SA-1-72.-

HOJA Nº 2

PROGRAMA DE SANEAMIENTO AMBIENTAL

REGION: ..... SERVICIO LOCAL ..... DE ..... ZONA ..... INSPECTOR .....

INSPECCIONES	PROG ANUAL	ENERO		FEBRERO		MARZO		ABRIL		MAYO		JUNIO		PRIMER SEMESTRE			JULIO		AGOSTO		SEPTIEMBRE		OCTUBRE		NOVIEMBRE		DICIEMBRE		SEGUNDO SEMESTRE			TOTAL ANUAL		
		PROG	ALCAN	PROG	ALCAN	PROG	ALCAN	PROG	ALCAN	PROG.	ALCAN	PROG.	ALCAN	PROG	ALCAN	%	PROG	ALCAN	PROG	ALCAN	PROG.	ALCAN	PROG.	ALCAN	PROG	ALCAN	PROG.	ALCAN	PROG	ALCAN	%	PROG	ALCAN	%
A) SIST. PUBLICO ABAST. DE AGUA																																			
B) TOMA DE MUESTRAS Y LECT. CLORO RES.																																			
2. INSP. SIST. PUB. EVAC. AG. RES. Y SERV.																																			
3. BASURAS INSP. PARA (A+B)																																			
A) SUPERV. SERVICIO PUBLICO DE ASEO																																			
B) FUMIGAC. Y TRATAMIENTO BASUREROS																																			
TOTAL DE INSPECCIONES I + II + III																																			
IV. ACTIVIDADES ESPECIALES																																			
V. REALIZACIONES																																			
1. MUESTRAS DE AGUA PARA LABORATORIO																																			
2. LECTURAS DE CLORO RESIDUAL																																			
3. CONEXIONES AL SERVICIO DE AGUA																																			
4. INST. SANIT. CONST. REP. O AMPLIADAS																																			
5. EXCUSADOS CONSTRUIDOS																																			
6. EXCUSADOS MEJORADOS																																			
7. CONEXIONES AL ALCANTARILLADO																																			
8. FOSAS SEPT. Y/O RESER. CONST. O REP.																																			
9. BASUREROS TRATADOS																																			
10. BASUREROS ELIMINADOS																																			
11. CRIADEROS DE ZANCUDOS DESCUBIERTOS																																			
12. CRIADEROS DE ZANCUDOS TRATADOS																																			
13. CRIADEROS DE ZANCUDOS ELIMINADOS																																			
14. ANIMALES DOM. RABIA CONTROLADOS (A+B)																																			
A) PERROS																																			
B) OTROS ANIMALES																																			
15. PERROS CALLEJEROS ELIMINADOS																																			
16. SOLICITUDES Y DENUNCIAS RECIBIDAS																																			
17. SOLICITUDES Y DENUNCIAS RESUELTAS																																			
18. KILOS. ALIMENTOS DECOMISADOS																																			
19. MUESTRAS DE ALIM. TOMADAS (UNID.)																																			
20. MEJORAS A ESTABLEC. DE ALIMENTOS																																			
21. MEJORAS A ESTABLEC. PUBLICOS																																			
22. BOLETIN DE SALUD ENTREG. A MANIPUL.																																			
23. CHARLAS DIRIGIDAS A GRUPOS																																			
24. ASISTENTES A CHARLAS																																			
25. CURSOS A MANIPULADORES DE ALIMENTOS																																			
26. ASISTENTES A CURSOS DE MANIPULADORES																																			
27. PROGRAMAS Y CAMPAÑAS																																			
28. ADIESTRAMIENTO RECIBIDO																																			
29. ADIESTRAMIENTO IMPARTIDO																																			
30. REUNIONES DE PERSONAL																																			
31. REUNIONES Y ENTREVISTAS DE COORDIN.																																			

SA-1-A-72.-

ANNEX III

Location of Wells Drilled
by PLANSABAR for MSPAS
Health Facilties

No. of Wells Drilled	Location
2	San Miguel Hospital (new)
1	Usulutan Hospital
1	Zacatecoluca Hospital
1	Ahuachapan Hospital
1 (not complete)	Santa Ana Hospital
1	San Vicente Hospital
1 (not complete)	San Bartolo
1 (begin drilling 6/83)	Nva.Concepcion Health Center
1 (abandoned)	Santa Tecla Hospital
1 (right of way dispute)	Chalatenango

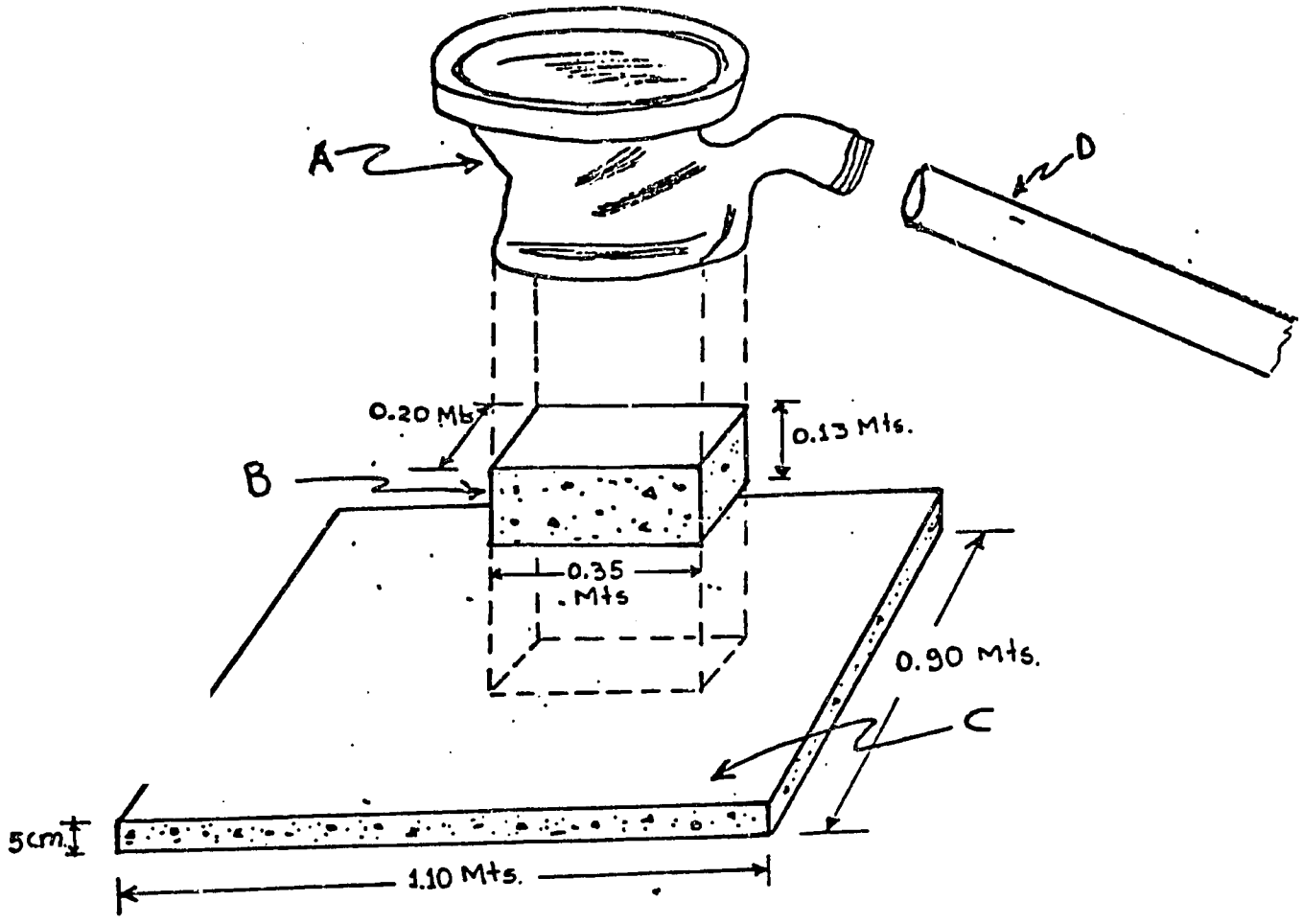


FIGURA No.3

PROCEDIMIENTO DE INSTALACION DE LA TAZA CAMPESINA

A.- TAZA CAMPESINA alto ancho largo
B.- PEDESTAL 13 X 20 X 35 cm.
C.- PLATAFORMA 110 X 90 cm.
D.- CONEXION PVC Ø 3" ó 4"

OBSERVACIONES: No es indispensable usar pernos en la conexión de la taza sobre el pedestal.

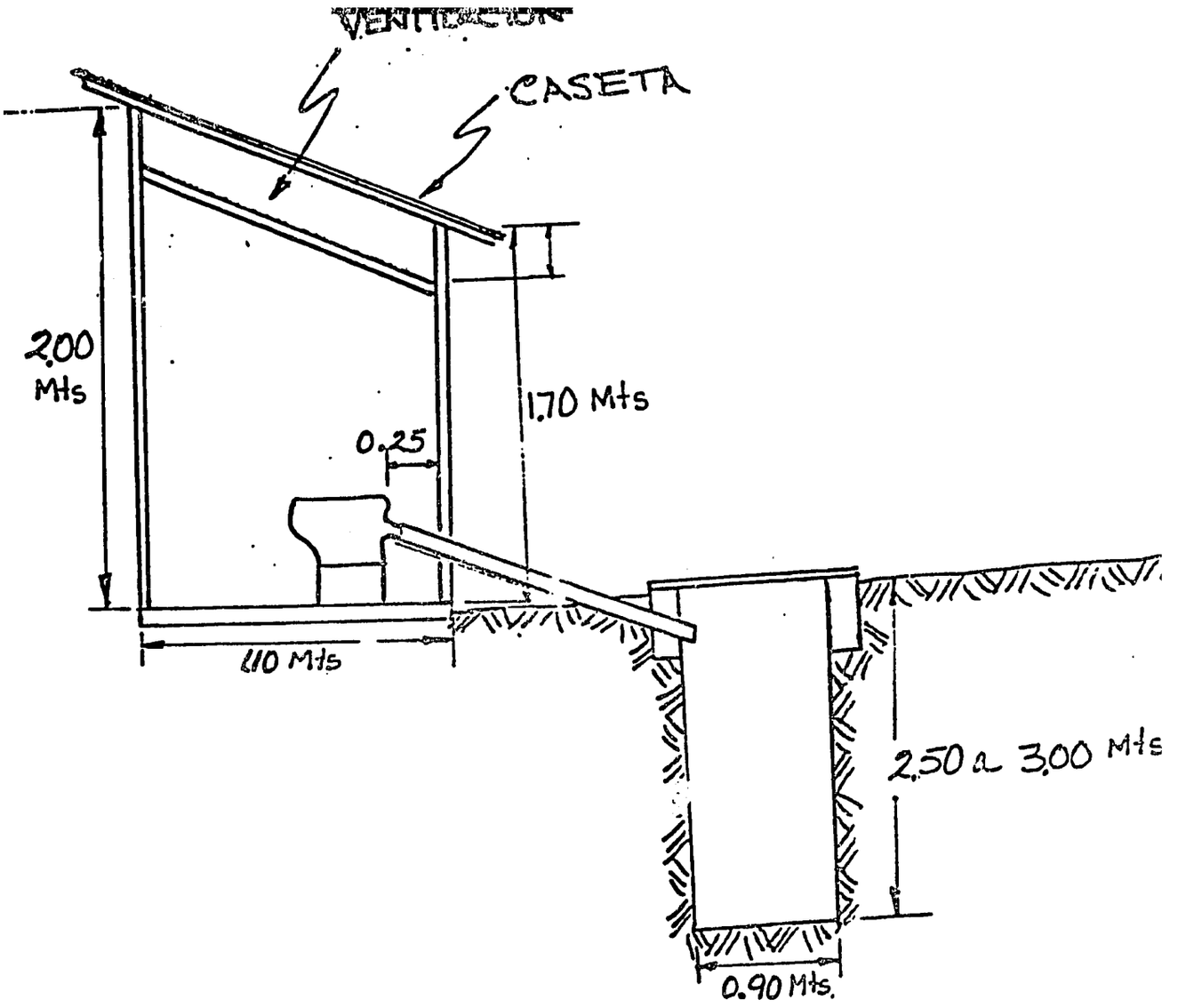


FIGURA No.2

INSTALACION FUERA DE LA VIVIENDA

En este caso es necesaria la construcción de la caseta, la cual deberá tener las dimensiones dadas en la Figura No.2

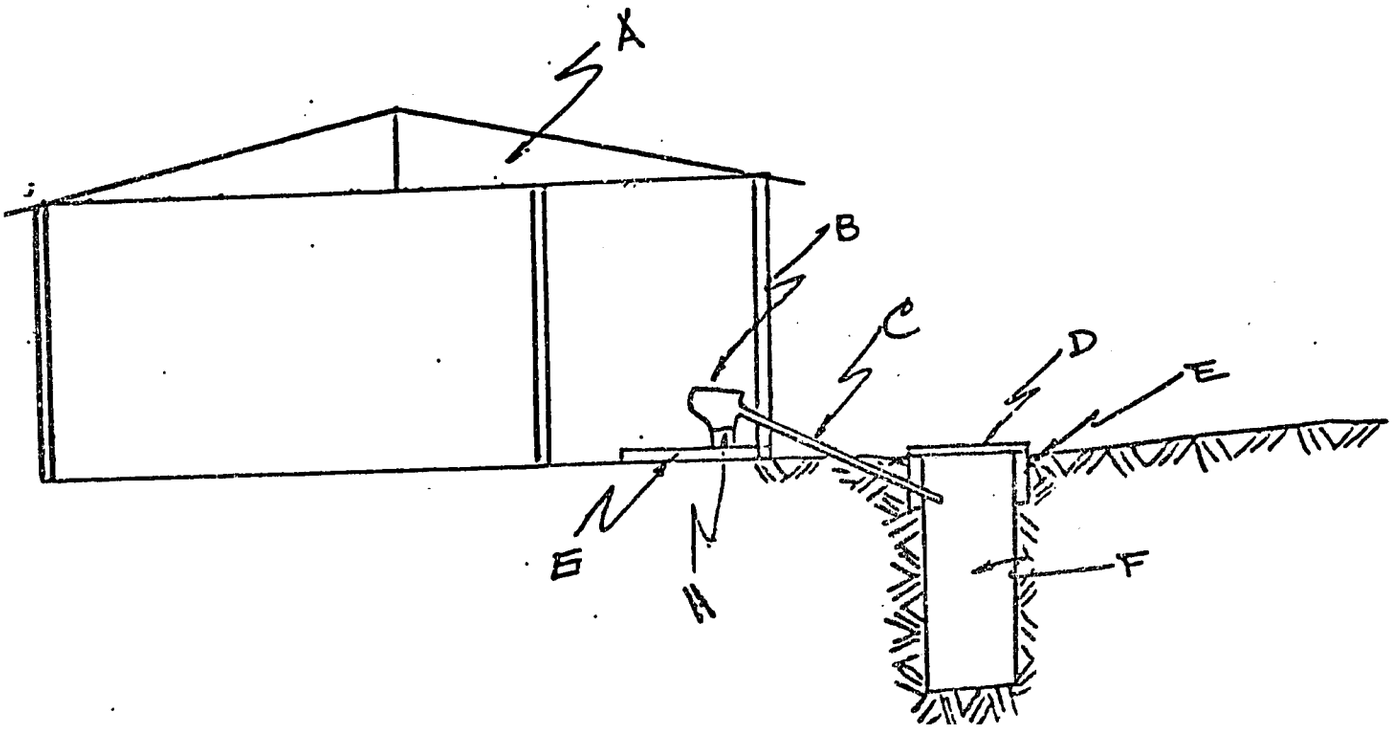


FIGURA No.1

INSTALACION DENTRO DE LA VIVIENDA

A.- VIVIENDA
B.- LETRINA DE CIERRE HIDRAULICO
C.- TUBO O CONEXION DE PVC Ø 4" O 3"
D.- LOSA DE HORMIGON REFORZADA
E.- BROCAL
F.- FOSA SIMPLE
G.- PLATAFORMA
H.- PEDESTAL

EJEMPLO: Se han hecho cuatro pruebas de infiltración, que han dado los siguientes tiempos promedio en cada una para bajar 2.5 cms: 45, 35, 28, y 16 minutos.
El tiempo promedio definitivo será: (45 + 35 + 28 + 16) ÷ 4 = 31 minutos. Con este tiempo se entra en la tabla que está a continuación, para determinar la superficie necesaria de infiltración del suelo de la sanja.

REQUISITOS DE LA ZONA DE ABSORCION

Indice de infiltración (tiempo requerido para que el agua descienda 2,5 cm, en minutos)	Zona de absorción necesaria (metros cuadrados del suelo de la zanja de absorción por persona servida)	
	viviendas	escuelas
2 o menos	2,30	0,84
3	2,80	0,93
4	3,25	1,12
5	3,50	1,21
10	4,65	1,67
15	5,35	1,86
30	7,00	2,70
45	8,45	3,10
60	9,20	3,50
Más de 60	No conveniente para los sistemas de absorción superficiales	

* Adaptado del cuadro publicado en *Studies on household sewage disposal systems.*[20]

ANNEX V

LIST OF GOES/BID
HEALTH FACILITIES CONSTRUCTION SITES
WITH WATER/WASTEWATER PROBLEMS

Health Centers:

(3) Ilobasco, Sensuntepeque and Jiquilisco

Health Unit:

(2) Comasaguas Villa Victoria

Health Posts:

1. Canton El Nino, San Miguel
2. El Cuco, San Miguel
3. Garita Palmera, Ahuachapan
4. Arenales, Sonsonate
5. Salinas de Ayacachapa, Sonsonate
6. Mizata, La Libertad
7. Huizucar, La Libertad
8. Las Isletas, La Paz
9. El Tecomatal, San Miguel
10. Las Placitas, San miguel
11. Planes de La Laguna, Santa Ana
12. Hato Nuevo, La Union
13. San Felipe, La Union
14. Bobadilla, La union
13. San Felipe, La Union
14. Bobadilla, La Union
15. Carolina, Caba;as
16. Las Pilas, Chalatenango
17. Santa Lucia, Cabanas

ANNEX VI

MINISTERIO DE SALUD PUBLICA Y ASISTENCIA SOCIAL

PLAN NACIONAL DE SANEAMIENTO BASICO RURAL

PLANSABAR

1983

PROGRAMA	ASIGNACION PRESUPUESTARIA (C)	METAS
303-019	2,000,000.00	Perforar.....800 m. Revestir.....700 m. Inspeccion, estudios y disenos.....150
303-029	256,750.00	Terminar la construccion de proyectos para 49 comunidades y 52,080 habitantes. Alcanzar el 95% para 21 comunidades y 29,193 habitantes.
303-029	737,400.00	Operar y mantener en buen estado de funcionamiento 483 acueductos
303-049	196,800.00	Disenar 12 acueductos para 9,723 habitantes, construir 6 acueductos para 2,539 habitantes.
303-509	200,000.00*	Disenar acueductos para 41 comunidades.
303-069	58,990.00*	Construir 17,500 letrinas.
304	450,000.00**	Construir 2,000 letrinas.
TOTAL	4,099,940.00	

* Tiene arrastre de dos anos anteriores.
** Los fondos asignados presupuestariamente son para mano de obra unicamente.

327

ANNEX VI-A
DONOR INVESTMENTS
IN PLANSABAR PROGRAMS

January 1982

Colones (millions)

Organization	Construction	Institutional
Development		
Interamerican Development Bank	5.36	-
Agency for International Development.	3.50	0.70
UNICEF	0.10	-
UNDP	-	0.41
Sub-total	8.96 COLS.	1.11 COLS.
TOTAL	10.07 MILLION	

ANNEX VII

LETRINIZACION

"IMPORTANCIA DE LA ACTIVIDAD"

La mayor causa de defuncion en El Salvador, la constituyen las enfermedades gastroentericas de origen hidrico y parasitaria, por lo cual es necesario para preservar la salud de los habitantes del area rural disponer adecuadamente de las excretas.

Actualmente, el Gobierno opera un taller de fabricacion de letrinas en la Ciudad de San Salvador con capacidad para producir 25,000 letrinas anuales. Asimismo, se estan construyendo dos talleres adicionales, uno en la Ciudad de Santa Ana (Region Occidental) y otro en la Ciudad de San Miguel (Region Oriental) con el objeto de incrementar hasta 45 000 letrinas la produccion anual' el equipo solicitado tiene por objeto implementar esas nuevas fabricas y los materiales para fabricar letrinas en las tres fabricas (en 19 82 se paralizo la fabricacion por falta de materiales).

LETRINIZACION

EQUIPO Y HERRAMIENTAS REQUERIDOS

01)	2 Aparato soldador	950.00
02)	2 Prensa de herreria con boca de 5"	400.00
03)	2 Cizaya p/cortar hierro redondo de 1/4" a 5/8"	1,500.00
04)	2 Yunque de 150 lbs.	250.00
05)	2 Fragua (para diversos usos)	370.00
06)	2 Esmerilador estacionacionario de 1 1/4" HP con dos discos de esmeril	750.00
07)	2 Taladros de 3/8"	500.00
08)	2 Dobladora de hierro de 1/4"	250.00
09)	2 Tarrajas para fabricacion de pernos de 1/4" a 1/2"	140.00
10)	2 Almadana de 12 lbs.	72.00
11)	2 Almadana de 4 lbs.	10.00
12)	12 Pares de guantes a 11.00 c/u	66.00
13)	2 Juegos de llaves fijas de 1/4" a 1/4"	130.00
14)	2 Tenaza de presion	35.00
15)	2 Delantal de cuerpo	60.00
16)	2 Llaves cangreja de 12"	30.00
17)	4 Marcos de sierra p/cortar hierro a	40.00

	20.00 c/u.	
18)	6 Carretillas de mano a 70.00 c/u	210.00
19)	Herramientas varias (cucharas medianas y pequenas, palas y azadones.)	250.00
	TOTAL	6,063.00

MATERIALES NECESARIOS PARA LA FABRICACION

DE LETRINAS

15,000 Bolsas de cemento	91,500.00
4,400 Varillas de hierro O 1/4"	80,000.00
3,900 Lbs. alambre de amarre O 1.5 mm.	4,875.00
TOTAL	176,375.00

Note: Only 2 pages are on the Wang. See attached copy for complete annex XIII.

PROGRAMA DE EMERGENCIA

AID/PLANSABAR

1983

1. Area de Hidrogeologia y Perforacion de Pozos.

La magnitud de la poblacion en el pais en relacion con la extension territorial, es un factor determinante en lo relativo al deterioro de los recursos naturales, en particular la forestacion y disponibilidad de recursos hidraulicos. Asimismo, dicho factor incide en que las localidades rurales tengan una poblacion relativamente numerosa (mayor de 800 habitantes) la cual demanda cantidades apreciables de agua para consumo humano. En consecuencia, la explotacion de aguas subterraneas garantiza el recurso hidraulico en calidad y cantidad necesaria, por lo que el 80% de los proyectos, requiere de la perforacion de un pozo profundo, para obtener una fuente de agua segura, de conformidad con lo expuesto, PLANSABAR cuenta con un Departamento de Hidrogeologia provisto de siete maquinas perforadoras y una grua, atendido por dos geologos, dos tecnicos y 28 perforadores.

EXISTENCIA DE EQUIPO

Cant.	DESCRIPCION	OBSERVACIONES
1	Equipo No. 1, peforadora de pozos Speed Star-55, Serie No. 10103, con motor Red Seal Continental Teledyne Mod. F. 163, Spec. 5123, Engine P-3234 57, 4 cilindros, gasolina. Montada sobre camion DODGE POWER WAGON, Mod. 1954, doble traccion, 6 cilindros, gasolina. -herramienta de perforacion completa -herramienta de pesca	BUEN ESTADO Motor Red Seal Continental nuevo, Carroceria Power Wagon Reacondicionado 01-03-83
2	Equipo No. 2 perforadora de pozos Speed Star-55, Serie 10495, con motor Red Seal Continental Teledyne Mod. F163, Spec. 5123 Engine P-32 3450, 4 cilindros, gasolina. Montada sobre camion DODGE POWER WAGON, modelo 1954 doble traccion, 6 cilindros, gasolina. -herramienta de perforacion completa -herramienta de pesca	Reacondicionamiento actual may/83. -motor Red Seal Continental nuevo -Pinones, clutch poleas eje principal nuevo. Carroceria Power Wagon, soldadura y pintura.
3	Equipo No. 3 perforadora de pozos Speed Star-55 P Serie No. 11773, con motor Red Seal Continental Teledyna Mod. F 163, Spec. 5103 Engine 248354, 4 cilindros, gasolina. Montada sobre camion Internacional Load Star 1600, Mod. 1976, doble traccion 6 cilindros, gasolina. -herramienta perforacion completa.	01-11-80 BUEN ESTADO Reacondicionada -motor Seed Seal Continental nuevo. montaje equipo sobre camion usado.
4	Equipo No. 4 perforadora de pozos Speed Star SS71A Serie No. 40144, con motor Hercules, Mod. 023oo x 172, Serie NH 3419090, 4 cilindros, Diesel. Montada sobre camion Internacional Load Star 1700 motor 323518 C1, Chasis 3970 22C1, 8 cilindros, gasolina traccion Standard. -herramienta perforacion completa.	BUEN ESTADO -Ajuste Motor Hercules Diesel, 06-02-81

234

ANNEX VIII (a)

PROGRAMA DE EMERGENCIA

AID/PLANSABAR

1983

1- Area de Hidrogeología y Perforación de Pozos.

La magnitud de la población en el país en relación con la extensión territorial, es un factor determinante en lo relativo al deterioro de los recursos naturales, en particular la forestación y disponibilidad de recursos hidráulicos. Asi mismo, dicho factor incide en que las localidades rurales tengan una población relativamente numerosa (mayor que 800 habitantes) la cual demanda cantidades apreciables de agua para consumo humano. En consecuencia, la explotación de aguas subterráneas garantiza el recurso hidráulico en calidad y cantidad necesarias, por lo que el 80% de los proyectos, requiere de la perforación de un pozo profundo, para obtener una fuente de agua segura. De conformidad con lo expuesto, PLANSABAR cuenta con un Departamento de Hidrogeología previsto de 7 máquinas perforadoras y una grúa, atendido por dos geólogos, dos técnicos y 28 perforadores.

LCV/mym
18/05/83

Best Available Document

235

EXISTENCIA DE EQUIPO

Cant.	DESCRIPCION	OBSERVACIONES
1	Equipo Nº 1, perforadora de pozos Speed Star-55, Serie -- Nº 10103, con motor Red Seal Continental Teledyne Mod. F-163, Spec. 5123, Engine P-3234 57, 4 cilindros, gasolina. Montada sobre camión DODGE POWER WAGON, Mod. 1954, doble tracción, 6 cilindros, gasolina. -herramienta de perforación completa -herramienta de pesca	BUEN ESTADO Motor Red Seal Continental, nuevo, Carrocería Power Wagon. Reacondicionado. 01-03-83.
2	Equipo Nº 2 perforadora de pozos Speed Star-55, Serie Nº 10495, con motor Red Seal Continental Teledyne Mod. F163, Spec. 5123 Engine P-32 3450, 4 cilindros, gasolina. Montada sobre camión DODGE POWR WAGON, modelo 1954 doble tracción, 6 cilindro, gasolina. -herramienta de perforación completa -herramienta de pesca	Reacondicionamiento actual mayo/83 -motor Red Seal Continental nuevo. -Piñones, clutch poleas, eje principal nuevo -Carrocería Power Wagon, soldadura y pintura.
3	Equipo Nº 3 perforadora de pozos Speed Star-55 P Serie - Nº 11773, con motor Red Seal Continental Teledyne Mod. F-163, Spec.5103 Engine 248354, 4 cilindros, gasolina. Montada sobre camión International Load Star 1600, Mod.-1976, doble tracción, 6 cilindros, gasolina. -herramienta perforación completa.	01-11-80 BUEN ESTADO Reacondicionada -motor Seed Seal Continental, nuevo -montaje equipo sobre camión, usado.
4	Equipo Nº 4 perforadora de pozos Speed Star SS71A, Serie Nº 40144, con motor Hércules, Mod. D2300 x 172, serie NH 3419090, 4 cilindros, Diesel, Montada sobre camión International Load Star 1700 motor 323518 C1, Chasis 3970 22C1, 8 cilindros, gasolina, tracción Standard. -herramienta perforación completa.	BUEN ESTADO -Ajuste motor Hércules Diesel, 06-02-81

. . .2/

Cant.	DESCRIPCION	OBSERVACIONES
5	Equipo Nº 5 (Donado Unicef) perforadora de pozos Speed - Star SS-71 II, serie Nº 78712-2, con motor Perkins Engines, 4 cilindros, diesel. Montada sobre camión International Load Star 1750, 6 cilindros, diesel, tracción Standard. -herramienta perforación completa	BUEN ESTADO
6	Equipo Nº 6 perforadora de pozos, Bucynes-Erie 22 W, Serie III, Nº 139325, con motor Red Seal Continental, Teledyne, Mod. F 227, Spec.4241 Engines 30334, 6 cilindros, de gasolina. Montada sobre camión Ford F-600 370-2V, motor H 298 NID 9 TE-9450 GA, Chasis Nº 701 20846 D9 HT-ATA NDV-7, 8 cilindros, gasolina, tracción Standard. -herramienta perforación completa	MAL ESTADO -Reconstrucción eje principal, baleros, piños, - poleas. 20-03-81 mayo del /83, necesitarse repuestos nuevos. -distribución eléctrica -volante, eje principal completo.
7	Equipo Nº 7 (Programa CIDA) perforadora de pozos Speedar Star SS 71-II, serie Nº 78 713-4, con motor Perkins NSP 37 112480/2, 4 cilindros, Diesel. Montada sobre camión Ford F-700 motor F 70 HVHD 7862, - Chasis Nº OHTBAA-31, 8 cilindros, gasolina, tracción -- Standard. -herramienta perforación completa.	BUEN ESTADO
8	Equipo Nº 8 (Programa CIDA) Grúa Hidráulica Well Master, Mod. BT 32 B, Serie Nº 1-80-208, capacidad 6000 Lbs., - 150 pies cable acero ½" ø controles automáticos. Montada sobre PicK-Up Chevrolet Creston de Luxe 20, motor Nº 1219 THC, 6 cilindros, gasolina, tracción standard	mayo del /83 necesita repuestos nuevos -bombas de aceite hidráulico. equipo opcional para baldeo y pistoneo de pozos.

... 3/

1.3 EQUIPOS, HERRAMIENTAS, REPUESTOS, REQUERIDOS.

COSTOS ESTIMADOS

Cant.	DESCRIPCION	$ U.S Costo estimado
	1.3.1 EQUIPOS	
1	ELECTRIC LOGGER, Mod. DR-74 Johnson Keck, 4 electrodos de prueba, cable ¼" ø 600 pies longitud, marcado cada 5 pies, montado sobre carrete y caja aluminio 13" x 9" x 9". Líneas resistividad y potencial, 15 pies longitud en carretes aluminio, caja aluminio lectura instrumentos 11" x 7"x 7". Resistividad 0-10.000 ohms/pies Potencial 0-1000 milivoltios positiva y negativa	4,000.00
1	Microscopio estereoscopico marca Wild M-5 portatil completo: Lámpara de luz, lentes 10 x 40 x 90 con estuche de transporte	1,500.00
2	Manómetros de 4" diámetro rango de 0-800 pies	240.00
2	Martillos soiltest RM-151	120.00
2	Planta soldador Miller Mod. AEA- 200L gasolina, regulación amperaje 45-225 AC potencia CA monofásica 5 Kva. 120/240 voltios 60 ciclos, 15 HP. Completo con accesorios, motor DONAN, Mod. DCK	7,200.00
2	Esmeril recto portatil Black $ Decher ½ HP. 120 voltios 4000 RPM.	800.00
1	Taladro tipo pesado ½", 120 voltios, 550 RPM Black $ Decker.	
	TOTAL	US $ 24,710.00

Cant.	DESCRIPCION	$ U.S Costo estimado
	1.3.2 HERRAMIENTAS PERFORACION	
1	Bomba de arena 5" ø O.D x 10' longitud de fondo regular, peso aproximado 165 Lbs. (Fig. 134 ACME)	1.000.00
1	Bomba de arena 7" ø O.D x 10' longitud de fondo regular peso aproximado 290 Lbs. (Fig. 134 ACME)	1,200.00
4	Barrenas regulares 12" diámetro 5' de longitud, peso aproximado 800 Lbs. (Fig. 108 ACME) Unión: 23/4 x 3 3/4 x 7 API	3,200.00
	1.3.3 REPUESTOS	
1	Distribuidor de corriente completo (distributor), motor Seed Real Continental, teledyne modelo F 227 Spec 4241, Engines -- 30334, 6 cilindros, gasolina.	250.00
1	• Volante o corona dentada completa (Crank Shaft)	400.00
1	• Eje principal o eje de embrajes, montado sobre baleros, con embragues independientes (Clutch Shaft)	2,000.00
	• Perforadora Bucynes-Erie 22 W, Serie III Nº 139325 sistema percusión.	
1	Grúa Will Master BT-328, 32 Pies de mastil 6000 Lbs. capacidad -Bomba hidráulica de aceite para operación, fuerza-despegue - (Power-Take-Off)	700.00
	EQUIPO OPCIONAL	
1	Carrete de baldeo, montado parte frontal marco de grúa 350/Pies minuto a 700 Lbs. de peso con caida libre, con gancho y cable (Sandreel Attachment)	700.00
	Cabrestante hidráulico con controles independientes	600.00
	Control remoto, cordón 30 pies de longitud, para control de velocidad, motor durante operación	500.00

COMPONENT IV

EMERGENCY MEDICAL SERVICES: HUMAN RESOURCE DEVELOPMENT

A. Overview

Among the principal findings of a team which assessed the MSPAS' capacit to deal with war-related trauma was a serious lack of health professionals trained in the special skills required for on-site first aid, intermediate wound stabilization and definitive surgical interventions. Specifically, the Medical Assessment Team recommended:

1. Recruitment, selection and training of two mobile surgical teams which could be deployed rapidly to outlying hospitals and centers requiring additional surgical services due to casualties.

2. Training of surgeons, general medical officers, and nurses in techniques of intermediate wound stabilization, prior to evacuatin of casualties for definitive surgical interventins.

3. Provide simplified first aid training at all levels i the health system, but particularly at peripheral facilities such as Health Units and Health Posts

staffed by auxiliary nurses.

4. Provide training to ambulance drivers in elementary first aid and patient handling techniques.

This component addresses the four levels of trauma management training briefly described above. Technical Assistance will be provided to develop, implement and evaluate the training. Funds will also be provided to finance educational materials, audio-visual equipment, participate perdiem, visiting faculty honoraria, and mobile surgical tea member incentive pay.

The emergency Medical Assessment Team also recommended that two studies be carried out: 1) A prospective study of the types and frequency distribution of trauma being attended by key hospitals and centers; and 2), an assessment of the nature and magnitude of the problem and rehabilitation of trauma victims.

The first study is needed to provide a sound basis upon which to refine the training modules designed for the various categories of health professionals and subsequently, to evaluate the impact of this training The second study will provide the information which may indicate the ne for a possible operational Program Grant to deal with the problem of trauma victim rehabilitation.

B. <u>End of Project Status</u>

1. Three mobile surgical teams will have been trained, equipped and ready for rapid deployment of MSPAS facilities experiencing mass casualties.

2. A total of 120 surgeons, general medical officers and residents, 500 graduate and 200 auxiliary nurses and 120 anesthetists (technicians) trained in intermediate level wound stabilization techniques. These personnel staff the MSPAS's health centers and health units.

3. A total of 159 auxiliary nurses trained in primary level trauma management. These personnel Staff the MSPAS's health post.

4. A total of 50 ambulance drivers trained in elementary first aid and patient handling techniques. This number includes retraining existing drivers and training those who will be recruited to provide service in the ambulance to be provided in this project.

5. Two studies completed: a) Trauma Assessment; b) Rehabilitation Needs Assessment.

Mobile Surgical Teams

With Technical Assistance (see Annex for scope of work), the MSPAS' Department of Human Resources, and specifically, curriculum designers in the Training School (Escuela de Capacitacion Sanitaria, E.C.S) will develop training modules, training plans, identify and arrange for practical training of ~~three~~ the mobile surgical teams. These teams will be equipped with surgical kits containing basic surgical instruments, drugs and other supplies.

Each team which consist of a general surgeon, and orthopedist and a surgical nurse, and will be rapidly deployed to hospitals and centers which are experiencing sharp increases in trauma workload and will serve to augment local staff while the emergency exists. Funds are provided under the project contract commercial helicopter services t transport the teams, when necessary; otherwise, ground transport using project-financed ambulances will be used.

The project will provide for three teams. Further consultation with the MSPAS in response to the report of the Emergency Medical Assessment Team indicated that an appropriate, feasible "on call" schedule ~~would provide for~~ makes it necessary to provide three teams. While team 1 remains "on call" status, team 2 would be on standby or back-up in case of significant demand and team 3 would be off-duty. Duty status of the teams would rotate.

The teams will serve a dual function: 1) To provide direct surgical services to trauma victims' and 2) To provide on-the-job training surgical and nursing staff as they deal with trauma cases.

The lenght of training of the mobile team personnel is difficult to estimate at this time because the teaching methodology is essential tutorial, i.e. training while operating on trauma patients. This will require and adequate range and number of trauma cases in order to ensure sufficient practice of surgical trauma management skills by team members. Tentatively, the project provides for fifteen to thirty days of training, which may not necessarily be consecutive, depending upon the availability of clinical cases.

It is anticipated that there will be difficulties in attracting team members with the desired competency. There are personal risks involved, living conditions during the emergency are likely to be, at best, rustic, and the need to be on"standby" status is bothersome. The project contemplates having to provide some type of incentive such as additional salary while on deployed duty and standby status; or short-term (3-6 monts) scholarships abroad (third country training) for advanced medical or nursing training. Sufficient funds are included in the project to cover either option.

The Training modules are expected to become an integral part of

medical school clinical practice and residency training for general surgeons and orthopedist in the various hospitals throughout the country

This subcomponent will produce three mobile surgical teams competent to deal with most types of trauma cases and training modules which are ~~introduced to~~ will be integrated into medical school curriculum and surgical residency training programs.

Intermediate Trauma Management

Wound Stabilization

An important finding of the Emergency Medical Assessment Team was that at the time of their visit there were "relatively few head, chest and abdominal patients were seen in hospitals. This is probably because victims with such injuries die before hospital admission."

The MSPAS' referral chain, Health Post-Health Unit Health Center-Hospital, is staffed with competent health professional who, with training in a short, 5-day wound stabilization courses, could significantly improve survival rates of trauma victims while they are being evacuated for definitive care at Centers and Hospitals.

The purpose of this sub-component is to rapidly improve the wound stabilization skills of surgeons, general medical officers, graduate nurses and anesthetists so that trauma victims can be transported to definitive care facilities with a relatively greater change of surviving the evacuation process

With Technical Assistance (See Annex), for Scope of Work), curriculum designers in the MSPAS Training School (ESC) will develop training modules, training plans, identify sites and arrange for practical training of the above mentioned categories of health professionals.

The training modules are expected to be short (5 days) and based strictly upon the competencies considered appropriate to the category of health worker. Implementation of training will be phased first in to geographic areas with ~~a~~ significant levels of conflict; subsequently, staff in other parts of the country will receive this training.

The training modules for graduate nurses and anesthetists are expected to be integrated subsequently into the basic curricula for these categories of workers.

This sub-component will provide Intermediate Wound

Stabilization training for 120 surgeons and general medical officers, 500 graduate and 200 auxiliary nurses and 120 anesthetists working in Health Centers.

Primary Health Care Management

Fist Aid

The MSPAS has an extensive network of Health Posts throughout the country (159). These facilities are staffed by full-time Auxiliary Nurses, with periodic assistance by mobile teams consisting of a physician, a graduate nurse and a health inspector.

The Health Post is the "front line" for the MSPAS. The Auxiliary Nurse receives first-aid training in her basic 1-year course. She receives, however, training only in dealing with such trauma morbidity as snake bites, minor cuts and burns, foreign objects in the eye, hangnails, and the like. ~~(See Annex ___ for course outline).~~

The purpose of this sub-component is to rapidly upgrade the first-aid skills of Auxiliary Nurses related to trauma management. There will be phased implementation of training activities, giving first priority to areas with greater frequency of conflict. The project will be providing the health post with simple trauma kits and the training will be built around the use of these supplies and equipment. Curriculum designers in the E.C.S., assisted by the Technical Assistance, will develop training modules, training plans, identify sites

and arrange for practical training of Auxiliary Nurses in Primary Trauma Management.

Training modules developed under this Sub-component will be integrated into ~~the E.C.S.~~ curriculum for basic training of Auxiliary Nurses.

This Sub-Component will provide Primary Trauma Management training to approximately 160 Auxiliary Nurses working in Health Posts throughout the country; the training modules developed will be integrated ~~by E.C.S.~~ into Auxiliary Nurse basic training curricula.

Sub-Component No. <u>Primary Trauma Management: Patient Handling Techniques</u>

The Emergency Medical Assesment Team found that the evacuation system, from the site of injury, or from a less sophisticated facility upward to more definitive treatment, was deficient or non-existent. The assessment team recommended increasing the ambulance fleet, equipping the ambulance with radios, and the training of personnel who operate these units. The project also addresses the acquisition and equipping of

ambulances.

The purpose of this sub-component is to rapidly provide basic, elementary first aid and patient handling techniques to ambulance operators who will be evacuating patients from one location to another. The training contemplated here is short (1-2 days) and will be limited to such things as how to lift a patient on to a stretcher, positioning patients so as to maintain open airways, and the like.

Again, curriculum designers in the E.C.S, with technical assistance, will develop training modules, develop training plains, identify sites and arrange for practical training plans, identify sites and arrange for practical training of ambulance drivers/attendants in Primary Trauma Management/Patient Handling Techniques.

This Sub-component will provide training for 50 ambulance drivers/attendants in Patient Handling Techniques.

Sub-Component No. <u>Special Trauma Studies</u>

The Emergency Medical Assessment Team recommended two studies which should prove useful for both immediate and medium term improvments in MSPAS' capacity to deal effectively with

trauma. The first study has two parts: 1) Hospital discharge trauma data for 1980-1982, already collected by the Statistics Division of the MSPAS but which needs to be tabulated and analyzed by age, sec, type of trauma, hospital/center and geographic area so as to facilitate targetting of resources, orient the design of training programs in trauma management, and to provide baseline data for evaluation program impact; and 2), a one or two month prospective study of the same variables needs to be implemented in all hospitals and centers, adding certain variables such as cause of trauma, time to arrive at the receiving facility and type of transport used to get to the facility. This prospective study would be repeated in approximately one year. Data collection for these studies need not to be financed by the project as the MSPAS as agreed to carry them out. Technical assistance to analyze these data, however, will be needed and is provided for in the budget.

The second study recommended is one which will assess the nature and magnitude of the need to provide assistance in rehabilitation of trauma victims. The Emergency Medical Assessment Team found significant numbers of amputees in the hospitals visisted, with no apparent systematic means of dealing with the return of these individuals as productive members of society.

The project provides funds for the latter assessment and it is expected that, if assistance is determined to be necessary, a potential proposal for OPG funding may be generated by the assessment.

BUDGET - COMPONENT IV
EMERGENCY MEDICAL SERVICES

A. **Training Costs**

1. **Technical Assistance**

a) Surgical Trauma Management Specialist 3 mo. x $11,000/mo	$	33,000
b) Trauma Stabilization/First Aid Specialist 2 mo x $11,000	$	22.000
Sub-Total	$	55,000

2. **Local Training Costs**

a) **Mobile Surgical Teams**

(Three teams each consisting of 1 general surgeon, 1 orthopedic surgeon, 1 surgical nurse).

1) Training materials (paper, chalk. transparencies, etc.)	$	1,000
2) Two surgical kits (see commodities below/above for costs).		
3) Faculty honoraria 135 hours x $10.00/hr	$	1,350
4) Miscellaneous/Contingencies	$	250
Sub-Total	$	3,000

(rounded)

b. **Wound Stabilization Training**

1) **Graduate and Auxiliary Nurses** (500 graduates and 200 aux. estimated)

a) Perdiem 28 courses x 5 days duration x 25 persons per course x $8.00 PO	$	28,000
b) Training Materials $200 per course x 28 courses	$	5,600

c) Fifteen Traumabits (see commodities above/below for costs.)

d) Faculty honoraria
80 hrs per week x 28 courses x $10.00 hr. $ 22,400

e) Miscellaneous/Contingencies
$100 per course x 28 $ 2,300

Sub-Total $ 58,800

2. Anesthetists: (120 estimated)

a) Per Diem
6 courses x 5 days x 20 persons x $8.00 per day $ 4,800

b) Training Materials
$200 per course x 6 courses $ 1,200

c) Faculty Honoraria:
40 hours/wk x 6 courses x $10/hr $ 2,400

Sub-Total $ 8,400

3. General Medical Officers (120 est.)

a. Per Diem
6 courses x 5 days x 20 persons x $8.00 per day $ 4,800

b) Training Materials
$200 per course x 6 $ 1,200

c) Faculty Honoraria
40 hrs/wh x 6 courses x $10/m $ 2,400

Sub-Total $ 8,400

c. First AID Training - Auxiliary Nurses
(160 working in Health Posts).

1)	Per Diem 8 courses x 5 days x 20 persons x $8.00	$	6,400
2)	Training Materials $200 x 8 courses	$	1,600
3)	Five First AID Kits See commodities above/below for cost		
4)	Faculty Honoraria 40 hrs/week x 8 courses x $10	$	3,200
5)	Miscellaneous/Contingencies $100 per course x 8	$	800
	Sub-Total	$	12,000

d. Patient Handling Techniques
Ambulance Drivers (50 est.)

1)	Per Diem 2 courses x 2 days x 25 persons x $8.00	$	800
2)	Training Materials 2 courses x $50	$	100
3)	Five stretchers See commodities above/below for cost		
4)	Faculty Honoraria 8 hrs/day x 2 days x 2 courses x $10	$	320
5)	Miscellaneous/Contingency $50 per course x 2	$	100
	Sub-Total	$	1,320

3. Training Support Equipment (Generic to all Training Activities)

a) Four overhead projectors

b) Four projector stands

c) Two slide projectors

d) Two small portable screens

e) Spare parts (bulbs) for projectors (See list turned into Henson)

GRAND TOTAL (EXCLUDING COMMODITIES) (rounded) $ 157,000

SUMMARY TABLE OF TRAINING COSTS

1.	Technical Assistance	$ 55,000
2.	Local Training Costs	
	a) Mobile surgical trains	$ 3,000
	b) Wound stabilization	$ 75,600
	c) First aid	$ 12,000
	d) Patient handling	$ 1,310
3.	Training Support Equipment	$ 10,000
	TOTAL	$ 157,000 (rounded)

B. Commodities

1. Medical Stabilization Kits

a)	Medical Equipment Set - Group 3 26 x $1.630.49	$	42,393.00
b)	Mass Casualties Rx 26 x $501.61.	$	13,042.00
c)	Consumables	$	30,000.00

2. Emergency Surgical Lamps

	26 x $1,216.09	$	27,486.46

3. Surgical Instrument Kits

a)	Chest Med No. 3 123 x $132.02	$	16,239.00
b)	Med. Equip. Set Ortho. 26 x 643.90	$	16,742.00
c)	First Aid Kit 97 x_____	$	4,947.00

4. X-Ray Machines

a)	300 MA Mobile 12 x 14,791	$	122,500.00
b)	Film 10 x 12 37 - 100's x 79.11	$	292,391.00
c)	Film 8 x 10 37 - 100's x 54.53	$	201.543.00
d)	Film 14 x 17 37 - 100's 153.23	$	566,399.00
e)	X-Ray Cassette, 8 x10 100 x 107.89	$	10,789.00
f)	X-Ray Cassette, 10 x 12 100 x 147.83	$	14,783.00
g)	X-Ray Cassette, 14 x 17 100 x 228.30	$	22,830.00

5. Sunction Machines

	26 x 778.29	$	20,235.00

6. <u>Ambulances</u>

a)	Star Line Model III (for surgical teams) 2 x 49,680	$ 99,360.00
b)	Standard Ambulances 25 x 34,500	$ 862,500.00
	Sub-total	$ 2,419,179.00

INSTITUTIONAL ANALYSIS -COMPONENT IV

THE DEPARTMENT OF HUMAN RESOURCES

The department of Human Resources of the MOH is the responsible entity for all pre-service (excluding physicians) and in-service training of MOH personnel, both direct health care providers and administrative staff. The Department is headed by a Medical Educator, former Dean of the National Medical School. The Department is composed of three sections: Nurses Training, Continuing Education and the Training School (Escuela de Capacitacion Sanitaria, E.C.S). These sections implement or coordinate implementation of the following:

A. NURSES TRAINING

1. Graduate Nurses

There are three graduate nurse schools in the country: one in San Salvador another in Santa Ana and the last, in San Miguel. The first two schools are oriented towards the production of hospital-based nurses; the latter school, only recently opened in 1981 has a stronger "community health" nursing focus. There are no graduates of this program as yet. Annual production of the established schools is about 80-100 graduates. Faculty in the three shools number 73 instructors.

2. Auxiliary Nurse Training

The country has five schools for Auxiliary Nurses: San Salvador, Santa Ana, San Miguel, San Vicente and Sonsonate. This 1-year program produces approximately 200 graduates per year. At present there are 19 instructors distributed throughout the five schools.

B. CONTINUING EDUCATION

At present, this section handles only the processing of externally funded scholarships for training in-country. The intention, however, was to develop an in-country capacity to provide C.E. services. CIDA showed considerable interest during 1981-1982 in funding a program here, patterned after their experiences with C.E. in Honduras and other countries in the Region. This interest, however, has cooled, perhaps waiting to see how events develop in El Salvador.

C. TRAINING SCHOOL (E.C.S.)

1) Community Health Workers

a) Rural Health Aides: This program, originally funded by

project No. 519-0149, began in 1977. Production of RHA's has varied over the years, as a function of political commitment and availability of funds. It is estimated that The RHAabestimated workengeiasthelfinlBeatechisheiformal health system and the folk system, for the delivery of basic primary health services and to promote the use of the formal health system, primarily for preventive health services. A recently published article by CDC investigators and other suggest that this worker is impacting on health behavior of rural populations in El Salvador. The article concludes that "appropriately trained primary health care workers can promote contact between the health care system and the rural populations the ...e. ( )

b) Traditional Birth Attendants (TBA)

The E.C.S. has had a continuing program, funded by UNFPA, designed to upgrade the basic skills of TBA's in safe delivery of babies and the early recognition of problem pregnancies which should be referred to the formal health system. Approximately 450 have received training and annual production averages 225 trainees. The project calls for a total of 950 trained by the end of CY 84.

3. Special Categories of Workers

a) Assistant Statisticians

Approximately 30 Assistant Statisticians are produced per year. These individuals serve in

health units, centers and hospitals and are responsible for collecting, tabulating and submitting service statistics.

b) Health Inspectors

About 60 Health Inspectors are produced each year. They are assigned to Regional Offices, health units and posts. These individuals promote latrinization, safe water supply and solid waste disposal.

D. Miscellaneous Programs

The Department has been carrying out seminars/workshops which acquaint and motivate mid-level health care administrators to adopt the concept of Primary Health Care as a strategy to achieve the goal of "Health for All by the Year 2000".

Also, with PD and S funding, the Department has carried out a series of workshops to improve curriculum design and evaluation skills of instructors in the various training programs. The Mission plans to continue financing these types of activities.

As related specifically to this Project Component, the Department is considered to be fully qualified and staffed to design and coordinate the implementation of the planned training activities. The only question mark is the degree of other-institution collaboration, ie. the provision of practical training sites and time, the loan of instructors, etc.

Draft: Component IV

EMERGENCY MEDICAL SERVICES:HUMAN RESOURCE DEVELOPMENT

A. Overview

Among the principal findings of a team which assessed the MSPAS' capacity to deal with war-related trauma was a serious lack of health professionals trained in the special skills required for on-site first aid, intermediate wound stabilization and definitive surgical interventions. Specifically, the Medical Assesment Team recommended:

1. Recruitment, selection and training of two mobile surgical teams which could be deployed rapidly to outlying hospitals and centers requiring additional surgical services due to casualties.

2. Training of surgeons, general medical officers, and nurses in techniques of intermediate wound stabilization, prior to evacuation of casualties for definitive surgical interventions.

3. Provide simplified first aid training at all levels in the health system, but particularly at peripheral facilities such as Health Units and Health posts manned by auxiliary nurses.

4. Provide training to ambulance drivers in elementary first aid and patient handling techniques.

This component addresses the four levels of trauma management training briefly described above. TA will be provided to develop, implement and evaluate the training. Funds will also be provided to finance educational materials, audio-visual equipment, participant perdiem, visiting faculty honoraria, and surgical team member incentive pay.

The Medical Assesment Team also recommended that two studies be carried out: 1) A prospective study of the types and frequency distribution of trauma being attended by key hospitals and centers; and 2), an assessment of the nature and magnitude of the problem of rehabilitation of trauma victims.

The first pilot study is needed to provide a sound basis upon which to design the training modules for the various categories of health professionals. The second study will provide the basis for a

Checkm. 1

possible OPG to deal with the problem of trauma victim rehabilitation.

B. End of Project Status

1. (Three) mobile surgical teams will have been trained, equi and ready for rapid deployment to MSPAS facilities experiencing casualties.

2. A total of ?. surgeons, general medical officers an residents, 560 graduate nurses and ?. anesthetists trained in intermediate level wound stabilization techniques. These person are located in health centers and health units.

3. A total of 560 auxiliary nurses trained in primary lev trauma management. These personnel are located principally in health centers, units and posts.

4. A total of 40 ambulance drivers trained in elementary first aid and patient handling techniques.

5. Two studies completed: a) Trauma Assessment; b) Rehabilitation Needs. - under project

Sub-component No. ____: Mobile Surgical Teams

With Technical Assistance (see Annex _____ for Scope of Work), the Department of Human Resources, and specifically, curriculum designers in the Training School (Escuela de Capacitacion Sanitaria, the E.C.S.) will develop training modules, training plans, identify and arrange for practical training of at ~~least two~~ three mobile surgical teams. These teams will be equipped with surgical kits containing basic surgical instruments, drugs and other supplies.

These teams, which consist of a general surgeon, an orthopedist and a surgical nurse, will be rapidly deployed to hospitals and centers which are experiencing sharp increases in trauma workload and will serve to augment local staff while emergency exists. The teams will serve a dual function: 1) To provide direct surgical services to trauma victims; and 2) To provide on-the-job training to surgical and nursing staff as they deal with trauma cases.

Add 7P on length. + 4B surgeon employed based

- 9 people for surgical team

SVO SV

It is anticipated that there will be difficulties in attracting team members of good quality. There are personal risks involved, living conditions during the emergency are likely to be, at best, rustic, and the need to be on "standby" status is bothersome. The project contemplates having to provide some type of incentive such as additional salary while on deployed duty and standby status; or short-term (3-6 months) scholarships abroad for advanced medical or nurses training.

- additional salaries / Short term scholarship

The training modules are expected to become an integral part of basic and residency training for general surgeons and orthopedists in the various hospitals throughout the country.

This subcomponent will produce three mobile surgical teams competent to deal with most types of trauma cases and training modules which are integrated into surgical residency training programs.

Subcomponent No. :Intermediate Trauma Management: Wound Stabilization

An important finding of the Medical Assessment Team was that there were "Relatively few head, chest and abdominal patients were seen in hospitals (at the time of their visit). This is probably because victims with such injuries die before hospital admission."

The MSPAS' referral chain, Health Post-Health Unit-Health Center-Hospital, is staffed with competent health professionals who, with short, 5-day wound stabilization courses, could significantly improve survival rates of trauma victims while they are being evacuated for definitive care at Centers or Hospitals.

The purpose of this sub-component is to rapidly improve the wound stabilization skills of surgeons, general medical officers, graduate nurses and anesthetists so that trauma victims can be transported to definitive care facilities with a relatively greater chance of surviving the evacuation process.

With Technical Assistance (See Annex _____, for Scope of Work), curriculum designers in the Z.C.S. will develop training modules, training plans, identify sites and arrange for practical training of the above mentioned categories of health professionals.

The training modules are expected to be short (5 days) and based strictly upon the competencies considered appropriate to the category of health worker. Implementation of training will be phased first into geographic areas with relatively greater and more frequent conflict; subsequently, staff in other parts of the country will receive this training.

The training modules for graduate nurses and nurse anesthetists are expected to be integrated subsequently into the basic curricula for these categories of workers.

This sub-component will provide Intermediate Wound Stabilization training for ____surgeons and general medical officers, 560 graduate nurses and ____nurse anesthetists working in

Health Centers and Health Units.

Sub-component No. ____: Primary Level Trauma Management:First Aid

The MSPAS has an extensive network of Health Posts throughout the country (____). These facilities are manned full-time by Auxiliary Nurses, with periodic assistance by mobile teams consisting of a physician, a graduate nurse and a health inspector.

The Health Post is the "front line" for the MSPAS. The Auxiliary Nurse receives first-aid training in her basic 1-year course. She receives, however, training only in dealing with such morbidity as snake bites, minor cuts and burns, foreign objects in the eye, hangnails, and the like. (See Annex ___, for course outline)

The purpose of this sub-component is to rapidly upgrade the first-aid skills of Auxiliary Nurses related to trauma management. There will be phased implementation of training activities, giving first priority to areas with greater frecuency of conflict. Another element of the project will be providing the health post with simple trauma kits and the training will be built around the use of these supplies and equipment.

As in Sub-component No.___ above, curriculum designers in , assisted by the TA, will develop training modules, lans, identify sites and arrange for practical training of Nurses in Primary Trauma Management.

Training modules developed under this Sub-component will ed into the curriculum for basic training of Auxiliary

This Sub-component will provide Primary Trauma management approximately _____Auxiliary Nurses working in Health ghout the country; the training modules developed will ed into Auxiliary Nurse basic training curricula.

Sub-component No. _____:Primary Trauma Management: Patient Handling Techniques

The Medical Assessment Team found that the evacuation the site of wounding, or from a less sophisticated ward for more definitive treatment, was deficient or nt. They recommended increasing the ambulance fleet, the ambulances with radios, and the training of personnel to these units. Another element of this project addresses ition and equipping of ambulances.

Best Available Document

basic, elementary first aid and patient handling techniques to ambulance operators who will be evacuating patients from one location to another. The training contemplated here is short (1-2 days) and will be limited to such things as how to lift a patient on to a stretcher, positioning patients so as to maintain open airways, and the like.

Again, curriculum designers in the E.C.S., with assistance from the TA, will develop training modules, develop training plans, identify sites and arrange for practical training of ambulance drivers/attendants in Primary Trauma Management/Patient Handling Techniques.

This Sub-component will provide training for 40 ambulance drivers/attendants in Patient Handling Techniques.

Sub-component No._____:Special Trauma Studies

The Medical Assessment Team recommended several studies which should prove useful for both immediate and medium term improvements in MSPAS' capacity to deal effectively with trauma. The first study has two parts: 1) Hospital discharge trauma data for 1980-82, already collected by the Statistics Dvision of the

MSPAS need to be tabulated and analyzed by age, sex, type of trauma, hospital/center and geographic area so as to facilitate targetting of resources, orient the design of training programs in trauma management, and to provide baseline data for evaluating program impact; and 2), a one or two month prospective study of the same variables needs to be implemented in all hospitals and centers, adding certain variables such as cause of trauma, time to arrive at the receiving facility and type of transport used to get to the facility. This prospective study would be repeated in approximately one year. Data collection for these studies need not be financed by the project as the MSPAS has agreed to carry this out. TA to analyze ~~this~~ these data, however, will be needed and is provided for in the budget.

? Cost of study

The second study recommended is one which will assess the nature and magnitude of the need to provide assistance in rehabilitation of trauma victims. The Medical Assessment Team found significant numbers of amputees in the hospitals visited, with no apparent systematic means of dealing with the return of these individuals as productive members of society.

The Project provides funds for the latter assessment and it is expected that, if assistance is ~~required,~~ determined to be necessary a proposal for OPG funding will be generated by the assessment.

How long?

A. Situational Analysis

1. Background and Present Situation:

a. Relevant History

In an assessment by Coppedge and Faich (See Annex) of the MSPAS to deal with conflict-related trauma the report indicates significant increase in the trauma workload borne by the MOH over the last few years. During the period 75-80, trauma cases increased about 55% from 6369 to 9803 discharges, with the greatest increases occurring during the latter period covered by the report. Of note is that during the same period, mortality due to violence moved from _____ position to _____ position, as cause of death. This finding is supported by Table 3 of the Coppedge/Faich(CF) report which shows a doubling of fatality rates (deaths to case ratio) for selected trauma discharge diagnoses, from 3% to 6%.

The CF report could only deal with official statistics, registered deaths, by cause, for the period 75-80. The degree of under registration of deaths due to violence cannot be estimated with any known degree of accuracy.

The CF report also indicated that the physical capacity of the MOH (surgical beds) to deal with trauma seemed to be adequate, or at least, not over taxed. Of concern, however, were the following findings:

i. Significant numbers of amputees on the wards.

ii. Lower than expected numbers of head/neck, chest and/or abdomen wound patients.

iii. Acute shortages of the basic, essential supplies and equipment to respond minimally to the needs of casulties.

IV. Inadequate means to transport casualties, from the site of wounding to a receiving facility or from a less sophisticated facility upward in the referral chain.

V. Shortages and inadequate training of the manpower available, to deal with strife-related trauma.

Regarding item v above, and which is the central [illegible] component, the CF report concludes and recommends the following:

" Conclusion: First aid and medical stabilization of trauma victims is often crude, delayed or non-existent.

Recommendation: Simplified first aid training should be provided to all MSPAS personnel in hospitals, centers, and selected health posts and units. Additonally, simple trauma kits containing first aid supplies should be distributed to peripheral facilities. Transport means should be arranged by each facility. Injured persons should be encouraged to use these facilities.

Conclusion: Additional ambulances should be assigned to hospitals and regional offices to allow for evacuation of injured persons particularly in contested areas.

Recommendation: MSPAS ambulance drivers and attendents should receive appropriate training.

Conclusion: Physician surgical manpower is inadequate in number and often isufficiently trained except in Santa Ana, San Miguel, and San Salvador.

Recommendation: Two mobile surgical teams should be assembled so that they can provide urgent surgical input when needed to outlying hospitals and centers.

Recommendation: Training programs dealing with the management of war wounds should be organized for nurses and surgeons.

It is clear from the above that serious deficiencies exist in the capacity of the already scarce human resources to deal with conflict-related trauma.

b. Present Policies:

The Minister of Health is a strong supporter of the WHO goal and strategy of "Primary Health Care" and "Health for All in the Year 2000". Indeed, he is taking executive measures to re-organize the MSPAS around the WHO mandate, re-affirmed recently in Geneva.

The WHO mandate, however, is only a guiding principle which must be adapted to country circumstances. The MSPAS leadership readily

agree that the definition of "Primary Health Care" for El Salvador, must also include the management of trauma, due to all causes.

c. Current Resources and Activities:

1. The Department of Human Resources

The MSPAS has a Department of Human Resources Development, headed by a medical educator, former Dean of the Medical School. He has excellent support staff, in numbers, professional training and quality.

The Department implements, supervises or coordinates the implementation of:

- Graduate nurse training (3 schools: Santa Ana, San Salvador
- and San Miguel)

  Total Annual production:

- Auxiliary nurse training

  (schools:

  Total Annual Production:

- Rural health aid 519-(K-030 funded) training

  #s/yr.

- Empirical midwives

  #s/yr.

- Assistant statisticians

  #s/yr

- Continuing education of professionals

What appears to be lacking is a clear mandate as to the role the Department of Human Resources plays in the design, programming, and implementation of education and training activities throughout the Ministry. Quite frequently, technical divisions will design and implement training programs without consulting or utilizing the resources available in the Department.

A significant problem facing the Department is the lack of suitable facilities to carry out training activities, other than nurses training. In June of 1982, the earthquake nearly distroyed the Escuela de Capacitación Sanitaria. This building, located next door to the National Nursing School, housed the Department's administrative offices and served as the locale for multiple training activities, both basic and in-service. The USAID has included funds in the "priority package" of Title I reflows, sufficient to either buy or rent a facility. Subsequent negotiations with the Ministry of Planning will determine wheter these funds remain in the priority package.

2. Current Training of Health Professionals in Trauma Management

I) Physicians

II) Graduate nurses

For an outline of the content received by nursing students, see Annex _____. A total of 35 classroom hours and devoted to first aid.

III) Auxiliary Nurses

T.A

SCOPE OF WORK

I. Specialty: Wound Stabilization and Combat First Aid.

II. Level of Effort: 2 PM (est.)

III General Objective: To assist the MSPAS in strenghthening its capacity to deal effectively with intermediate and first level wound management, through improved wound stabilization and first aid techniques, thereby improving the survival rates during the evacuation process.

IV Specific Tasks:

1. Through site visits and review of available date (preferrably in collaboration with the trauma management specialist), develop a profile of the trauma being attended in hospitals/centers and at (lower other) levels of the evacuation chain. The profile will serve as a basis for developing competency based training modules for graduate nurses, auxiliary nurses and possibly, ambulance attendants.

2. With curriculum design experts and surgical nursing instructiors, develop ptraining modules for the above mentioned categories of personnel.

3. With MSPAS Training Coordinators develop training plans, including resources required (human, financial and material) and tentative implementation schedules.

4. With surgical nursing instructors, develop a list of basic equipment and supplies for the first aid kits to be placed in puestos.

5. With Training Coordinators and other MSPAS subject matter experts, supervise and assist directly in the implementation of the modules.

6. With MSPAS curriculum designers, develop plans for evaluation of this component.

V Qualifications:

1. A licensed P. A. or E. M. T.

2. Combat experience

3. Experience in Teaching; curriculum design skills not essential as MSPAS has trained staff.

4. Spanish speaker at or above FSI-3 level, or equivalent.

VI. Reporting Requirements:

(Identical to the end of A)

B. Recommendations for follow-up activities, including the inclusion of trauma management in the curricula for graduate nurse and auxiliary nurse training programs.

B. Proposed Assistance Strategy

1. Objective: To assist the MSPAS with the rapid design and implementation of trauma management training courses for all levels of health care professionals: Surgeous both general and orthopedic; general medical officers; graduate nurses; auxiliary nurses. Implementation would begin for MSPAS staff presently located in conflictive zones and in a phased fashion, extend to other areas of the country.

2. End of Project Status:

Phase I

a) Two mobile surgical teams trained and equipped for rapid deployment:

i) Training includes designed, tested and implemented.

ii) Mobile surgical kits designed, tested and packed.

b) _____general medical officers trained in definitive surgical management of trauma.

c) _____general medical officers trained in intermediate wound stabilization techniques.

d) _____ graduate nurses trained in intermediate wound stabilization techniques.

e) _____auxiliary nurses trained in first level first-aid for trauma victims.

Phase II

a) Training modules for definitive and intermediate trauma management improved and included in undergraduate and/or internship/residency training curricula for physicians.

b) Training modules for intermediate trauma management integrated into graduate nurse training curricula.

c) Training modules for first level first-aid integrated into auxiliary nurse training curricula.

COMPONENT IV

SCOPE OF WORK

I Specialty: Trauma Management.

II Level of Effort: Two PM (est.)

III General Objective: To assist the MSPAS in strengthening its capacity in dealing definitively with civil strife related wounds, through improved surgical techniques. Thereby reducing mortality and amputation rates.

IV Specific Tasks:

1. Through site visits and review of available data, develop a profile of the types of trauma being attended by hospitals and centers. The profile will serve as a basis for developing a competency based training program for various levels of health professionals.

2. With curriculum desighn experts and surgical staff of the MSPAS develop training modules for the mobile surgical teams.

3. With surgical staff develop criteria for surgical team composition, recruitment and selection.

4. With MSPAS training coordinators, develop training plans, including resources required (human, financial and material), and tentative implementation schedules.

5. With surgical staff develop a list of basic equipment and supplies for mobile surgical units; design an efficient packing of the equipment and supplies, as well as a replenishment schedule for those items with expiration dates.

6. With Training Coordinators and other MSPAS subject matter experts, supervise and assist directly in the implementation of the Training modules.

7. With MSPAS curriculum designers, modify and improve the modules, so that the surgical teams may subsequently implement the modules, creating a "multiplier effect".

8. With curriculum designers, develop a plan for evaluation of this subcomponent.

V Qualifications:

1. Board certified in general or orthopedic surgery.

2. Combat experience

3. Preferred, but not essential, a background in research in trauma management.

4. Experience in teaching; curricu design skills not essential, as MSPAS has trained staff.

5. Spanish speaker at or FSI-3 level, or above equivalent.

VI Reporting Requirements:

The contractor will provide the MSPAS and USAID with a report within 30-days of completing the mission which includes, but is not limited to:

A. Review of the entire design, initial implementation and evaluation process of the modules.

B. Recommendations for follow-up activities, including inclusion of trauma management in intership and surgery residency training programs.

280

May, 1983

CONSULTANT REPORT ON MALARIA CONTROL FOR THE HEALTH SYSTEMS REVITALIZATION PROJECT

prepared by
Larry Cowper, Health Science Administrator, AID/W and
Dr. Mauricio Sauerbrey, Malaria Consultant, El Salvador

A. Situational Analysis

1. Background and present situation

a) For several decades the program strategy against malaria in El Salvador was carried out using the eradication criteria, based upon the establishment of a passive and active case detection system, total coverage of houses with insecticides and mass distribution of drugs throughout the malarious areas of the country. However, with the appearance over the years of physiological resistance to most insecticides by the local vector (Anopheles albimanus), due to pressure from an indiscriminate usage of several types of presticides (*) in the highly agricultural coastal zone; associated with an increasingly more reluctance to take the specific drug among the population, such strategy became unpracticable and expensive. Consequently by, a gradual increasing malaria morbidity occured during the last two decades in spite of a significant reduction in malaria mortality. In 1980, malaria was the third cause of morbidity in El Salvador.

Due to the circumstances previously mentioned, the Malaria Division decided in 1979 to carry on a detailed analysis of all its epidemiologic, operational and administrative activities with the objective of redesigning the program into a new control strategy which could allow for more dynamic actions and better distribution of resources. The criteria was to focus the attack of each problem area individually at the precise time and place by using a combination of attack measures, depending upon specific local characteristics responsible for disease transmission.

b) Present Policies

As a direct result of this analysis, the previous malaria eradication strategy was replaced after 1979 by a more realistic malaria control one, which has as its main purpose to bring down malaria levels in the country to a point where malaria no longer represents a public health problem.

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* According to data released by Ministry of Agriculture, insecticide usage in El Salvador has been estimated to be in the order of 18 million tons of Chlorinated, hydrocarbons, 14 tons of Organophosphorous and 20 tons of Carbamates insecticides during the last decade.

281

May, 1983

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282

A strategy change of this kind would normally require at the beginning a higher number of personnel and resources but, in order not to increase scarce resources from MSPAS, it was decided to emphasize control measures in the areas of first priority which are responsible for 85% of all reported cases. The first priority areas were selected through stratification of malarious areas (table I) throughout the country which was based upon the average number of cases produced by locality in a given period of time (1970-1977)

TABLE I

Malaria Stratification by area
El Salvador
(January 1983)

AREA CHARACTERICTIS	MALARIA CASES %	SIZE SQUARE Kms.	NUMBER OF INHABTS.	AREA%
First priority Hiperendemic More than 60 cases Annually per voluntary colaborators posts (0 to 300 mts. altitude).	85	4.819.00	1.407.620	22.9
Second priority Moderate endemic 30 to 60 cases annually per voluntary col. posts (301 to 600 mts)	10	3.215.79	928,780	15.3
Third priority* Hipoendemic 0 to 29 cases per voluntary col. posts (more than 601 mts.)	5	13.006.00	2.962.686	61.8
TOTAL COUNTRY	100	21.040.79	5.299.086	100

* Includes non-malarious area estimated 1.118 square Kms.

The program is expected to meet its short term goals of decreasing malaria morbidity by reducing and controlling vector breeding places in areas of first and second priority. The program will do this through the systematic application of combined attack measures with more emphasis initially on chemical measures. After this has been accomplished, it will carryout long term activities c elimination, reduction and control of 80% of all breeding places within both areas with an expected emphasis at that time on more non-chemical measures. The design of this strategy represents an innovative approach and, with the exception of lacking more specif objectives within a given time frame, it is considered generally well planned and unique among other Central American and Caribbean programs. Therefore, it could be seen as an experiment that may result in new approaches for malaria control in the area.

283

c) Current Resources and Activities

I. Programs

Malaria control activities currently undertaken by the Malaria Division, MSPAS are as follows:

- Case detection through passive and active case systems as well as general health services.

- Treatment of cases: Presumptive treatment at voluntary colaborators posts, mass distribution of drugs in selected areas for presumptive and radical cure. Drugs used are Chloroquine and Primaquine, single and combined.

- Simple source reduction activities consisting of drainage, opening of estuaries, fillings and cleaning of ditches.

- Promotion and education of communities with emphasis on those under the agrarian reform process.

- Intradomiciliary spraying of residual insecticide (Propoxur-adulticide) in areas of susceptibility.

- Special ULV spraying of insecticide (Pyrethroid-adulticide) in areas of vector high density.

- Application of larvicide (ABATE) in water accumulations mainly during dry season.

The passive case detection system (PCD) is considered an important asset within the program, it consists at present of a total of 2563 voluntary collaborator posts of which 1150 (45%) are localized within the hyperendemic zone and the rest among the other malarious areas. Their present average number of inhabitants covered by each VC post is estimated to be 697. It is planned to lower this ratio to one VC post to reach 250. The VC is responsible for delivering presumptive treatment to febriles and provides practically all basic epidemiologic information for the program by detecting 80% of total reported cases in the country. The other 20% of cases are detected through active case detection by malaria personnel and general health services.

II. Manpower

Malaria Division (MSPAS) has a total of 614 positions and, according to their last program planning activities for the period May-October 1983, has reported to have a total of 511 field operational personnel which represents approximately 85% of all program personnel. Field operational personnel are divided in the following categories: 78 Chiefs of Zones, Departments, operational Polos and Sections.

284

319 Operational personnel (supervisors, evaluators, microspists, spraymen, operators, drivers, etc.)
114 Support Personnel (includes personnel hired under contract to do operational activities)

At the executive level, the Malaria Division consists of a Program Director (a Medical Doctor), a Chief for Field Operations, a Chief for Entomology and an Administrative Officer. This level receives additional technical support from PAHO by the provision of a full time technical officer and a part time Malaria Epidemiologist. The rest of personnel provide administrative support of the program and consists of a total of 40 persons such as secretaries, mechanics, etc.

According to Program Director's, such personnel can only be responsible for covering control activities of 27% of the first priority area. It is estimated that to cover 80% of the first priority area they would need three times the present number of operational personnel.

It is remarkable that in a program of this magnitude, that there is not a full time malaria epidemiologist or an officer with an engineering background to solve some of the source reduction problems.

III. Budget

The fixed budget for the Malaria Division for 1983 as in the order of 4,431.689 colones which corresponds to 2.6% of total MSPAS budget. However, theDivision has this year an additional amount of 2,900.000 colones reserved from general funds to buy 2,500.000 colones of insecticides and drugs 400,000 colones. Distribution of total budget (colones) for 1983 by categories is as follows:

Personal services (permanent employees)	242.940
Other personal services (contract personnel)	3.788.750
Non-personal services (utilities etc.)	41.540
Materials and Supplies (Office equipment, etc.)	58.450
Equipment	—
Insecticides	2.500.000
Drugs *	400.000
GRAND TOTAL	7.331.680

* According to instructions from MSPAS since July 1980 purchasing of new equipment has been cancelled.

IV. Operational Management Policies and Procedures

The operational epidemiological unit of the program is the "caserio" (smallest accumulation of houses) in contrast to the previous" canton" (political unit consisting of several" caserios") in the old strategy. This decision was taken based on trying to individualize as much as possible each problem. Control activities are planned and executed by operational "Polos" which are actually individual operational zones.

Theoretically, there are two major regular program activities: one for the dry season (November-April) and one for the rainy (May-October) season. Such seasonal based operational programming is the product of an epidemiologic analysis by "caserio" based upon data obtained during the previous three years. The parameters used for the analysis are the following:

- Number of cases detected during the period.
- Months of higher intensity
- Slide positive rate (SPR).
- Frequency of P.falciparum infections.
- Annual parasitic incidence (API).
- History of applied measures in the area.
- Population characteristics of the area.

In addition to the seasonal programming, there is an on-going analysis of the epidemiologic and parasitologic information by "caserio" carried on a weekly basis at the "Polos". This is to define any necessary operational changes to be made by priority, according to local vector and disease situation, in order to attack the problem at precise time and place with available measures and resources.

In general terms, vector control aspects during rainy season give emphasis to controlling the adult phase. Therefore, ULV and intradomiciliary residual spraying in conjunction with drug distribution constitutes the major seasonal activities. During the dry season control efforts are mainly larvicide application and source reduction.

Training of malaria personnel up to certain level constitutes an on-going activity under this type of strategy and it usually takes place on the job. In addition, there are supposed to beregular specific training sessions of approximately 15 days duration under program supervision, on different aspects like entomology, epidemiology, evaluation, vector control, insecticides spraying safeguards, administrative, etc. During 1983, the Malaria Division provided short term three day training sessions at the zones concerning with different aspects of program. During the

period January-May, the Malaria Division has given five such sessions. Additionally, there are sporadic courses programmed at national level. Some personnel have participated in courses at international level.

V. Supplies and Materials

This area is considered critical and its deficiency could be explained by following aspects:

- Limited financial resources.
- Lack of administrative efficiency at central level to obtain and distribute materials and supplies on time and appropriate quantities.
- Deteriorated status and insufficiency of most working and transport equipment.

2. Major Constraints or Problems

a) Budget

The fixed budget allocated to the Malaria Division for 1983 represents a 2.6% of the total Ministry of Health Budget. In reviewing this budget relationship for the last five years, it shows that a decrease of 0.6% has taken place gradually since 1980 in the malaria budget.

This level of budget support is considered insufficient by the Program Director and constitutes the major constraint to the Program as it allows only for covering activities in 27% of all "caserios" in the area of first priority.

b) Management, Policies and Phylosophy

Technical, administrative and financial problems found in El Salvador are hindering the progress and development of the malaria control program. Major problems encountered are as follows:

- Most critical among the technical problems is the physiological resistance of the local vector (A.albimanus) to almost all available insecticides in the majority of the country's coastal zone (see specifi_ maps in annexes).

- Lack of personnel resources which has been aggravated by a freeze hire policy effective since July 1980. At present, program vacancies are estimated at a 30% level among field operational positions.

- Due to diminished reasources the Malaria Division's program is presently able to cover only 27% of the area considered of higher priority and responsible for 85% of total cases produced in the country. As a direct consequence, the program is forced to leave unattended the rest of malarious areas which are necessary to be put under control, to reduce malaria to levels normally considered acceptable.

- Lack of more efficient administration at central level which leaves the program without essentially required supplies for significant period of time, diminishing response capacity at crucial times when problems arise with higher intensity.

- Inaccessibility by program personnel for certain areas (Chalatenango) due to persisting circumstances in the country.

- A significantly increased population movement which contributes to spreading the disease.

- Utilization of Malaria Division resources (manpower, equipment, insecticides, etc.) to attend other demands of MSPAS especially those related to environmental sanitation which are direct responsibility of another technical division from MSPAS.

b) Commodities, Supplies and Materials

A lack of commodities, supplies and materials is severely damaging program development and morale. There are two main factors for this lack..

- According to instructions from the MSPAS since July 1980, all purchase of new equipment has been cancelled.

- Difficulties encountered by private enterprise to meet their delivery schedules for products contracted by MSPAS because of the country's foreign exchange problems.

3. MSPAS Response to Problems and Constraints

a) Resources, Policies and Programs

Response from the MSPAS to the problems presently encountered by the Malaria Control Program, if seen from an individual program standpoint of view, could be considered marginal. However, due to present general economical deterioration of the country, such level of response is more likely to be standard for all MSPAS programs.

b) Donor Assistance

At present, only PAHO is providing assistance in technical and training aspects. UNICEF assistance was suspended in 1974 and German Government was withdrawn in 1975.

258

B. Proposed Assistance Strategy - Malaria Control Component

The Government of El Salvador is continuing to strengthen its antimalaria activities under the National Malaria Control Program in the 1984 - 1985 period, through comprehensive malaria control efforts using a variety of alternative control methods. A number of serious constraints must be overcome in order to attain the objectives of maintaining and/or further reducing the current level of malaria incidence.

a. Constraints

i. Epidemic malaria of the 1950's has been overcome and transmission of the disease has been contained, but malaria is again on the rise as ecological factors, such as population movements, new settlements, and migrant farming are leading to re-establishment of malaria as a major public health problem in El Salvador.

ii. Vulnerability to the introduction and spread of malaria is generally high in the endemic malarious areas, specially in re-settlement locations and along the coastal areas.

iii. Vector resistance to the insecticides DDT and malathion has occurred in El Salvador. Tolerance to other O.P. insecticides has appeared in some locations which will require intensive study and change to Propoxur or some other carbamate insecticide.

iv. Falciparum malaria infections, which has more serious clinical manifestations than other forms of malaria, are being detected and the incidence is now about 11% of the total cases reported.

v. Operational Problems related to inadequate spray coverage due to the lack of resources require detailed study and concerted action if the disease is to be controlled at a satisfactory level.

b. Malaria Program Accomplishment

i. Achievements in malaria reduction from, 1950's and 1960's by the Division of Malaria have been impressive as mortality from malaria has almost dissapeared during the program's activities in spray operation and drug distribution.

ii. In-depth knowledge of malarious areas has been accumulated through many years of investigations and anti-malaria work by the Division of Malaria

iii. Malaria Control Program methodologies which can be applied in the country have been developed and are being implemented.

iv. Experienced staff members are present at all levels and represents a nuclei for further development of the program. However, there are program needs for an epidemiologist as well as engineering skills for a source reduction program.

289

v. Planning to meet training needs is being given major attention. Many of the staff have been given training in the new malaria control methodologies, but more needs to be done in both basic and refresher training.

vi. Commitment to reducing spray coverage through expanded epidemiologist analysis and alternative interventions has been demonstrated and will be further supported by this project. The new epidemiological stratification process is becoming established and is working well.

vii. Research has helped identify problem areas requiring further investigation. Research will continue as a priority in the program.

2. Project Purpose and Sub-Purpose of the Malaria Control Component.

The purpose to which the malaria componment contributes is to increase existing levels of primary health care service by meeting short term needs of the MSPAS for essential goods and support services, especially malaria control, through support of a responsive, efficient and effective nationwide malaria control program. The sub-purpose of the project is to assist the Government of El Salvador to contain or further reduce the incidence of malaria. Measures of purpose achievement by the end of the project incude the following:

a) An annual parasite incidence which does not exceed that of the 1980-1982 period.

b) P. falciparum represents less than 10% of all cases of malaria and is being further reduced on a progressive basis.

c) The number of blood smear slides collected through passive case detection by the Voluntary Collaborators continues to increase during 1984-1985.

d) House spraying coverage exceed 90% of the planned numbe of houses to be sprayed each cycle.

Important assumption for achieving the project goal and purpose of the malaria control component are that the GOES will accord priority to malaria control activities by providing adequate budgetary support to the program, and that chloroquine resistance and resistance to available insecticides do not develop during the life of the project.

3. End-of-Project Status

Specified output indicators for the End-of Project Status (EOPS) by Fiscal Year are presented below:

290

		1984	1985
a.	Spray Operation		
	Spray Operations should cover at least 90% of the planned number of houses to be sprayed each year.	90%	90%
b.	Surveillance		
i.	Passive Case Detection (PCD) PCD blood slide collection from health institutions should reach 10% of the total number of slides collected by 1985.	5%	10%
ii.	Surveillance Case Detection (a) blood slide collection should exceed 10% of the number in the population under protection.(AVER of 10% or more).	1984 10%	1985 10%
	(b) the average time lag from slide collection to radical treatment of a positive case should be 7 days or less.	days 7	days 7
iii.	Laboratory Service The error rate in laboratory examination should not exceed 0.1%	0.1%	0.1%
c.	Transport		
	The percentage of the total vehicular fleet (including condemned, non-repairable vehicles) which is off-the-road at any time should not exceed 10% by the end of the project if support services and condemnation actions by the MSPAS Maintenance Department are properly carried out.	15%	10%

291

d. **Planning**

i.	Annual plan of action prepared/submitted.	1	1
ii.	Annual plan for insecticide safety measures to be taken is prepared.	1	1

e. **Evaluation**

Program wide evaluations conducted with GOES/AID/PAHO other Donor participation.		1

4. **Technical Analysis**

a) **Spraying Operations**

Residual insecticides will continue to be used in all field operations during the 1984 - 1985 period. The demarcation and scheduling of the spray operations are the responsibility of the Operational Areas (Polos) in consultation with the National Division of Malaria. Field operations are staffed, financed and implemented by the Division of Malaria. The 1982 spray program was based on epidemiologic selection of high malaria incidence areas and not on a total coverage basis as was done in the past. Selection of areas for pray protection was related to case rates, receptivity and historial patterns of malaria incidence. The use of selected spraying techniques based on epidemiologic criteria will be incorporated in all future anti-malaria efforts. The lack of insecticides in 1983 is seriously hindering operational progress.

Insecticides are applied in one or more rounds of coverage depending on the malaria situation. Propoxur and possibly fenitrothion will be used during the project period unless the mosquito vector becomes totally refractory to these insecticides as shown by entomological studies. It is estimated that approximately 40% of the total malaria area still requires some level of residual spray protection during the course of the program. Focal spraying will be carried out as required around known foci of detected malaria. The Division of Malaria has identified that 85% of the cases in the country come from 22.9% of the area containing 26% of the population. It is to this population that major efforts will b made to control malaria during the project period.

This stratification process is the epidemiological basis for the spray operation program. There has been established six operational areas (Polos Operacionales) in accordance with epidemiological priorities. Epidemiological data are reviewed and analyzed every week and necessary actions are taken in accordance with the situation found following standards set by the Division of Malaria. Each operational area has been equipped with a diagnostic laboratory aimed at radical treatment within 72 hours after a positive blood smear has been detected.

Resources required to support the spraying operation, including equipment, staff and operating costs are based in accordance with each Polo's annual projections. However, epidemiological analysis must be expanded and improved in order to direct house spraying and other malaria control interventions on a more selective basis than is currently the case in order to conserve insecticides, reduce other operating costs and lessen the danger of developing insecticide resistance of the mosquito vector. More intensive control coverage will be required in certain areas in the coastal portion of the country. In 1982, actual spray coverage as a percent of planned target houses was approximately 27%. The shortfalls were attributed to lack of insecticides to carry out a proper field program.

It is estimated that during the remaining portion of 1983, depending on ecological conditions and vector resistance, approximately 30,000 kgs. of insecticide will be needed for selective residual spraying of priority areas. These estimates are based on the standard dosages for Propoxur. At present, the Division of Malaria does not have sufficient insecticide in-country or in the pipeline for the 1983 spraying season. The GOES is proposing to procure insecticides from the USAID Loan support to cover the CY 1983/1984 needs. This project is specifically designed to increase spray coverage and to provide necessary insecticides to protect the first priority areas.

b) Surveillance

Malaria incidence surveillance, upon which efficient residual insecticide spraying, larviciding, spot applications and drug treatment are planned, depends on active case detection (ACD), passive case detection (PCD) and periodic mass blood surveys. In El Salvador, the voluntary collaborator system is well established in a network of some 2700 people and 75%-80% of all slides taken are from this source. It is important to increase the role of health institutions in taking blood slides. In order for these voluntary collaborators to function properly, a supply of anti-malarials must be available to them. At the present time, it is estimated that only six weeks supply of anti-malaria drugs exist in the country and a re-supply is urgently needed. This project provides funding for such drugs on an emergency basis.

The training, motivation and supervision required to carry out an effective surveillance and disease control operation are formidable. Despite Ministry of Health (MSPAS) instructions for increased participation of health offices in the malaria program, training courses for medical and public health workers, their participation has been less than satisfactory.

c) Research

There are no operational research components in this project but the Division of Malaria will be actively improving epidemiological techniques for case detection; entomological studies on vector resistance to insecticides; monitoring of malaria parasite

resistance to drug treatment (chloroquine resistance), especially P.falciparum; biological control methodologies and, innovative approaches for obtaining public cooperation in the program.

In the event that vectors become operationally resistant to Propoxur, other insecticides will be tested under field conditions at several locations in the country. Research findings will have a direct bearing on future insecticide procurement and in the selection of operational methodology.

d) Health Education

Health education designed to increase the understanding, cooperation and participation of the people in the program at the community level is as important as the technical operations of vector control, case finding and treatment. Because it is relatively difficult to achieve results in this area, health education is often neglected in malaria programs. The Malaria Division recognized the importance of health education and is attemping to strengthen that component of the program.

The Malaria Division has utilized leaflets and posters, newspapers articles and direct contact by malaria field workers to communicate program objectives, procedures and schedules to the community. The Division feels that these efforts have succeeded in increasing public understanding of the program.

The Malaria Division has been handicapped by a shortage of trained health educators assigned to the program. Progress in reducing malaria, maintaining low levels, and finally eliminating malaria as a public health problem will require a greater health education effort than when the disease was more prevalent.

e) Training

There is a pressing need for more basic training in malaria control as well as refresher training. However, this project is not designed to assist in these needs. The project will assist in the training of Malaria Division personnel in the operation of U.L.V., dusting and larviciding equipment.

f) Biological Control

Continued reliance on large-scale use of insecticides possess a number of problems, including vector resistance to insecticides, general environmental hazards, and high program operating costs, especially given the high cost of insecticides and the drain they represent on scarce foreign exchange. In the long run, El Salvador must develop alternatives to residual insecticide spraying for use as part of its malaria control strategy.

Biological control measures hold some promise as alternative control interventions. The use of larivorous fish has been investigated in the mid-1970's but proved to be inpractical under El Salvador conditions at that time.

294

g) Insecticide Handling Procedures

Strict safety precautions are required for organophosphorous and carbamate compounds (fanitrothion and propoxur). Workers must be specially trained and supervised on the proper safety procedures. Continuous follow-up and supervision of spraymen are critical.

During the last five years the Malaria Division has greatly increased its training and supervision in the safe handling and storing organophosphorous (OP) and carbamate compounds. Protective equipment such as gloves, head gear, boots and uniforms are provided to all spraymen. Intensive safety training is provided to national supervisors. Laboratory personnel are trained in the colorimetric test for cholinesterase levels in spraymen and field supervisors. Emphasis is placed on the procedures used in safely applying insecticides at the village level to ensure that field personnel and villagers are not subjected to any undue health hazard.

AID has determined that the GOES understands and follows proper and safe pesticide management practices from the initial formulation process to its application in villages and can be expected to continue to do so during the project period. The assignment of an experienced malaria control officer in the first year will assure that US-source insecticides are being used safely.

h. Environmental Analysis

An Initial Environmental Examination (IEE) is provided as Annex I. The insecticides to be used in the El Salvador Malaria Control Program are those commonly used in other malaria programs around the world. Numerous environmental studies and assessments have already been undertaken for these organophosphorous and carbamate insecticides, and all have concluded that these compounds have a favorable risk-benefit impact on the environment when proper precautions are being observed and adequate training has been given to field personnel. The proposed source reduction study outlined in the Project Paper is a continuation of long term efforts made by the GOES in the past. Such efforts should improve the environment. In view of previous environmental studies and the fact that El Salvador has not experienced any major health problems over the last five years in its malaria spray operations due to the safeguards built into the program such as protective clothing, frequent testing of cholinesterase levels in personnel, adequate supervision, regular and refresher training, and proper storage and distribution practices, the Mission has concluded that no further environmental analysis is required and recommends a negative determination. If new chemical, biological, or physical malaria control methodologies are introduced into the program after the approval of this project, the environmental impact will be reviewed, and, if necessary, environmental studies or assessments will be carried out.

i) Women in Development

This project has both direct and indirect impact of the status of women. Direct benefits will accrue to female malaria and general health workers, researchers, health educators and volunteer collaborators, who will improve their knowledge and skills as a result of the technical assistance and training to be provided under this project. At present, approximately 8-10% of the Voluntary Collaborators in the villages are women. The Division of Malaria reported that women perform very well as volunteers collaborators as they are more available to the public. Indirect benefits resulting from program evaluation findings will permit all service providers, including female providers, to implement an effective malaria control program. Most importantly, the recipients of services of the project will include all females in the population who will benefit from reduced incidence of malaria in the population. The increased participation of females in surveillance activities as both recipients and providers of malaria control services, is an output of this project.

5. Long-Term Sustainability and Impact

If successfully executed, the project will have assisted the GOES to move forward in its transition from a program emphasizing total coverage house-spraying to an integrated program utilizing a selective mix of vector control measures and a better balance between active and passive case detection and treatment methods. Progressive reduction of malaria transmission by vector control and radical drug treatment for humans will reduce the geographical area to be actively controlled, thereby reducing the administrative and financial costs of the program. Successful execution will depend on a number of key variables, including vector resistance to the insecticides used, epidemiologically accurate direction of spray operations, cooperation and participation of the general public and general health service staff, continued reduction in the incidence of P. falciparum malaria, and expanded use of feasible alternative control measures.

6. Summary

The malaria control component of this project is judged to be technically feasible and sound. The project design provides appropriate and sufficient technical assistance. The commodity, technical assistance and training components will assist the GSL to implement an effective and technically sound program of malaria control.

C. Project Sub-Component Description - Malaria Control

1. Outputs

The project sub-purpose will be achieved by: (A) supporting and increasing the capability of the national and operational areas services to effectively control malaria; and, (B) assisting the Division of Malaria to move more rapidly to a program emphasizing a more integrated program utilizing a selective mix of vector control methods and a better balance between active and passive case detection and treatment methods. The project is expected to produce the following outputs which together should achieve the project purpose.

a) Annual house-spraying programs are targeted specifically to moderate or highly endemic areas based on refined epidemiological analysis and careful stratification.

b) Senior and mid-level health personnel at health institutions undertake surveillance as a regular part of their duties, including taking blood smears and administering appropriate drug treatment.

c) Criteria for selection of appropriate insecticides (Propoxur, fenitrothion or other insecticides) are developed and are applied in the program.

d) Appropriate and effective biological control methods have been identified from field trials and are implemented where it is appropriate.

e) Division of Malaria's training programs meet the priority needs of the GOES's malaria control program.

f) Health Education activities have expanded and increased social acceptance of house spraying and surveillance activities.

g) A detailed Plan of Action for 1984 and 1985 for malaria control covering the period of the AID project is prepared and adopted by the GOES and PAHO.

2. Project Components

The Malaria Control component of the Project consists of three elements: (1) Technical Assistance; (2) Training and; (3) Commodity Support.

1. Technical Assistance

In order to effectively control malaria, the GOES Malaria Control effort will require intensive surveillance and possible modifications in program strategy and activities over the life of the project to respond to a changing vector-human-insecticide environment

The program plans to provide the following technical assistance:

a) Malaria Control Officer - 7 month (local hire contract)

This officer will be primarily responsible for monitoring the U.S. commodity input in the field to insure that the GOES is carrying proper health safeguards in its spraying operation to protect the environment, malaria personnel and the public. (A scope of work is included in this report).

b) Mosquito Control Specialist - 2 weeks, (US source)

The specialist will be responsible for training malaria personnel in the operation, calibration and maintenance of the US supplied ULV, dusting equipment. (Scope of work is included in this report).

c) Source Reduction Specialist - 4 months, (US source)

In an effort to increase alternative malaria control methodologies within the country in order to reduce the quantity of residual insecticides required, it is planned to provide TA service to plan a source reduction program especially along the coastal areas where malaria is highly endemic. This TA is planned to provide one month of planning a program development followed by two-six week TDY services to carry out actual field demonstrations as well as initiate programs. (Scope of work is included in this report).

Technical assistance will be aimed at (1) program monitoring (2) increasing alternative control methodologies and (3) training of personnel in operating and maintaining the U.S. - supplied equipment. In addition, one short-term expert consultant will be provided each year for up to one month to participate as a member of the External Review Team with Representatives of the GOES, AID and the PAHO to conduct an annual evaluation of the program. During each year of the project, up to one person-month of assistance will also be available from a AID/Washington direct-hire/consultant malaria field operations of a selective basis and review the GOES's plans of action as required by USAID/San Salvador.

2. Training

There will be limited training in this project component and all training provided will be in-country. The two week training in operation and maintenance of ULV, fogging and dusting equipment will be done through a short term consultant. It is expected approximately 25 people will under-go training on this equipment. Limited training services will also be provided to the Division of Malaria to plan and present training on health safeguards in the application of insecticides. Approximately 200 spray personnel will benefit by this training.

295

3. Commodity Support

a) Insecticides

The Anti-Malaria activities in El Salvador, as in many other countries, is largely dependent on residual insecticide house-spraying to interrupt malaria transmission. In some rural areas in particular, no other suitable mechanism currently exists which can provide comprehensive protective coverage of the population. Widespread vector resistance has developed to DDT, the internationally recognized insecticide of first choice, as well as malathion. Resistance to other organophosphorous (OP) compounds is, therefore, indicated and requires careful study.

The amount and type of insecticides required is determined by the MCP/GOES on the basis of an analysis of extensive field data collected by means of geographical reconnissance (GR) of operational areas which is then related to epidemiological findings. This information includes the area of sprayable interior surfaces as well as the number of houses and occupants as well as malaria case rates. Under the present selective spraying approach, only areas in the first priority areas are targeted for spraying. Once the areas are identified and the most effective insecticide to be used in each operational spraying area is chosen, the amounts of insecticide required are computed in accordance with standard dosages and the extent of sprayable surface. Unfortunately, due to a lack of funding for external source commodities, the Malaria Program has had to limit its program to cover only up to 27% of the first priority area in 1982/83. The Malaria Division estimates that in any given year, depending on ecological conditions and vector resistance, between 30 and 60 metric tons of residual insecticides will be needed for selective spraying.

In addition, there is a requirement for larviciding materials and the compound, Abate, is the one of choice. It is formulated in both 1% granules and Emulsifiable Concentrate (EC). The project plans to procure approximately 15,000 kgs. of granules and 1,500 Gl. of EC in the year one period.

b) Anti-Malaria Drugs

There is, at present, a severe shortage of anti-malaria drugs in the country and the project plans to procure approximately 5.0 million tablets to provide immediate relief over the next six months. At present, there is no indication of chloroquine resistant parasites in the country.

c) Equipment

To provide focal relief from malaria the project will be procuring 5-truck mounted, ULV machines and the pick-ups to carry them to remote areas. In addition, 5 small fogging units as well as 100 Hudson three gallon spray pumps along with auxiliary equipment and limited sprayer spare parts will be provided under the project.

299

To improve the surveillance and to shorten the time lags between taking a slide and treatment, 10 additional microscopes are being scheduled for purchase under loan during each year.

There is no construction, remodeling or up-grading of existing malaria offices planned.

D. Project Sub-Components - Malaria Control Budget

ITEM	YEAR I	YEAR II	TOTAL ($)
1. Technical Assistance			
a. Long term	-	-	-
b. Short term			
1. Malaria Officer (LH)*	28,000	-	28,000
2. Malaria Specialist (US)	5,500	-	5,500
3. Source Reduction (US)	27,500	16,500	44,000
4. Evaluation (US)	-	5,500	5,500
* includes salary, allowances travel	Sub-total		$83,000
2. Commodities			
a. Insecticides			
1. Abate, 1% granules, (15,000 Kg.)	16,500	16,500	33,000
2. Abate, 44%, 500" (1500 gal.)	110,000	110,000	220,000
3. Propoxur, 50%, wdp. (30 metric ton/yr.)	360,000	360,000	720,000
	Sub-total (A)		$973,000
b. Anti-Malaria Drugs			
1. Chloroquin Diphosphate (150 mg.) plus Primaquin (15 mg.) tablets/1,000 tabs. (Amodiaquin)	75,000	75,000	150,000
2. Cloroquin Diphosphate ((75 mg. base) plus Primaquine (7.5 mg. base) for children 1000 tabs. (Amodiaquin)	10,000	10,000	20,000
3. Primaquine (15 mg. base) per 1,000 tabs.	11,000	11,000	22,000

4. Primaquine (5mg. base), 100 tabs.	7,000	7,000	14,000
5. Chloroquin Diphosphate (150 mg. base) 1000 tabs/btl. (aralen, Avloclor)	24,000	24,000	48,000
	127,000	127,000	
	Sub-total (b)		$254,000
c. Spray Equipment			
1. U.L.V. Sprayer truck mounted, Leco model H.D. Series D, 7000-12 or equivalent.	22,500	-	22,500
2. Fog Unit Dyna fog model D-H 90 or equivalent	3,000	-	3,000
3. Spray Pumps, 3 gal Hudson No.67ewwA without pressure gauge,	7,000	7,000	14,000
4. Dusting Sprayers With ULV larviciding attachments	15,000	-	15,000
5. Nozzle tips For Hudson, 3 gal. sprayer HSS-8002E Tee-jet. ($2.40 ea)	4,800	4,800	9,600
6. Nozzle tips for Hudson, 3 gal. sprayer Cone jet	4,800	4,800	9,600
	Sub-total (C)		73,700

d. Vehicles			
1. Pick-up, 4wd., 3/4 ton, 6-ply tires with tubes	57,500	-	57,500
2. Vehicle tires	12,500	15,000	27,500
	Sub-total (D)		$85,000
e. Scientific Supplies			
1. Microscopes Bi-nocular, lenses 10X, 100X, oil immersi (American Spencer or equivalent) with light source (10 per year)	15,400	15,400	30,800
f. Entomological Supplies	-	8,000	8,000
	Sub-total (E)		$38,800

3. Total Budgets

1. Technical Assistance	61,000	22,000	83,000
2. Commodities			
Sub-total (A)	486,500	486,500	973,000
Sub-total (B)	127,000	127,000	254,000
Sub-total (C)	57,100	16,600	73,700
Sub-total (D)	70,000	15,000	85,000
Sub-total (E)	15,400	23,400	38,800
	$756,000	$668,500	$1,424,500
3. TOTALS	$817,000	$690,500	$1,507,500

NOTE:

1. On the order for the Abate, Propoxur, 50%, wdp and anti-malaria drugs the PIO/C should state "funds controlling" in order to protect the authorized amount on the order.

2. All malaria vehicles (5) to be standardized with total project order for vehicles.

3. Approximately one-half of the anti-malaria drug order for chloroquine (150 mg.) should be shipped by air.

4. Specifications (as available) are included in Annex.

E. Implementation Plan

1. Implementation Schedule

Project activities are programmed to occur over a two year period from the date of signing the Loan Agreement. The Project Assistance Completion Date (PACD) is September 30, 1985. The proposed implementation schedule is as follows:

a) Commodities

Upon signing of the Loan Agreement and completion of the required Conditions Precedent and Covenants, procurement will be initiated for 30 metric tons of Propoxur, 50%, wdp; anti-malaria drugs, Abate larvicides, vehicles, spraying equipment and microscopes for use in the 1984 operational season. The GOES will submit to A.I.D. by October 1, 1983, a plan detailing the safety measures to be used in the application of the insecticides. The insecticides must arrive in El Salvador no later then December 1, 1983 to allow sufficient time for off-loading and inland transportation of the supplies and equipment to the Operational Areas (Polos). The timetable for the procurement is scheduled for two phases for the operational calendar years of 1984 and 1985.

Year I - July 1, 1983 - June 30, 1984

By August 1, 1983 commodities orders will be placed for the procurement of insecticides and supplies required for the 1984 spray season. This procurement will be organized and implemented through existing General Service Administration (GSA) contracts for anti-malaria drugs, insecticides and equipment as well as through the IFB process of SER/COM in AID/W. Negotiated procurement of several specific items such as insecticide is envisaged. All awards under the bidding process should be complete by September 15 and contracts finalized.

Insecticides and other supplies/equipment are to arrive by December 1, 1983 for the first year's plan.

Year II - July 1, 1984 - June 30, 1985

The second year's procurement will be initiated in (June/July, 1984 and be limited to additional insecticides, anti-malaria drugs, entomological field supplies and additional parts for sprayers. All items procured are to arrive in-country by November 1, 1984 for use in the 1985 operational year.

b) Technical Assistance (TA)

1) The recruitment of a short term USAID Malaria Control Officer for monitoriong and procurement functions will begin in the September/October period of 1983. This contract, local-hire employee will be scheduled to report for duty with A.I.D. on December 15, 1983. This contractor will be available for A.I.D. monitoring until July 15, 1984 or for approximately 7 months service. (Scope of work attached).

304

2) It is proposed to have four months of technical assistance from a Source Reduction Specialist during the period of the project. This TA will be broken up into three phases. The first phase of one month will be initiated in January 1984 for evaluation, survey and planning for an increased source reduction effort in malaria control in El Salvador. Upon acceptance of the consultant report by the GOES/Malaria Division, there will be two-six week visits by the same consultant. One visit will be in May/June of 1984 and the other in March/April of 1985. (See scope of work attached to the report).

3) A short term consultant on the operation, maintenance, calibration and control procedures of the ULV, dusting and fogging equipment supplied by A.I.D. under the project is proposed for a period of two weeks in early 1984. (See scope of work attached).

4) It is planned to have a two week TDY each year in 1984 and 1985 for technical consultation on the monitoring of the project, supervision of the work activity of the contract AID monitor and consultants, procurement matters and future planning. This consultation assistance will be available through the Office of Health, Science and Technology and/or Office of Health, LAC Bureau. The funding and timing of this assistance will be the responsibility of USAID/El Salvador.

5) The project proposes one month of technical assistance over the life of the project for project evaluation purposes. The mid-term evaluation is scheduled for January, 1985 and will be made in coordination with the GOES/ Malaria Division and the Pan American Health Organization (PAHO). The funding of the U.S. consultant in this evaluation is to be project-supported.

A Plan of Action will be prepared by the GOES/Malaria Division for the 1984 operational program and submitted to A.I.D by December 5, 1983 which outlines the malaria programs activities for CY 1984 by operational area both for spray operations and surveillance. A similar plan of action is to be provided to A.I.D. for the operational year 1985 by December 1, 1984. An External Program Review (ERT) will be scheduled for the last two weeks of January in 1985 to evaluate the program performance and will include representatives of the GOES, USAID, AID/Washington and PAHO. The final program review will be scheduled by USAID/El Salvador after the PACD date.

2 Administrative and Monitoring Arrangements

A. AID Responsibilities

The USAID/El Salvador, Office of Human Resources and Humanitarian Affairs (HR/HA) will assume over-all responsibility for managing the project. This office, which is current by staffed by two USDH and four Salvadoran professionals, will be expanded by the addition of one local hire short term contract professional in FY 1984.

The Office of Capital Development will assist the HR/HA Office in all contracting and procurement actions under the project. The Regional Legal Advisor will also be available for contract negotiations and document review.

These staff resources are considered adequate tohandle USAID/El Salvador administrative and monitoring responsibilities for the project.

B. GOES Responsabilities

The Malaria Division is a direct line office within Ministry of Public Health and Social Assistance (MSPAS) and will be the implementing agency for all the malaria components of this project.

The Malaria Division will be responsible for:

1) Furnishing to A.I.D. requests for procurement of commodities and technical assistance;

2) Ensuring that counterparts are in place for all technical assistance provided under this project;

3) Arranging for and participating in scheduled program evaluations;

4) Preparing annual Plans of Action for 1984 and 1985 including a plan for safe application and training in the use of US-supplied insecticides.

3. Procurement Plan

A. Technical Assistance (TA)

The malaria component of this project will finance 12.5 person months of short term technical assistance (TA). This TA is scheduled as follows:

7 person months for operational monitoring
4 person months for source reduction
1 person month for evaluation purpose
2 person weeks for ULV equipment training

All TA will be arranged by the Mission in accordance with A.I.D. procedures.

In addition, to the project-financed TA, and AID/W source malaria consultant will provide up to two weeks each year of assistance in each of 1984 and 1985. PAHO will be providing one professional malaria advisor on a full time basis and a part-time epidemiologist to the GOES Malaria Division over the life of the project.

B. Commodities

Insecticides constitute a major category of commodities to be procured under the project. Other donors including PAHO, Government of Japan and the Government of West Germany have assisted in furnishing commodities to the program. All AID-source commodities procured under this component of the project will have their source in the United States or El Salvador.

To ensure the the insecticides and other supplies are procured in a timely manner, the Mission will take responsibility for procurement with the assistance of a SERCOM, AID/W. All procurement will be made in accordance with A.I.D. policies and procedures.

C. Evaluation Plan

The mid-term evaluation will take place during the last two weeks in January, 1985 to review the accomplishments and program operations for 1984. The final evaluation will be scheduled by the Mission after the PACD. The evaluation will be made with GOES,AID/W, USAID and PAHO representatives.

In addition to measuring progress achieved against the specific yearly output indicators for the project, the mid-term and final evaluations will assess and provide recommendations on the following aspects of the National Malaria Program.

a) Staffing and administrative procedures at National and Operational Areas (Polos);

b) Quality and quantity of labortory services;

c) Volunteer collaborator program;

d) Condition and maintenance of vehicles, motorcycles and spray equipment.

e) Epidemiological quality in the stratification process including surveillance, passive and active case detection, health institution participation, drug treatment, follow-up, etc.

f) Utilization of insecticides and anti-malaria drugs including logistic and supply procedures;

g) Spray and larviciding operations, including coverage and efficiency;

h) Entomological studies and resistance problems;

i) Training;

j) Health education and community participation;

k) Insecticide handling and safety measures.

The evaluation will be conducted in the basis of field trips, interviews with personnel at various levels, administrative and technical reports, PAHO reports both within El Salvador and at the WHO, Regional Office and documents in the USAID Office.

4. Project Rationale

Given the nature of malaria with its capacity for resurgence, the ability of vectors to develop resistance and the likelihood of re-infection from neighboring countries, control of malaria is essential for the orderly social and economic development of the country. The tremendous problems and significant cost in human suffering and economic loss with not controlling malaria alone provides sufficient justification for this component of the project. In addition, malaria control is important in all sectors of A.I.D.'s development efforts in El Salvador since such success relies on a healthy, productive labor force.

In addition to meeting the urgent requirements for insecticides, anti-malaria drugs and equipment which the country is in dire need, the project is designed to support the GOES in its efforts to reduce recurrent and foreign exchange costs by:

A. Through the use of alternative malaria control methodology such as source reduction, reduce the geographic area that must be actively control by insecticides which in turn will reduce foreign exchange costs; and

B. Support a comprehensive study of the epidemiological situation in order that a rational long term plan can be developed rather than the ad-hoc planning and program operation which is now occurring.

This project component is entirely consistant with the agreed upon strategy and objectives of the present economic assistance program to El Salvador.

F. Conditions Precedent, Covenants, Special Conditions

1. Conditions Precedent to the Procurement of Insecticides for FY 1985

Prior to the disbursement under this project or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made for FY 1985, the GOES through its Division of Malaria, MSPAS, shall furnish to A.I.D. in form and substance satisfactory to A.I.D. that insecticides procured by A.I.D. for the preceding years program have been effectively utilized for the program and that the request for FY 1985 insecticides have been determined on a scientific basis providing specifications and amounts of the insecticide required.

2. Covenants

1. The GOES, through the Division of Malaria, shall prepare by December 5 of FY 1984 and FY 1985 and provide copies to A.I.D., an annual plan detailing safety measures and procedures to be followed in the application of all insecticides used in the program.

2. The GOES shall take appropriate safety measures for the use of insecticides furnished under this project, including the provision of safety equipment to insecticide handlers and training of spray personnel engaged in actual application or field supervision. The GOES shall also maintain rigid control over the quality of the insecticides procured for the program to ensure that they meet WHO and A.I.D. technical specification.

Recommendation

If the A.I.D. is to continue its support to malaria control efforts in the country, that assistance should be based on a Plan of Operation which has been approved by the GOES and PAHO.

3. Resources - budget and manpower

The Division of Malaria has stated that it is unable to even cover its first priority areas in the present program with necessary insecticide interventions. The program, at present, is operated on a year-by-year ad-hoc arrangement which is not conducive to either maintaining gains achieved or to reducing malaria as a public health problem in the long term.

Recommendation

If the A.I.D. is to consider further assistance to the malaria effort in El Salvador, the present project period could be used as a planning and development period to prepare for a meaningful operational program in the period of 1985-1990.

G. Recommendations for Project Follow-Up

1. Policy Dialogue

There is no question that malaria will remain a priority disease problem in the foreseable future in El Salvador. The Division of Malaria has shown itself to be more innovative in attempting new alternatives to malaria control than many other countries in the Latin American Region. The provision of commodities in this project is only a stop-gap effort and, while these commodities are exceedingly important to prevent a serious malaria outbreak, they will be of limited value in the long term unless additional assistance is provided. The consequences of not providing assistance to the country's malaria effort will be a rapid reversion to high rates of malaria.

Recommendation

Over the next 18 month period an evaluation of the management and technical abilities of the Division of Malaria should be informally made by USAID to determine whether an increased rate of support over the five year period between FY 1985-FY 1990 would have major positive impact on the disease and on the development of the country. If such assistance would have such an effect, then joint negotiation could be initiated for this assistance and planning and program documents prepared.

2. Need for Institutionalization

There is a great need to institute a proper long term Plan of Operation for Malaria Control in El Salvador. This plan should describe clear cut objectives and targets for the program. The MSPAS in conjunction with the Ministries of Planning and Finance should approve this Plan of Operations, so the program has a firm long-term base to operate. At the present time, the Malaria Division does not have long or short term objectives in quantifiable terms.

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I. Annexes

1. List of Commodities and Specifications

SPECIFICATIONS FOR COMMODITIES FOR

MALARIA CONTROL COMPONENT

FIRST YEAR'S PIO/C

SUBJECT AREA	UNIT DESCRIPTION	COST/UNIT ($)	QUANTITY	TOTAL COST	SUGGESTED SOURCE
1. SPRAYING EQUIPMENT	a. ULV spray unit truck mounted with Briggs and Stratton 16 hp. LECO, model H-D Series D-7000-12 or equivalent	$4,500 ea.	5 each	$22,500	Lounder Engineering Co 125 Blanchard St. Baldosta, GA 31601 U. S. A.
	b. Spray Pumps, 3 gal. capacity without pressure gauge. Hudson X-Pert Sprayer #67322 (Proprietary procurement as all such pumps in the El Salvador Malaria Program are of this make.)	$70.00 ea.	100	$7,000	H. D. Hudson 500 N. Michigan Chicago, Ill. 60611
	c. Nozzle tips, for Hudson X-Pert, 3 gal. sprayer. HSS-8002E Tee-jet	$2.40 ea.	2000	$4,800	H.D. Hudson
	d. Nozzle tips, for Hudson X-Pert Sprayer. Cone-Jet for larviciding	$2.40 ea.	2000	$4,800	Spraying Systems

MALARIA CONTROL COMPONENT

SUBJECT AREA	UNIT DESCRIPTION	COST/UNIT ($)	QUANTITY	TOTAL COST	SUGGESTED SOURCE
1. Spraying Equipment (continued)	e. Fogging Unit, model D-H-90 52 3/4 inches long 13 1/4 inches high 9 5/8 inches wide with 1/2 gallon gas tank and an insecticide tank of one (1) gallon to produce dropplet size- 5-50 microns. or equivalent model	$600.00 ea.	5 ea.	$3,000	Dyna-Fog Company or Micro-Gen in Texas
	f. Dusting, U.L.V. and larviciding sprayer, back pack, with 2 cycle engine	$500.00	30 ea.	$15,000	H.D. Hudson Chicago, Ill.
1. ANTI-MALARIA DRUGS	a. Chloroquin Diphosphate (150 mg.base) plus Primaquine (15 mg.) tablets (Amodiaquin). Bottles of 1000 tabs.	$25.00/btl.	3000 btls.	$75,000	General Service Administration (GSA)
	b. Chloroquin Diphosphate (75 mg. base) plus Primaquin (7.5 mg base) tablets. Bottle of 1000 tabs. each.	$33.33/btl.	300 btls.	$10,000	G S A
	c. Primaquine (15 mg. base) bottles of 1000 (for malaria treatment)	$15.70/btl.	700 btls.	$11,000	G S A

MALARIA CONTROL COMPONENT

SUBJECT AREA	UNIT DESCRIPTION	COST/UNIT ($)	QUANTITY	TOTAL COST	SUGGESTED SOURCE
2. Anti-Malaria Drugs	d. Primaquine (5 mg. base) bottles of 1000 tabs. (for malaria treatment)	$23.30/btl.	300 btls.	$7,000	G S A
(continued)	e. Chloroquin Diphosphate, (150 mg.base) 1000 tabs per bottle. (for malaria treatment) Trade names - Aralen, Avloclor	$24.00/btl.	1000 btls.	$24,000	G S A
3. INSECTICIDE NOTE P10/C to state "funds controlling" on all insecticide procurement.	a. Abate (Temephos), 1% ganules for treating domestic water. 15 kg. units in cardboard drums.	$1.10/kg. (FOB Miami)	15,000 kg.	$16,500	American Cyanamid New Jersey
	b. Abate (Temephos), 44% E.C. For use in larviciding in surface water. In 5-gallon metal containers	$73.00/gallon (FOB Miami)	1500 gallons	$110,000	American Cyanamid New Jersey
	c. Propoxur (OMS-33), "Baygon" 50% water dispersible powder, prepared in plastic bags of 800 grms. each for a total of 30,000 kgs.	$12.00/kg.	30,000 kg.	$360,000	Mobay Chemical Co. Missouri
4. VEHICLES AND SPARE PARTS	a. Pick-up 3/4 ton, 6-Ply tires with tubes	$11,500 ea.	5 ea.	$57,500	American Motors (Standardize with the other vehicles in project)

MALARIA CONTROL COMPONENT

SUBJECT AREA	UNIT DESCRIPTION	COST/UNIT ($)	QUANTITY	TOTAL COST	SUGGESTED SOURCE
2. Anti-Malaria Drugs	d. Primaquine (5 mg. base) bottles of 1000 tabs. (for malaria treatment)	$23.30/btl.	300 btls.	$7,000	G S A
(continued)	e. Chloroquin Diphosphate, (150 mg.base) 1000 tabs per bottle. (for malaria treatment) Trade names - Aralen, Avloclor	$24.00/btl.	1000 btls.	$24,000	G S A
3. INSECTICIDE NOTE PIO/C to state "funds controlling" on all insecticide procurement.	a. Abate (Temephos), 1% ganules for treating domestic water. 15 kg. units in cardboard drums.	$1.10/kg. (FOB Miami)	15,000 kg.	$16,500	American Cyanamid New Jersey
	b. Abate (Temephos), 44% E.C. For use in larviciding in surface water. In 5-gallon metal containers	$73.00/gallon (FOB Miami)	1500 gallons	$110,000	American Cyanamid New Jersey
	c. Propoxur (OMS-33), "Baygon" 50% water dispersible powder, prepared in plastic bags of 800 grms. each for a total of 30,000 kgs.	$12.00/kg.	30,000 kg.	$360,000	Mobay Chemical Co. Missouri
4. VEHICLES AND SPARE PARTS	a. Pick-up 3/4 ton, 6-Ply tires with tubes	$11,500 ea.	5 ea.	$57,500	American Motors (Standardize with the other vehicles in project)

MALARIA CONTROL COMPONENT

SUBJECT AREA	UNIT DESCRIPTION	COST/UNIT ($)	QUANTITY	TOTAL COST	SUGGESTED SOURCE
4. VEHICLES and SPARE PARTS (continued)	b. Vehicle tires, tractor-type, 6-ply, steel-belted.				American Motors (standardize with other vehicles in project).
	700 x 16 (15 each)	$ 80 each	15	$ 1,200.00	
	735 x 14 (8 each)	$ 70 "	8	$ 560.00	
	750 x 15 (13 each)	$100 "	13	$ 1,300.00	
	700 x 15 (54 each)	$110 "	54	$ 5,900.00	
	750 x 10 (35 each)	$100 "	35	$ 3,500.00	
				$12,500.00	
5. SCIENTIFIC EQUIPMENT	a. Microscopes, bi-nocular with built-in light source 60 cyl x 110 lenses 10 and 100 x for oil immersion with carrying case, Similar to AO model 369-363, Series 150	$1,540 ea.	10	$15,400	American Optical or Bausch and Lomb

2. Scopes of Work for Technical Assistance

SCOPE OF WORK

1. Title of Position/Consultant - Source Reduction Specialist

A. Level of Consultant Grade - GS-14, GS-15

B. Source of Consultant - U.S.

2. Education, Experience and Previous Work Activities

A. Education

The Specialist mut possess a degree in engineering or entomology with special training in techniques of source reduction in mosquito abatament activities. Completion of a special course in malaria control or disease vector control is mandatory.

B. Experience

It is required that this consultant have no less than 5 years experience in mosquito control work either in the U.S. or in overseas areas. It is required that this work involve engineering solutions to mosquitos breeding problems including draining, filling, installation of drains, grading of surfaces and water management. It is essential that the specialist have at least short term experience with malaria control programs in an overseas environment.

C. Previous Work Activities

The specialist should have experience working in a local mosquito abatement district, a vector control program at State or Federal level, a international agency or with a private pest control operation engaged in mosquito related source reduction activities.

D. Language Requirement

The specialist must be fluent in Spanish to at least the FSI standard of S-2/R-2 level.

3. Duties and Work Tasks

A. During the initial visit to the country, the Specialist will be required to evaluate the present source reduction program of the Division of Malaria, make a rapid survey of the country to determine the major causes of mosquito breeding and which breeding sites can be eliminated through source reduction methodologies or water management methods and provide USAID/San Salvador with a report of the findings and recommendations. All activities of the Specialist are to be coordinated fully with the Division of Malaria. This activity is estimated to take one month.

B. Upon approval of the recommendations in the report by the GOES/Division of Malaria and with their concurrance and appointment of a counterpart to the consultant, the consultant will (1) begin a training and demonstration activity in one or more major mosquito breeding sites which have been determined to be receptive to this intervention; (2) initiate small scale source reduction activities and training in each of the Polos; and (3) prepare a simple field manual on source reduction and water management adapted to El Salvador's conditions.

This activity is expected to be phased into two consultant visits of six weeks each during 1984 and 1985 for a total of three months over the life of the Project.

4. Time required for Specialist/Consultant

It is estimated that four months of short term technical assistance will be required over the life of the project for this consultant. The time will be divided into three phases, (1) initial investigation one report; (2) establishment of pilot projects and training in source reduction and water management and (3) supervision of work in progress and preparation of a plan of action for the next three years.

SCOPE OF WORK

1. Title of Position/Consultant - Malaria Control Officer
A. Level of Consultant Grade - Local hire, senior grade
B. Source of Consultant - San Salvador

2. Education, Experience and Previous Work Activity

A. Education

This officer must possess at least a master's level degree in the biological or engineering sciences with a degree in medical entomology or parasitology preferred. Completion of a special course in Malaria Eradication or Malaria Control is mandatory. A specialized course in vector control techniques would be desirable. Must be fluent in both Spanish and English at the FSI S/3-R/3 level.

B. Experience

It is required that this specialist have no less than five years experience in mosquito control or malaria control work. It is also required that this specialist be familiar with the proper application and use of pesticides in a malaria control or mosquito control operation and be able to train personnel in these subjects with special emphasis on health safeguards.

C. Previous Work Activities

The officer should have worked at least three years in an international organization, U.S. Agency or a country program which has as its main activity the control of malaria or other vector-borne diseases.

3. Duties and Tasks

This officer acts as the part time USAID/San Salvador specialist in the malaria control activities for the Health Service Vitalization Project. The duties of this position are as follows:

A. Assists the USAID/San Salvador in all matters relating to the malaria control component of U.S. assistance including planning, operation, monitoring and evaluation. Maintains close contact with Malaria operations at the National Division of Malaria and Polo levels to identify and assist GOES and USAID authorities in solving any potential or existing technical or management problems connected to U.S. assistance efforts in malaria control. Prepares reports on these contacts and problems to A.I.D.

B. Monitors field operations where U.S. supplied commodities are being used to ensure that these commodities are (1) being used in a technically sound fashion (2); in accord with US-GOES agreements; (3) properly stored and controlled; and (4) in a safe manner which protects the health of malaria program personnel as well as villages populations. Makes actual site visits to spray operations and prepares a report on the findings of these visits.

C. Assists the GOES in the establishment of a viable training program for the safe use and application of U.S. supplied insecticides and participates in this training if requested by the GOES. Evaluation of the GOES training procedures for pesticide management and use will be expected at the completion of this assignment.

D. Assists the Office of Human Resources/Humanitarian Affairs of A.I.D. (HR/HA) in the development, preparation and follow-up of USAID procurement for the malaria control program. Assists in the end use audits of U.S. supplied commodities.

E. Assist the A.I.D. HR/HA office in planning future U.S. assistance in malaria control.

F. Acts as USAID Control Officer for short term consultants and US officers concerned with malaria control. Meets with representatives of International Agencies, private concerns and other donor nations.

G. Prepares reports and recommendations as directed on malaria control, vector control or public health activities.

H. Attends meetiongs and conferences as directed by the HR/HA office of AID.

I. Performs the duties as assigned.

4. Time Required for this Specialist

It is expected that this specialist will be locally contracted by the USAID/San Salvador for a period of seven months beginning o/a December 15, 1983 and terminating o/a July 15, 1983. If, at this time, there is to be a continuing interest on the part of USAID/San Salvador, then additional contract time may be required.

SCOPE OF WORK

1.	Title of Position/Consultant	- Mosquito Control Specialist
A.	Level of Consultant Grade	- GS-12, GS-13
B.	Source of Consultant	- U.S. - Mosquito Abatement District in California, Florida, Texas.
C.	Est.Time required	- two weeks

2. Education, Experience and Previous Work Activity.

A. Education

A degree in the Biological Sciences, Physical Sciences or Engineering is desirable but not mandatory. Special training in mosquito control using Cold Foggers (ULV), Thermal Foggers, dusters and mist applicators for adult and larva control is mandatory. Completion of a course on malaria control would be desirable.

B. Experience

This specialist must have minimum of five years experience in mosquito control of which at least two years must have been directly related to the application of insecticides through the use of ULV, fogging or misting ground equipment. Must be able to prepare and provide hands-on training in the proper use of ULV , fogging and dusting equipment.

C. Previous Work Experience

This specialist should have worked at least three years with a U.S. local, state or federal agency or international organization in a mosquito and other vector control program in a position which required actual application of insecticides by ground equipment and supervision of personnel carry out such tasks. Actual experience in the safe application of such insecticides as fenitrothion, Propoxur, Landrin, Abate, Dursban, Actellic, Bendiocarb using ground equipment is essential Work experience in an overseas area for a period of two years would be desirable. Experience in Latin America would be preferred.

3. Duties and Tasks

This specialist is primarily concerned with the short term training of host country nationals in the proper use and maintenance of Ultra Low Volume (U.L.V.), fogging and dusting equipment used in the National Malaria Control Program.

Duties include:

A. Short-term basic and refresher training of host country nationals who are assigned by the Division of Malaria to operate and maintain U.S.-supplied ground equipment used in the National Malaria Program for adult mosquito control and larviciding.

B. Demonstrates proper calibration techniques of such equipment and assures that trainees can accurately carry out such calibrations at the end of the training period. Presents a model reporting system which can be used in managing such application.

C. Presents proper field application techniques for concentrates, formulated insecticides, dusts, and larvicides using such equipment to a training group.

D. Coordinates training with the Division of Malaria and follows their suggestions on training schedules and sites.

E. Renews operation manuals with Division of Malaria operators to ensure their understanding of the instructions given in the manuals. Assists in preparing spanish versions of the manuals if necessary.

F. Prepares a brief report on the training provided, evaluation of the results and recommendations for USAID prior to departure from El Salvador.

G. Other duties as assigned in the final Scope of Work.

4. Time required for Specialist/Consultant

It is estimated that a period of two weeks will be required for this short term technical assistance activity. It will be necessary for the USAID/San Salvador to make arrangements for the training with the Division of Malaria prior to arrival of the consultants. It is foreseen that at least two or three training sessions of three days each at various locations will be necessary to carry out this work.

The specialist must be fluent in Spanish at the FSI S/3 - R/4 level.

3. Maps (Enclosures).

J. COUNTERPARTS

Dr.Jose Mario Vanaeveren
Malaria Division Director
Ministry of Health
San Salvador

K. LIST OF PERSONS CONTACTED

Dr.Jose Mario Vanaeveren
Malaria Division Director
Ministry of Health
San Salvador

Mr. Jesus Guevara Estrada
Chief Field Operations
Malaria Division
Ministry of Health
San Salvador

Mr. Salvador Aragon Melara
Administrative Officer
Malaria Division
Ministry of Health
San Salvador

Dr. Agustin Lago Arroyo
Epidemiologist
Pan American Health Organization
San Salvador

Mr. Orlando Lopez Ortiz
Technical Officer (Malaria)
Pan American Health Organization
San Salvador

Dr. Francisco Serrano
Director, Natural Resources Divisioin
Ministry of Agriculture
San Salvador

Lic. Jose Antonio Soto Gómez
Director Agricultural Economy Division
Ministry of Agriculture
San Salvador

Ing.Manuel Martinez
Pesticides Division
Bayer de El Salvador, S.A.
San Salvador.

L. GLOSSARY OF TERMS

Abate: An organophosphorous larvicide which may be applied in granular or concentrate form.

Active Case Detection is a part of surveillance activities in which malaria personnel actively search for malaria cases through the collection of blood slides and epidemiological investigations.

Annual Parasite Incidence is the proportion of cases of malaria detected on an annual basis in relation to the unit of population in which malaria occurs.

BHC is an abbreviation of the common name Benzene Hexachloride, a chlorinated hydrocarbon type of residual insecticide.

Biological Control is a method of controlling mosquitoes using living vertebrate or invertebrate predators, genetic control or parasites.

DDT is an abbreviation of the common name Dichlorodiphenyl Trichloroethane, a chlorinated hydrocarbon type of residual insecticide.

Epidemicity is a term applied to malaria when there is a constant measurable incidence in an area over a succession of years.

Epidemic is a term applied to malaria when the incidence of cases in an area rises rapidly and markedly above its usual level.

Epidemiology in a broad sense is the study of the environmental, personal and other factors that determine the incidence of disease.

Fenitrothion is an organophosphorous residual insecticide.

Focal Spraying is residual insecticide house spraying around a malaria focus.

Larvicide is a substance used to kill the aquatic larval stage of the malaria mosquito by ingestion, contact or respiratory blockage.

Malaria Control is an operation aimed at reducing the prevalence of malaria to a level at which it is no longer a major public health problem.

Malaria Control Program or Division of Malaria refers to the national malaria control efforts of the Government of El Salvador.

Malaria Eradication is the ending of the transmission of malaria and the elimination of the reservoir of infected cases in a time-limited compaing such that when it comes to an end, there is no resumption of transmission.

Malaria Focus is a defined and circumscribed locality situated in a currently or formerly malarious area and containing continuous or intermittent malaria transmission.

Malariogenic Potential is the degree to which an area is conducive to malaria based on cumulative epidemiological data collected from each area regarding the parasite load, vector density, water-logging, climatic conditions, population movement and other factors.

Malathion is an organophosphorous residual insecticide.

Malaria Parasite is a colloquial term for any of the protozoan organisms causing malaria infections.

Parasite Rate is the percentage of persons showing malaria parasites by blood smear examination.

Passive Case Detection is a part of the surveillance activities in which the public health and medical services other than the regularly constituted malaria service assist surveillance activities by the collection of blood slides from persons requesting treatment.

P. falciparum Malaria is a severe type of malaria caused by Plasmodium falciparum , a species of malaria parasite.

Presumptive Treatment is initial drug treatment given to an expected malaria case at the time when a blood sample is taken for examination.

Propoxur is a carbamate residual insecticide.

Residual Insecticide is an insecticide which when suitably applied on a surface, maintains for a considerable period of time its insecticidal activity for either contact or fumigant action.

Slide Positivity Rate is developed from the number of slides detected with malaria parasites over the total slides examined.

Surveillance is the part of a malaria program aimed at the discovery, investigation, and elimination of continuing transmission and prevention and cure of infections.

Total Spray Coverage is the application of residual insecticide during one spraying cycle to all sprayable surfaces in all sprayable houses within a given operational area.

Ultra Low Volume (ULV) Spraying is a method of insecticide dispersion by special air or ground equipment using very small amounts of finely dispersed particles of insecticides.

Vector in malaria is any species of mosquito in which the malaria parasite completes its sexual cicle and which is thus able to transmit the disease.

Vector Density is the number of female Anopheline mosquitoes in relation to the number of specified shelters or hosts or to a given time period, specifying the method of collection.

Vector Susceptibility represents the degree to which a species of mosquito has developed resistance to the effects of insecticides.

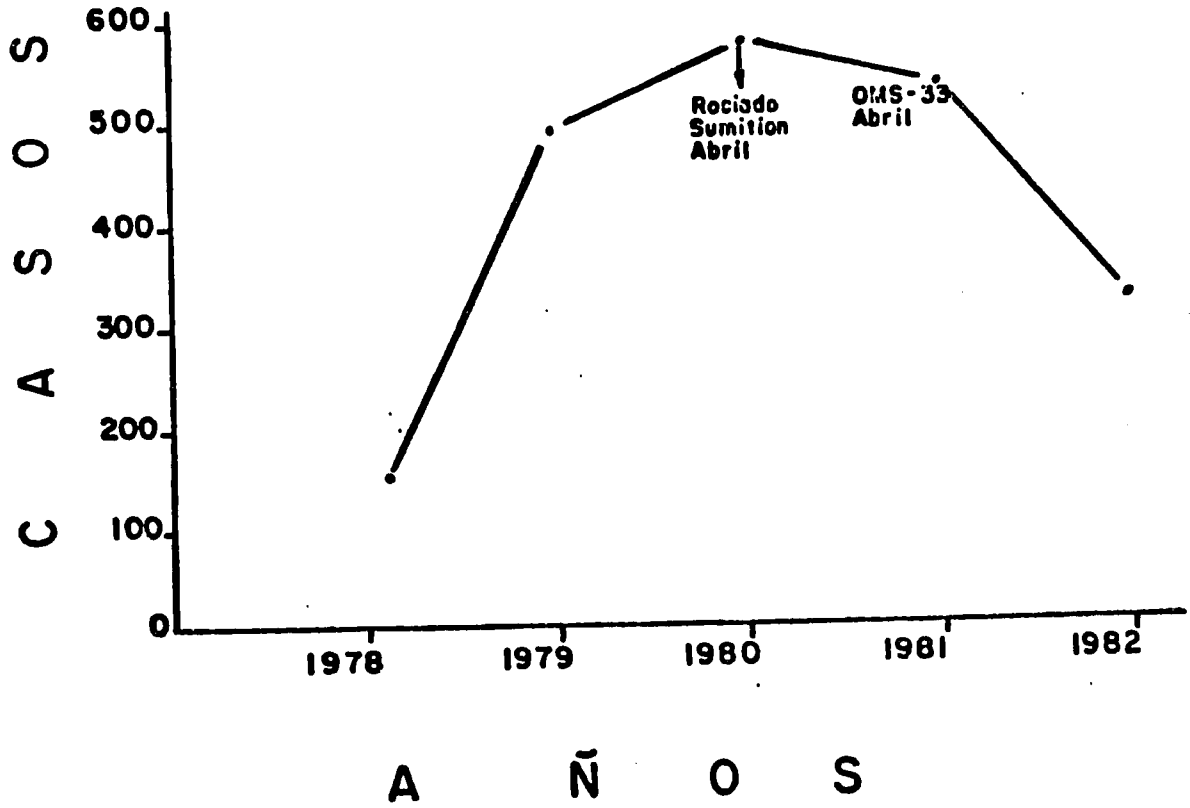
Water Management as it relates to malaria control involves the reduction or elimination of sources of mosquito breeding through filling, draining, digging, changing water levels, flushing, canal trimming and other engineering methods.

M. LIST OF ABBREVIATIONS

ACD.	Active Case Detection
A.I.D.	Agency for International Development
API	Annual Paraside Incidence
BHC	Benzene Hexachloride (Insecticide)
DDT	Dichlorodiphenyl Trichloroethane (Inecticide)
EPA	Environmental Protection Agency
ERT	External Review Team
GOES	Government of El Salvador
GR	Geographical Reconnaissance
MCP	Malaria Control Programs
MEP	Malaria Eradication Program
MSPAS	Ministry of Public Health and Social Assistance
OP	Organophosphorous (i.e. malathion, fenitrothion).
PAHO	Pan American Health Organization
PCD	Passive Case Detection
Plan Ops	GOES Planning document similar to AID's Project Paper.
SPR	Slide Positive Rate
ULV	Ultra-Low Volume
WDP	Water Dispersable Powder
WHO	World Health Organization

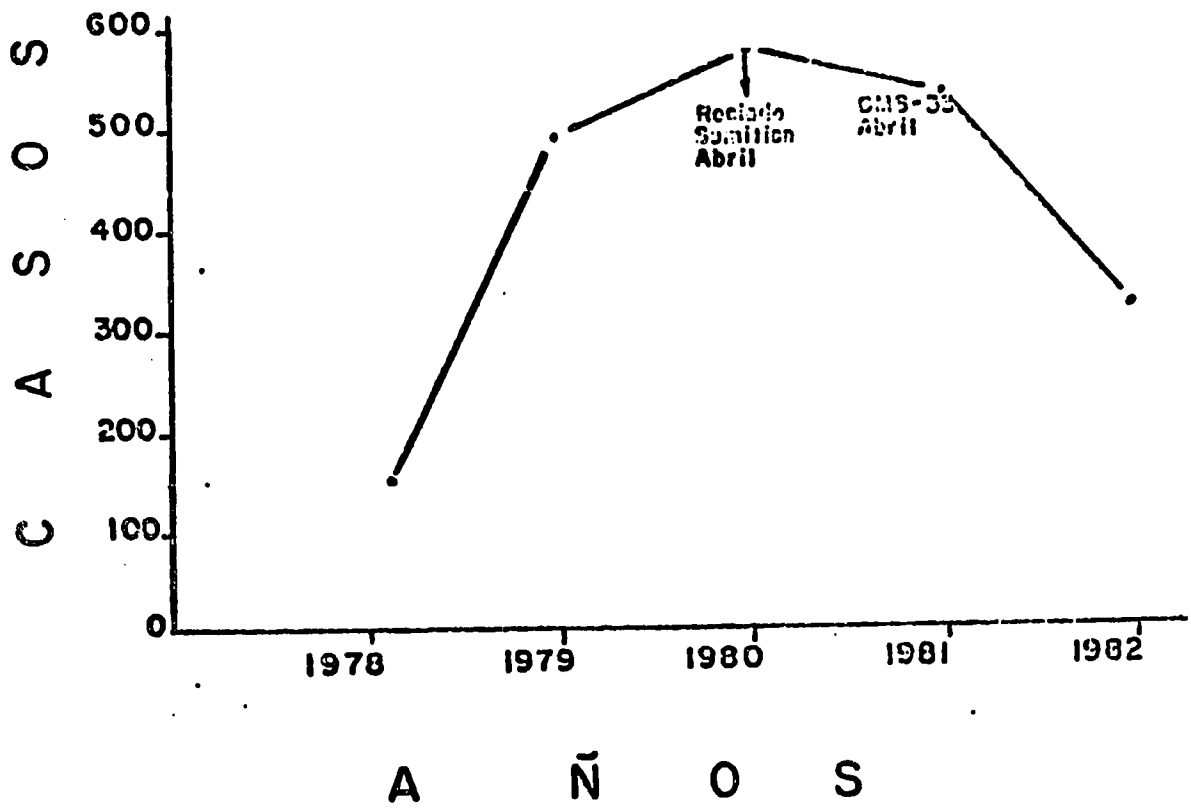
AREA DE GARITA PALMERA

AHUACHAPAN - SUR



AREA DE GARITA PALMERA

AHUACHAPAN - SUR



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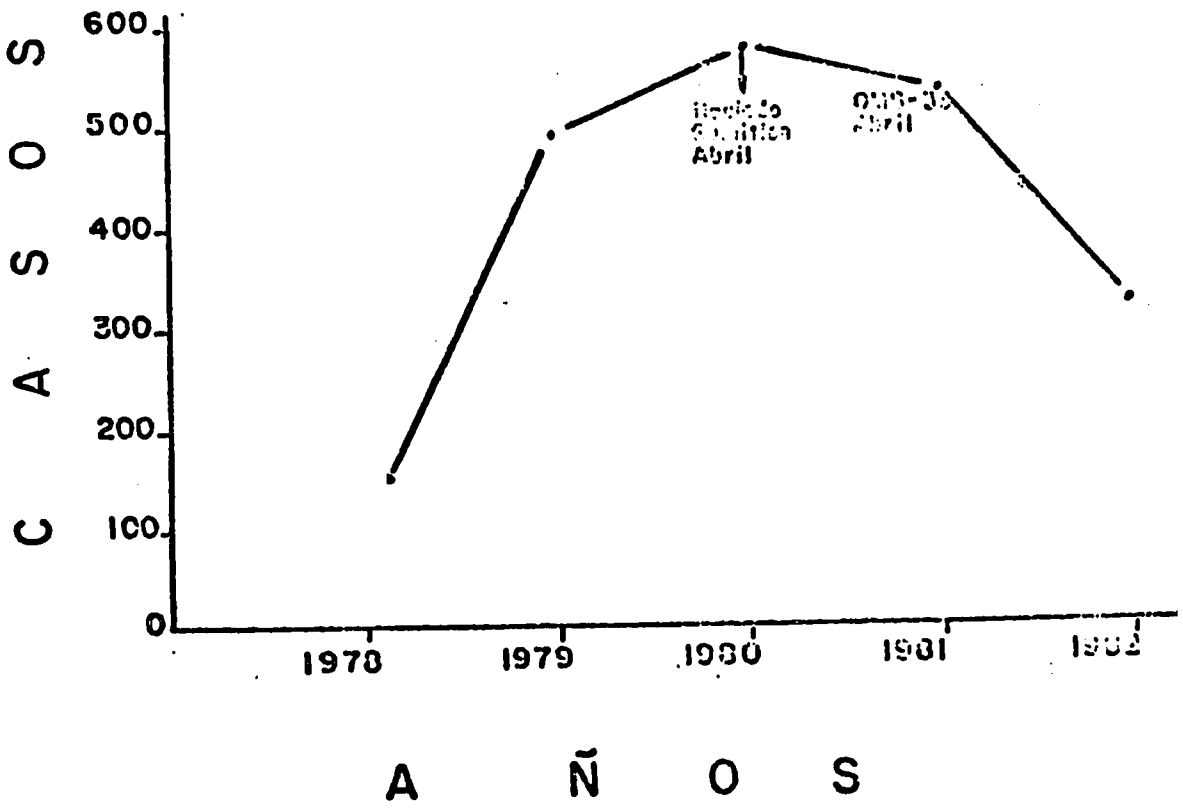
AREA DE GARITA PALMERA

AHUACHAPAN - SUR



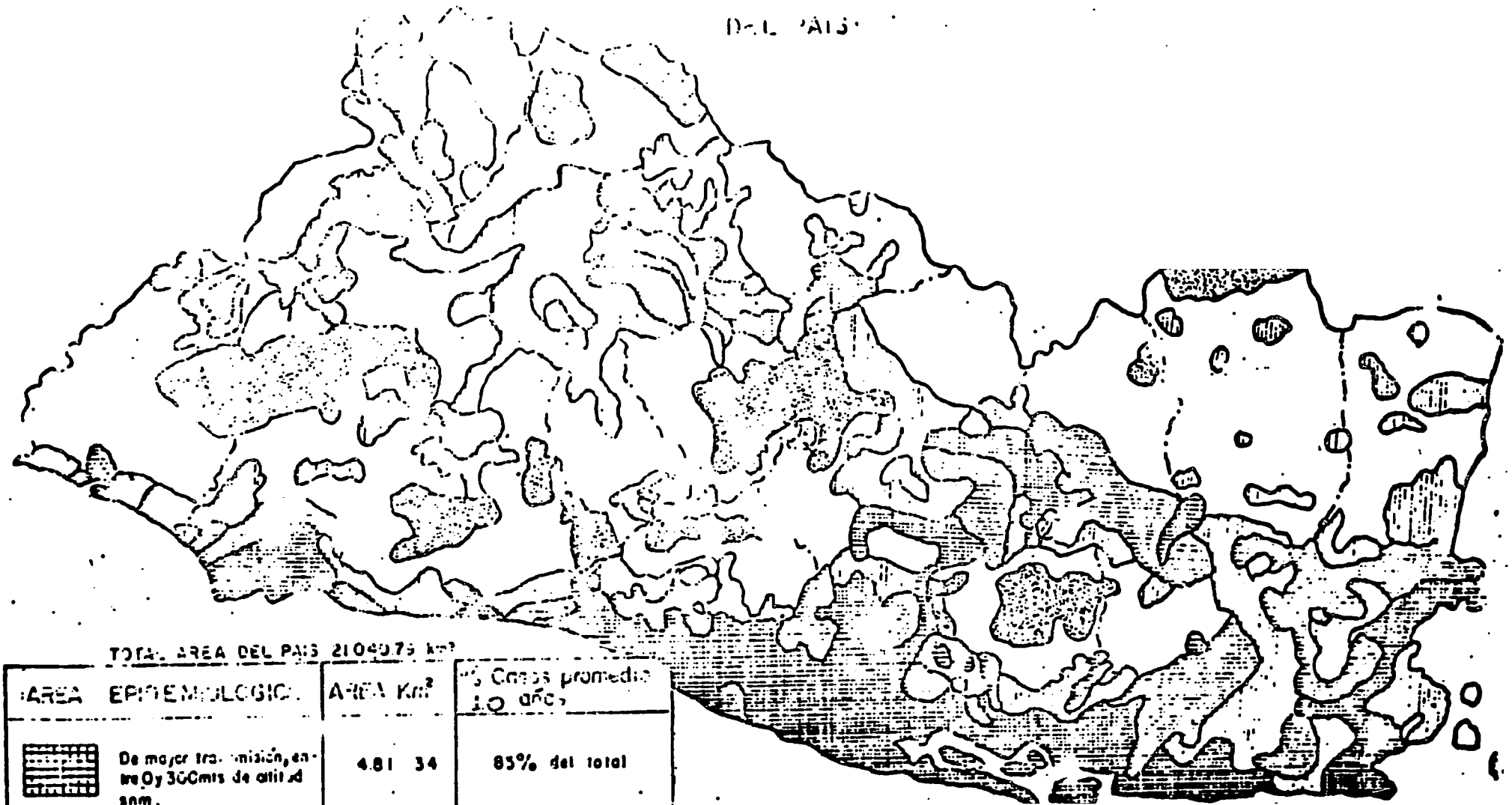
528

REPUBLICA DE EL SALVADOR
MINISTERIO DE SALUD PUBLICA Y A[illegible]
DIVISION DE MALARIA

Mapa Nº 1

[illegible] DEL AREA MALARICA

DEL PAIS



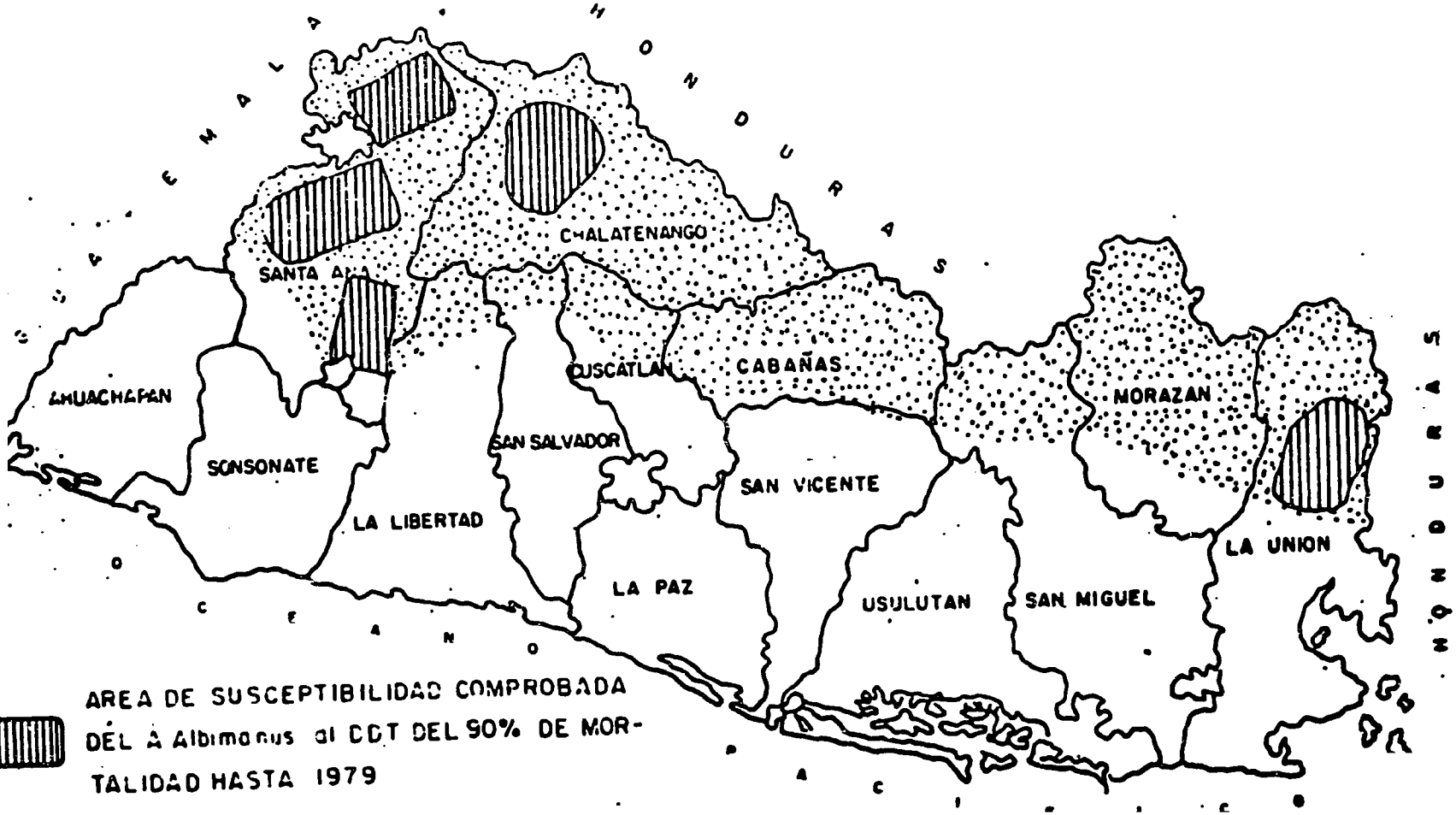
TOTAL AREA DEL PAIS 21040.75 km²

AREA EPIDEMIOLOGICA	AREA Km²	% Casos promedio 10 años
De mayor transmisión, entre 0 y 300mts de altitud snm.	4.81 34	85% del total
De transmisión moderada entre 301 y 600mts. snm.	3.215.76	10 % del total
De menor transmisión, entre 601 y 900mts. snm.	11.117.69	5 % del total
No malárica, más de [illegible]	1.899.0	0 % [illegible]

DDT.

MAPA DE EL SALVADOR

Division de Malariología



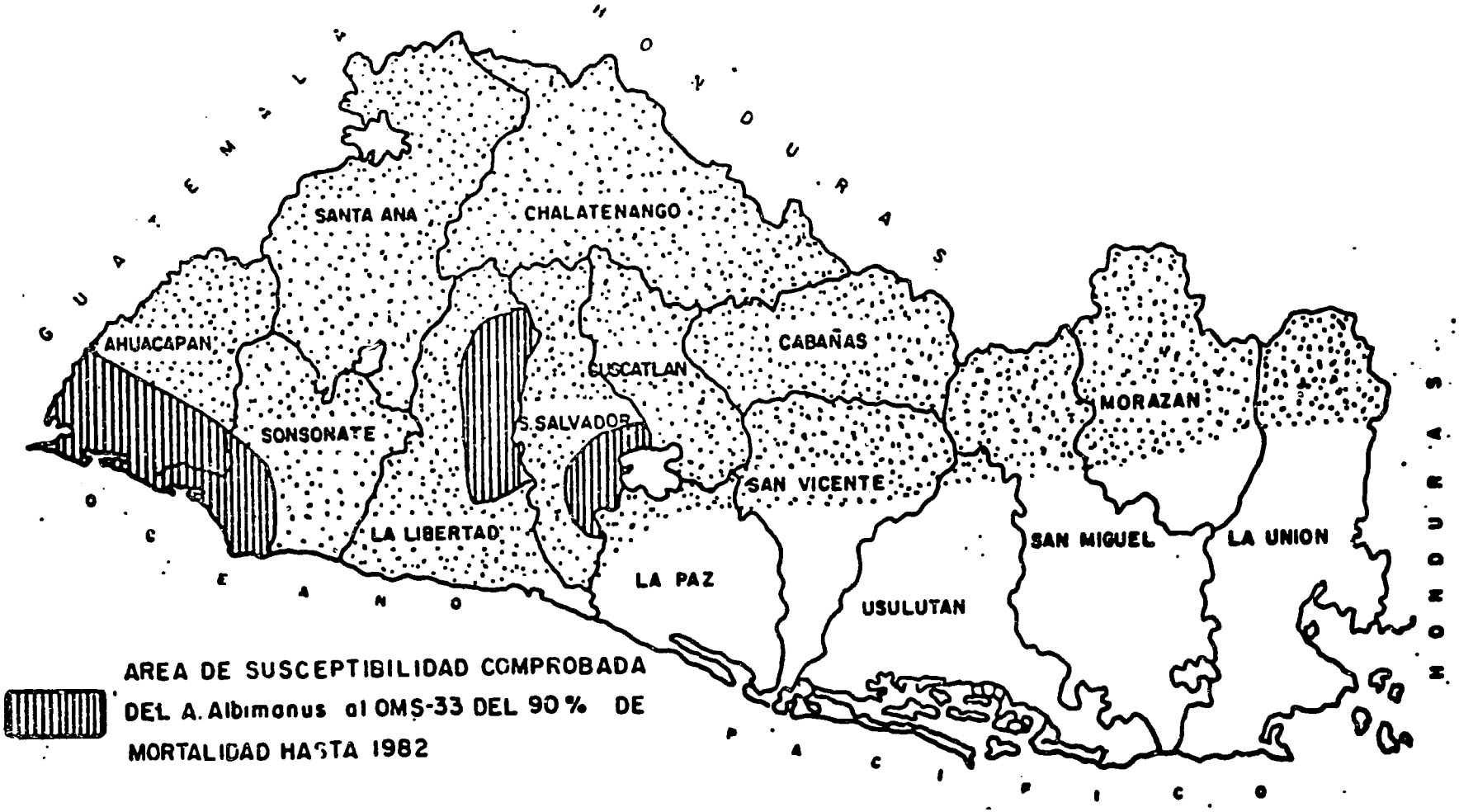
AREA DE SUSCEPTIBILIDAD COMPROBADA DEL A Albimanus al DDT DEL 90% DE MORTALIDAD HASTA 1979

SUSCEPTIBILIDAD DE INFLUENCIA TEORICA POR EL AREA COMPROBADA

OMS-33

MAPA DE EL SALVADOR

División de Malariología



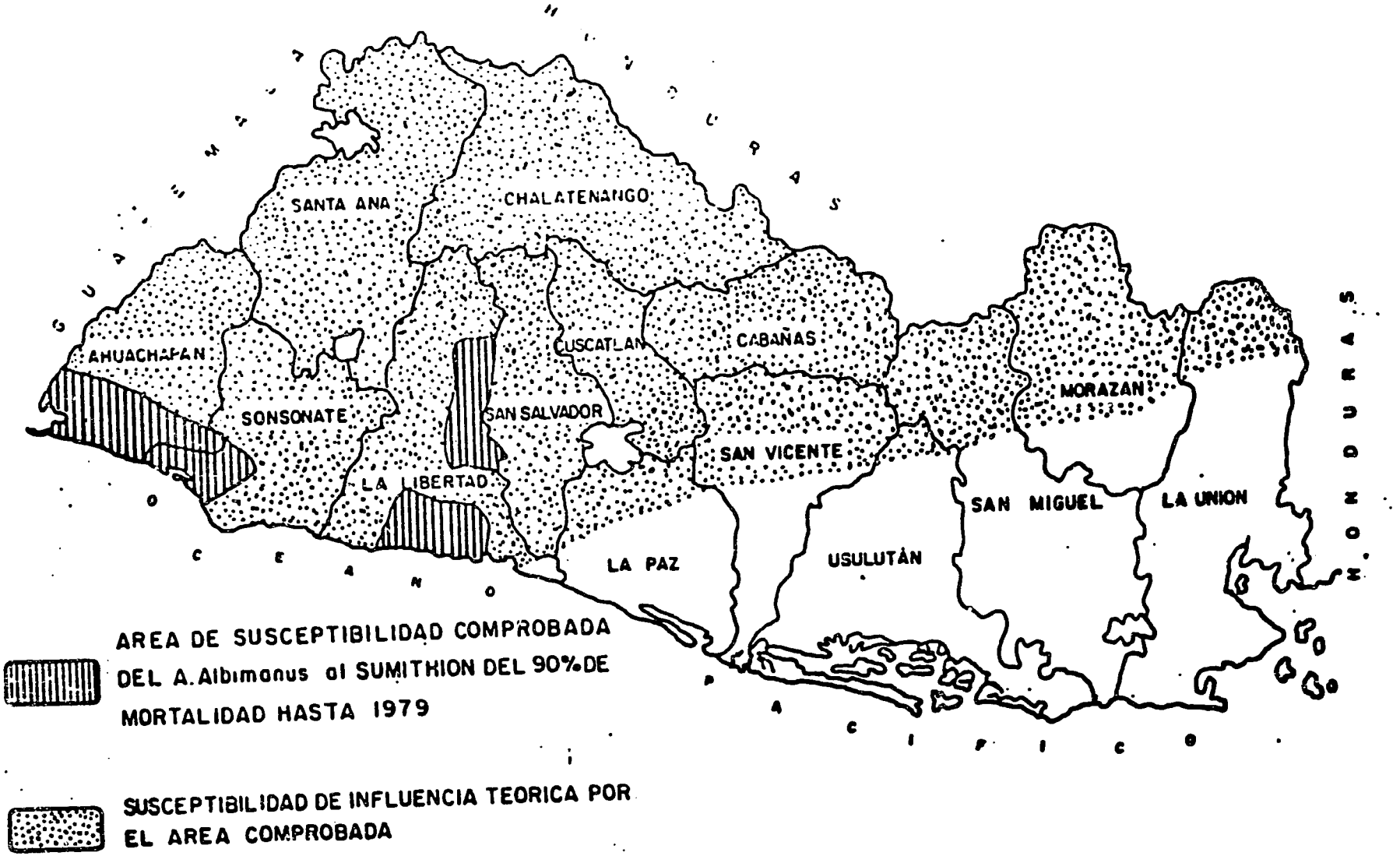
AREA DE SUSCEPTIBILIDAD COMPROBADA DEL A. Albimanus al OMS-33 DEL 90 % DE MORTALIDAD HASTA 1982

SUSCEPTIBILIDAD DE INFLUENCIA TEORICA POR EL AREA COMPROBADA

SUMITHION

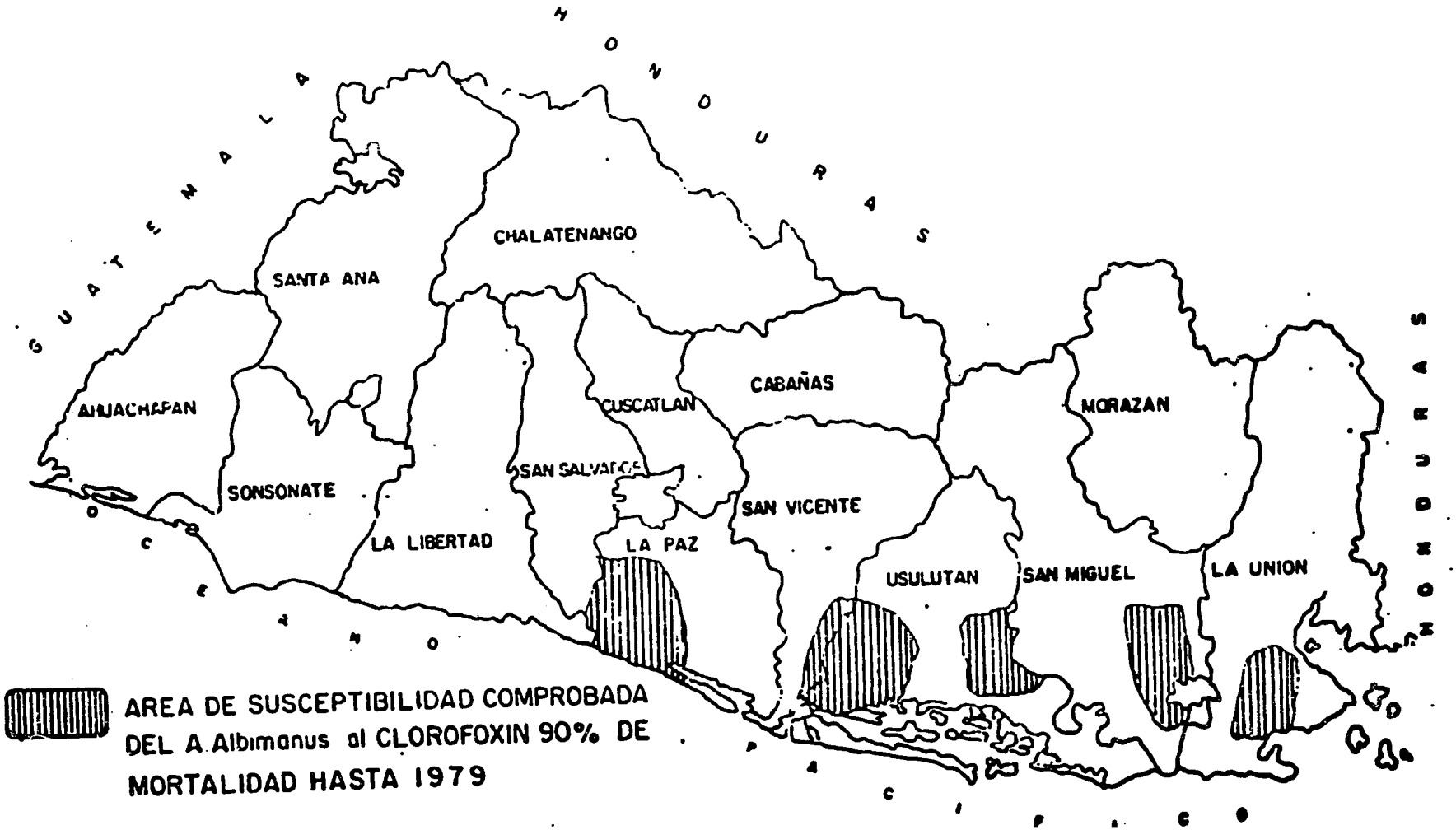
MAPA DE EL SALVADOR

División de Malariología



MAPA DE EL SALVADOR

Division de Malariología



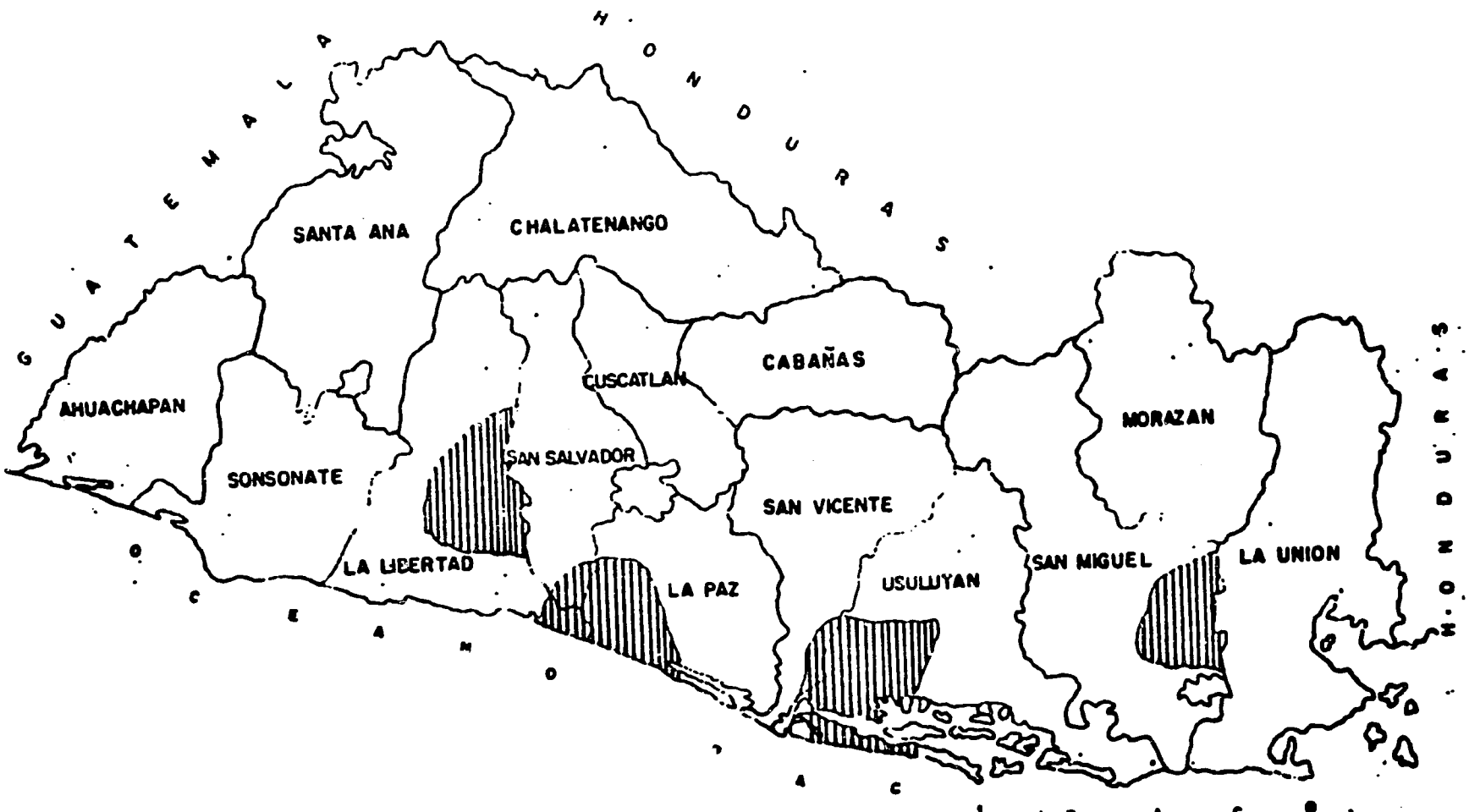
NOTA:

Las pruebas de pared no coincidieron con las pruebas de susceptibilidad y los resultados de las pruebas de susceptibilidad variaron de una prueba a

K-OTHRIN

MAPA DE EL SALVADOR

Division de Malariologia



AREA DE PRUEBAS DE SUSCEPTIBILIDAD DEL A.Albimanus al K-OTHRIN MAS DE 90 % DE MORTALIDAD.

MINISTERIO DE SALUD PUBLICA
Y ASISTENCIA SOCIAL
REPUBLICA DE EL SALVADOR, C. A.

MAL-042-83

17 de mayo de 1983

Dr. Mauricio Sauerbrey
Asesor Temporal A.I.D.
P r e s e n t e .-

Con base en las conversaciones sostenidas con Ud. en las reuniones de trabajo realizadas en esta División, le estoy adjuntando un listado de las necesidades más urgentes que tiene la División para poder cumplir con lo programado durante el 1° de mayo al 30 de octubre del corriente año, para el control de la malaria en el país.

Esta solicitud de necesidades se hace en vista de que los rubros en élla especificados, nos encontramos carentes de casi todos éllos y es durante el período de la estación lluviosa cuando hay mayor transmisión y por consiguiente el aumento de casos; lo cual pretendíamos por lo menos mantenernos a un nivel menor que en otros años, ya que la malaria a partir de 1981, 1982 y lo que llevamos del presente año la disminución de casos llegan en el orden de unos 10.000 menos comparado con el 81, que si bien es cierto no hacen gran impacto por lo menos vamos con una tendencia a la disminución la cual no hemos podido acelerar debido a la situación socio-política que vive el país.

El uso de químicos y medicamentos son los aprobados por la Organización Mundial de la Salud y son aplicados por todo el mundo, por lo cual estamos concientes de que desde el punto de vista de insecticidas no estamos contaminando el medio ambiente y con las medicinas tampoco estamos poniendo en riesgo a la población.

He de hacer notar que nuestro énfasis en esta época lluviosa es básico en el control de vectores en su fase adulta, con equipo de ULV y UB reforzado con rociado de acción residual intradomiciliar y medicación, dejando otro grupo de medidas especialmente el control de vectores en su fase larvaria, por medios físicos y químicos en los pantanos durante la época seca.

Quizás valga esta oportunidad para poner de manifiesto que como primera prioridad la División de Malariología, ha enfocado su política de largo plazo en la disminución y destrucción de criaderos por medios físicos y químicos y a corto plazo el uso de insecticidas y medicamentos como medidas de control, mientras se van desarrollando las otras de largo plazo en una forma gradual y técnica.

.../...

Necesitando para esta última la asesoría de Ingeniería en el manejo y control de las aguas en el país para preparar proyectos de alta ingeniería en tanto continuamos con obras de ingeniería manual, utilizando nuestros pequeños recursos y la participación de la comunidad.

Finalmente esta petición de necesidades la hacemos en vista de que se nos ha hablado de un préstamo-donativo que hará el AID al gobierno de El Salvador en el ramo de Salud.

Cualquier ampliación a la solicitud presentada, estamos dispuestos a dar nuestra colaboración cuando así lo solicitaren.

Soy de Ud. su atento y seguro servidor.

DIOS, UNION Y LIBERTAD

DIRECCION GENERAL DE SALUD
DIVISION DE MALARIA
EL SALVADOR, C.A.

Dr. José Mario Van Severén
Director División de Malariología.

cc: Dr. Juan Antonio Figueroa Avilés
Subsecretario de Salud Pública y A.S.

JMVS/mdec.

236

ridad	Mercadería	Descripción	Cantidad	Precio Unitario	Precio Total
	Medicamentos				
1a.	Combinada Adulto	Difosfato Cloroquina 150 mg. + Primaquina 15 mg. base, Tabletas.	3.000.000	$ 29.8 %	$ 89.400
1a.	Combinada Infantil	Difosfato Cloroquina 75 mg. + Primaquina 7.5 mg. base, Tabletas	350.000	$ 30.78%	$ 10.773
1a.	Primaquina Adulto	15 mg. base, Tabletas	700.000	$ 28.4 %	$ 19.880
1a.	Primaquina Infantil	5 mg. base, Tabletas	300.000	$ 24 %	$ 7.200
1a.	Cloroquina Difosfato	150 mg. base, Tabletas	1.000.000	$ 24 %	$ 24.000
	Químicos:				
1a.	Temephos (Abate) (Cyanamid Corp.)	Granulado al 1% (para ser aplicado 1 p.p.m. en aguas de uso doméstico).	15.000 Kg.	$ 1.10 K. (FOB Miami)	$ 16.500
1a.	Temephos (Abate) (Cyanamid Corp.)	500 E. 44% para aplicar 2 cc. por m³. de agua contaminada.	1.500 Gl.	$ 73 Gl. (FOB Miami)	$ 109.500
1a.	Propoxur OMS-33, Baygón (BAYER)	Polvo mojable al 50% en bolsas de 800 grs. para preparar concentración al 5% y rociar 2 gr./m2 intradomiciliar.	30.000 Kg.	$ 12. Kg.	$ 360.000
	Equipo:				
1a.	LECO (Máquina para control de insectos)	Modelo H-D, Serie D N°7000-12, fluxómetro manual, con Motor Briggs & Stratton 16 hp. batería, etc. para rociado U.L.V.	5	$4.500 c/u	$ 22.500
1a.	Pick-Up	Doble transmisión de 1 1/2 Ton. Diesel.	5	$11.000 c/u	$ 55.000

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idad	Mercadería	Descripción	Cantidad	Unitario	Total
1a.	Dyna-Fog	Modelo "D-H-90" de 52 3/4 pulg. largo 13 1/4 " alto, 9 5/8 " ancho, tanque de gasolina de 1/2 galón. Tanque de insecticida de 1 galón. Tamaño de la gota: .5-50 micrones (+ 10% en repuestos)	5	$ 600 c/u	$ 3.000
1a.	Bombas de Mochila	Motor 2 ciclos con aditivo /rociar ULV., L.V. y polvo (+ 10% en repuestos)	30	$ 500 c/u	$ 15.000
1a.	Bombas Manuales Hudson.	Nº 67322 A-Pert Sprayer, para 2 Gls. capacidad, Manómetro, con extensión para rociar de 20 ".	100	$ 100 c/u	$ 10.000
1a.	Water Bug y Pusher boat	(SE ADJUNTA CATALOGO).	1	$35.000	$ 35.000
1a.	Boquillas	H.S.S. 8002 E Tee-Jet	2.000	$ 1	$ 2.000
1a.	Boquillas	Spraying Sistems Co. Cone.Jet. 2 X	2.000	$ 1	$ 2.000
1a.	Llantas	Tractoras 700 x 16 " 735 x 14 " 750 x 15 " 700 x 15 " 750 x 10	15 8 13 54 35	$ 100 $ 70 $ 100 $ 110 $ 110	$ 1.500 $ 560 $ 1.300 $ 5.940 $ 3.850
2a.	Microscopios (Profesional)	Binoculares, lente 10x y 100x, bacteriológicos.	10	$1,500 c/u	$ 15.400
	TOTAL				$810.303.00

NOTA: Precios obtenidos de hace varios años.

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LISTA DE NECESIDADES DE LA SECCION DE ENTOMOLOGIA.

50 Capturadores plásticos rectos, de 35 cm. de largo por 10 mm. de diámetro interior y 12 mm. de diámetro exterior.

50 Yardas de manguera de hule para capturador, de 10 mm. de diámetro interior.

25 Capturadores de plástico curvos, de 25 cm. de largo y 10 mm. de diámetro interior.

25 Cajas de Surgitube N° 3 de 50 ydas. c/u.

10 Trampas luz, tipo New Yersey, de celda eléctrica automática (Ojo Mágico).

25 Cucharones de peltre, de 10 cm. de diámetro interior y 13 de diámetro exterior, con un pequeño mango del mismo material para ponerle mango de madera.

10 Higrómetros de uso manual, de conversión de las temperaturas para obtener la humedad relativa. Los resultados se encuentran en el mismo estuche.

5 Micrómetros.

2 Lámparas para Microscopios entomológicos. Para iluminación del objeto.

INITIAL ENVIRONMENTAL EXAMINATION (IEE)

PROJECT LOCATION:	El Salvador
PROJECT TITLE:	Health Systems Vitalization
LIFE OF PROJECT	FY 1983 - 1985
FUNDING (000)	A.I.D. = $ 9,000 GOP = $ 3,000 TOTAL = $12,000
IEE PREPARED BY	Lawrence T. Cowper Health Science Administrator, S and T/Health, AID/W.
ENVIRONMENTAL ACTION RECOMMENDED	Negative Determination. No further environmental analysis is required. If new chemical, biological or physical malaria control methodologies are introduced into the program after the approval of this project the environmental impact will be reviewed, and, if necessary, environmental studies or assessment will be carried out.
MISSION DIRECTOR'S :	Signature _____
CONCURRENCE	Date _____
DECISION OF ASSISTANT ADMINISTRATOR	Approved _____ Disapproved _____ Date _____

INITIAL ENVIRONMENTAL EXAMINATION

1. Project Description

This project will provide technical assistance, limited training and commodities to assist the Government of El Salvador to implement its nationwide malaria control program. The project will provide funding to be used in an effective malaria control program focusing on the rural population of El Salvador, thus enhancing economic and social development in the fields of health and agriculture. The program will carry out environmental improvements, larviciding, water management, and ULV adulticide activities as well as limited residual spraying. The project will enhance the quality of the environment in those rural and urban areas where source reduction and water management practices are made a part of the program. Insecticides will be used in the program. These chemicals, which have been used in El Salvador with no adverse effects over the last ten years, will be applied in a manner which is not detrimental to the environment. Health safeguards and protective clothing are in place in the field program and careful attention is paid to training and supervising the handling and application of insecticides.

II. Evaluation of Environmental Impact

The general A.I.D. Environmental Impact Statement (EIS) included an in-depth review of the impact of malaria programs on the environment. The conclusions of the EIS were that the major insecticides used in malaria control programs have a favorable risk-benefit impact on the environment due to their method of application in public health programs. In 1977, a comprehensive Environmental Assessment undertaken in Sri Lanka concluded that residual insecticides used in malaria control efforts are not detrimental to the environment and have a very favorable risk benefit. In May, 1980, an Environmental Assessment carried out concerning the use of similar residual insecticides and larvicides in India's malaria control activities reached similar conclusions.

One of the purposes of the comprehensive EIS submitted by A.I.D. and accepted by the Environmental Protection Agency (EPA) was to avoid duplicating environmental review efforts for projects of a similar nature in countries with comparable conditions. Environmental studies have been made on malaria control programs in the last four years in India, Thailand, Nepal, Haiti and Sri Lanka with a similar favorable risk-benefit conclusion. The points of similarity between this project and previous environmental studies, both of residual insecticide use and other methods of malaria control should obviate the need for another major analysis. All the above reports are available in AID/Washington.

Chemical Control Aspects

In addition to DDT, BHC, fenitrothion and Malathion, the El Salvador Malaria Program has been applying a number of organophosphorus and carbamate insecticides in its spray operation program since 1973 in limited areas of the country. Under this project, the GOES does not plan to use the insecticides malathion, DDT and BHC, but is expected to apply

propoxur and/or fenitrothion on a limited and selected scale. Both of these insecticides are bio-degradable. The GOES malaria program will also be applying a larvicide, Abate, in its field program. Abate has been used in malaria and mosquito control programs for approximately twenty years and is a safe product which is registered without restriction as mosquito larvicide in the U.S. by the Environmental Protection Agency (EPA).

Fenitrothion has gone through the seven stage trials of screening by the World Health Organization (WHO) and is one of the compounds recommended by WHO for residual spraying in malaria control programs. Fenitrothion like Malathion does inhibit cholinesterase activity, but to date El Salvador has not experienced any major health problems in its spray operations with this insecticide due to the safeguards built into the program of protective clothing, frequent testing of cholinesterase levels in personnel, adequate supervision, regular and refresher training, and proper storage and distribution practices. Fenitrothion has been used recently in Haiti, Thailand and India in their operational malaria programs. All three of these malaria control programs are being assisted by A.I.D. Fenitrothion is registered in the U.S.A. with the Environmental Protection Agency (EPA) for a variety of uses. There have been numerous significant studies on the environmental impact of fenitrothion since it was reported as a chemical in 1956. These studies include tests on man, cows, dogs, rats, rabbits, fish, birds, steers, and sheep. In a WHO program using fenitrothion as a residual insecticide in Kisumu, Kenya, only one mild case of intoxication was reported in 2000 man-days of spraying. Fenitrothion was applied widely as a residual spray in the Punjab Province of Pakistan in 1981, and no serious intoxication of sprayman or villagers was reported. Fenitrothion has been used in El Salvador for approximately 10 years in the malaria control program. There have been incidences of fenitrothion intoxication with spray personnel, but all cases have successfully recovered usually within a short period of time. There have been no deaths reported from any insecticide intoxication in the malaria program.

As fenitrothion is a wide-spectrum insecticide, it is apt to kill a number of non-target organisms in the areas where it is used unless accurate operational techniques are adopted. This insecticide is highly toxic to bees, but as its primary use in malaria control is as an indoor residual spray, this should not cause environmental problems. Additional information on fenitrothion is available in various EA's prepared for other malaria control programs.

The larvicide, Abate, an organophosphate, is to be used as a supplemntary control measure during the life of the project in some locations mainly during the drier portions of the year. This compound has been shown to have low toxicity even if taken orally and applied dermally. Normal applications of Abate as a larvicide in water is about 0.5 ppm. Even if an adult were to drink the water treated directly and if 2 liters were consumed, the maximum amount of Abate inbided daily would be 1 mg. This compares with a dosage of 256 mg./man/day fed to

human volunteers for 5 days and 66 mg./man/days for four weeks without clinical symptoms or side effects. Through the dermal route, Abate was found to be even less toxic. Abate has a short half life, is not stored in the body, and produces no known chronic or residual effect. Abate offers little potential for harm to human health. (Page 244, AID, EIS).

The insecticide, Propoxur, is a carbamate which has both contact and fumigant action. This insecticide is applied as a residual spray at 2 grms/square meter and is effective up to three months. Propoxur is registered by the EPA in the United States for residual control of adult mosquitoes. The Malaria Division has used this compound successfully over the last ten years in El Salvador without incidence to either spray personnel or village populations. Precautions are taken by the Malaria Division in applying Propoxur by intensive training in the handling and application by spray personnel, provision of protective clothing, rigid supervision and educational effort in the villages. Spraymen are required to wash after a days' work and before smoking or eating. No cholinesterase monitoring is indicated when carbamate insecticides are applied since the inhibited enzyme is reactivated too quickly for this to be a useful preventive measure.

The Malaria Division plans to use very limited quantities of synthetic pyrethroids in the program in U.L.V. applications. Due to its expense, the application of this material will be made only on a selective focal basis at a time of unusually high vector mosquito densities. The program has used synthetic pyrethroids over the last 8-10 years without incidence. This insecticide is a knock-down chemical and has no residual or very limited residual effect. The oral LD50 of Permethrin, a synthetic pyrethroid, is 4000 mg./kg. which indicates a very safe product. It is applied at 5-10 grams of actual material to a hectare of land and at this dosage rate there are no adverse environmental implications. It biodegrades rapidly. The toxicological information available indicates no serious health environmental problems should arive from use of this material, but care inhandling and application are to be carried out by the Malaria Division through proper training of concerned personnel adequate supervision and provision of protective clothing. The USAID assistance project will not be procuring this insecticide as a part of its commodity arrangements and it is mentioned in this IEE only for its environmental effect. Permehrin is registered by the EPA for adult mosquito control in the U.S. using ULV or Cold Fogger techniques. Attached to this IEE, please find EPA certifictions of the insecticide described in this IEE.

Environmental Management

The project does plan to use limited environmental management techniques in its program by use of (1) environmental modifications such as draining or filling; (2) Environmental manipulations by saline regulations or flushing; and (3) by reducing non-vector contact through the design and siting the villages and the promotion of the use of bed nets. It is expected that any of the environmental management actions taken will lead to an improvement of the environment and will not create environmental hazards or problems. A U.S. consultant for source reduction planning and training has been included in the Project Paper Technical Assistance inputs.

Biological Control

The Malaria Division some years ago tried larvivorous fish in its program but this effort did not prove satisfactory. If these trials are again started, there will be no fish species introduced into the country for larva control purposes during the life of the project. The project also does not plan to introduce any operational procedures involving the use of parasites (nematodes), pathoges (Bacillus thuringiensis), chemosterilants, genetic manipulations. It is possible that some research efforts will be made using B. Thuringiensus (BTI-13) as this method is showing some promise as a natural larvicide in other areas if such research could be supported with additional personnel and funding.

Health Safeguard

Special attention is given to the handling of the insecticide concentrates (both water dispersible powders and emulsion concentrates) by the Malaria Division. In the case of Propoxur, the project is designed to provide this insecticide by separate packets which will fill one pump. These packets carry a warning notice and ID label which eliminates personnel exposure due to packaging and weighing a bulk product. In preparing suspension or emulsion of the insecticides, use is made of long handled mixers to protect the operator from splashing and allow stirring from a standing position.

Insecticide concentrates left over from the operation (unused packets or liquid concentrate) and the empty containers are returned from the field and either stored or disposed of safely in a manner not to contaminate water sources or create any other environmental hazard. The washing of spray equipment is done in a manner which will not allow the washings to enter well, streams, lagoons, swimming pools or any other water source which could be used by persons or animals for drinking or washing.

It should be noted that each spraymen received up to 15 days training each year in spray techniques and operational matters prior to the initiation of the major spray cycle. Approximately 15% of their training time is spent on health safeguards for both personal and village protection. At the start of the spraying cycle each sprayman is issued 3 sets of protective uniforms which include a long sleeve shirt, a metal helmet, rubber gloves which extend about half way to the elbow, rubber boots, a gauze face mask (if required) and some belladona drops in case of a sudden emergency. Spraymen are supervised to change uniform on a regular every other day basis.

Each spraymen is also issued a personal instruction booklet describing the proper techniques and precautions to take when employed as a malaria program spray operator. There a series of instructions issued by the malaria program for spraymen, team leaders, Chief of Zones and villages which are to be followed in the application of insecticides. Copies of these instructions are attached in this IEE.

Ha "Manual Operaciones de Rociado" issued by the GOES Division of Malaria and used as a guide by the program contains instructions on health safeguards which are to be followed by field personnel in applying insecticides and in training. There are specific instructions for fenitrothion and propoxur in this manual. A copy is available at USAID/El Salvador.

In the course of preparing the IEE visits were made to the warehouse facilities at the Central Level and at several outlying storage points by members of the Project Paper Team. The Central Warehouse was visited on May 20, 1983 and was found to be secure, constructed in a manner to protect the insecticide from rain and direct sunlight exposure, with a solid floor and in good housekeeping condition. The outlying storazge units at San Miguel were also reported as being satisfactory.

Attached to this IEE are copies of official documentation on the application and storage of insecticides issued by the Division of Malaria. These instructions are considered suitable and adequate for this program.

Project Monitoring

The project foresees the employment of a local-hire contract malaria officer to insure that training in health safeguards is carried out and to observe actual field operations at the time of spraying. A report on each site visit will be made. A copy of the proposed form to be used in these visits is attached.

Other Factors

El Salvador uses a large amount of insecticides in its agriculture activities of which many of the compounds are very toxic and have far more human health hazards than the insecticides used in the malaria program. There is very little control on the use and storage of these agriculture chemicals. The insecticide used in the Malaria Program represents less than 1% of the insecticide estimated for use in El Salvador for the year 1983. The Malaria Program will continue to make every effort to protect the environment, its workers and the population from mis-use of any of its working insecticides, but its over-all environmental effect is limited when compared to insecticide used in other activities. Attached to this IEE is a breakdown of insecticides used in Agriculture in El Salvador by name and amount used and projected.

III. Recommendation

In view of the above examination of the environmental issues of this project, it is recommended that a negative determination be made for this project.

Manual for Spray Personnel

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ilas: 1/2 cucharadita

brevaderos: 1 ó 2 cucharitas, según l tamaño.

astizales y Arrozales: Se dispersará mano en forma de abanico. También uede ser aplicado por medios mecánicos.

a periodicidad y otras indicaciones técnicas las dará el equipo de supervisión de nivel local.

ABATE EMULSIFICABLE. El Abate emulsificable no se aplicará en depósitos de uso doméstico ni en abrevaderos de animales domésticos. Se aplicará en orillas de quebradas, ríos, pantanos,

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e quiere tratar.

os polvos flotantes podrán ser aplicados en: arrozales, pantanos de poca egetación y en general en estancamientos de agua de muy poca corriente.

odo de Aplicarse. Se aplicarán por medio de una bomba dispersadora mecánica, on aditamento especial para ese objeto y debidamente regulada para obtener terminada dosificación por hectárea.

ondiciones Ambientales a Observar

ebido a que son polvos flotantes se ebe tener especial cuidado, de que la elocidad del viento sea mínima. Es or eso que se indica que sean aplicados por la mañana o por la tarde.

GUIA OPERACIONAL PARA LA APLICACION DE VARIOS TIPOS DE INSECTICIDAS Y LARVICIDAS.

ABATE.

El Abate es un larvicida que viene en dos formas: líquido y granulado.

Granulado. El granulado se aplicará en depósitos de agua de uso doméstico tales como: Pilas, Toneles y cualquier otro recipiente que la gente use para almacenar agua. También se puede aplicar en: pastizales, arrozales y abrevaderos de ganado.

Dosificación:

Toneles: 1 cucharita de Abate

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charcas y cualquier otro u otros estancamientos de agua que puedan constituir un criadero de mosquitos. También podrá aplicarse en pastizales y arrozales cuando se indique.

Forma de Prepararse. Se pondrán 0.2 de Abate emulsificable por cada litro de agua.

Modo de Aplicarse: Se puede aplicar tanto con la bomba aspersora manual Hudson como con la de mochila o la Chapin. La periodicidad y otras indicaciones técnicas se les darán el grupo de supervisión local.

Baytex. Polvos Flotantes. Los polvos flotantes del Baytex se dispersan sobre la superficie del agua del criadero que

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346

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ación del vehículo. Por otro
debe tomar muy en cuenta que
do es un pequeño tractor, es
parcial de locomoción y no de
orzado a penetrar en todo tipo
eno, tales como: pantanos de
flojo donde este vehículo co-
lquier otro tiene sus limitacio-

icida Usado. En la actualidad
á empleando el Abate emulsifica-
40%, diluido a una proporción
c por cada litro de agua. Es de
ara el tanque completo del PUG
s de 108 galones se necesitarían
c de Abate emulsificable.

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a proporción de 2cc por cada litro de
agua. O sea, 400cc por tanque lleno.
También se podrá utilizar cualquier
otro insecticida líquido.
Presión. La presión uniforme a mantener
es de 100 lbs/p.c. pudiendo aumentarla
de acuerdo a la necesidad pero sin ex-
ceder los 3/4 de la capacidad total.
APLICACION DE ADULTICIDAS
Rociamiento Especial: Se entiende por
rociamiento especial o nebulización a
la dispersión de algún insecticida en
forma de gotas finas o partículas en el
aire.
Aplicaciones de Piretrina (piretroides)
BV
Actualmente en El Salvador por medio

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Por otro lado, aún cuando haya poca ve-
locidad de viento, se deben aprovechar
las corrientes de aire al hacer la apli
cación. Es decir se aplicará a favor
del viento para aumentar la penetración
y profundidad.
APLICACION DE LARVICIDA CON EL "PUG"
La aplicación de larvicida por medio
del "PUG" que no es más que un compre-
sor montado en un vehículo tipo tractor
pequeño, se hace de igual manera que
con cualquier otro equipo mecánico, so-
lamente que con este se aumenta la cape
cidad operativa y se aumenta el rendi-
miento hombre-hora y/o superficie, sien
pre y cuando el terreno sea adecuado a

..7

Presión. La presión a que debe operar
se la bomba es de 200 libras por pulga
da cuadrada, presión que debe ser man-
tenida. Sin embargo, pudiera aumentar
se de acuerdo a la necesidad, pero sin
sobrepasar los 3/4 del total señalado
en el manómetro.
APLICACION DE LARVICIDA CON LA "JOHN
BEAN"
Al igual que el PUG, la John Bean es
un compre-sor con un tanque cuya capa-
cidad es de 55 galones. Con la dife-
rencia que la John Bean no tiene auto-
nomía de movimiento y debe ser jalado
(halado) o remolcado con un vehículo a
motor. También con este equipo se em-
pleará el abate emulsificable a la mis

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de la bomba de mochila marca Holder con una boquilla No.02. En el futuro se podrán introducir otras marcas, que no difieren grandemente en su aplicación.

Forma de Aplicación. Se podrá hacer tanto en el interior de las viviendas como fuera o en ambas, según indicaciones operacionales.

En Viviendas. Cuando se trata de aplicar dentro de las viviendas, el operador se situará al centro del ambiente que quiere proteger y girará lentamente de izquierda a derecha hasta terminar el circulo en el punto de

, dirigiendo la aspersión ha-
iba en un ángulo de aproxima-
40 grados. Deberá además man
na velocidad uniforme: Como
o se ha calculado que un minu-
uficiente tiempo para hacer la
ción en una vivienda pequeña,
del área rural.

ción Fuera de las Viviendas

aplicación se va a hacer fuera
viviendas o como complemento
intradomiciliar, se hará en el
no del predio de las mismas, di
ndo la aspersión hacia el folla-
una distancia no mayor de 3 me-
no menor de dos metros.

Condiciones Ambientales a Observar

Velocidad del viento: menos de 5 kilómetros por hora.

Ausencia de lluvia.

Baja temperatura.

Condiciones Operacionales. Aceleración controlada y regulada uniformemente a menos de 3/4.

Preparación de la mezcla:

De insecticida: 1 galón de piretrina por 20 de aceite diesel o kerosene.

De gasolina para la máquina:

5 onzas de aceite por 1 galón de gasolina. (aceite fino No.30 para motor fuera de borda).

icación Espacial a UBV

aplicación espacial a UBV, se hace
la actualidad con las máquinas ne-
lizadoras marca Micro Gen y Leco
ntadas en vehículo.

secticida Empleado

insecticida actualmente usado es
a piretrina sintética al 5%, pudien
utilizar también a otras concentra
ones tales como 2,5%, 2%, 3%, etc.
mbién puede ser aplicado cualquier
tro insecticida líquido.

reparación del Insecticida

ento las recomendaciones de los fa-
... otras indicaciones téc

Best Available Document

ionas Ambientales

dad del viento: A menos de 8 ki-
os por hora.

ratura: A menos de 27 grados cen-
dos. Que haya poco follaje entre
alles de circulación del vehículo
cosas a proteger.

nimiento del Equipo

amente después de cada aplicación
rá la limpieza del equipo, en la
siguiente:

iar los conductos de descarga del
ue del depósito de insecticida al
ue de depósito del alcohol.

nicas de organismos entendidos, dicen que para las aplicaciones a UBV debe ponerse el insecticida al porcentaje a que viene. Sin embargo, en El Salvador, se está diluyendo a 1 x 1, o sea, 1 galón de piretrina por un galón de aceite diesel u otro solvente.

Condiciones Operacionales a Observar

- Calibración de la descarga a 90cc por minuto.
- Velocidad del vehículo no mayor de 8 kilómetros por hora.
- Buen estado de funcionamiento del equipo.

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la bomba, correas, etc.

Semanalmente. Se desarmará el sistema de carga y descarga y se lavará también con agua y jabón todos los conductos y piezas desarmables. Se sacará la bujía y se limpiará con gasolina.

Póngase a funcionar la máquina normalmente por unos tres minutos con lo que se logrará limpiar todos los conductos de descarga y las boquillas.

Mantenimiento de la Bomba Holder

Diariamente y al término de la jornada diaria se deberá limpiar el tanque de depósito del insecticida con agua y jabón. Se sacará el filtro y se lavará también con agua y jabón. De igual forma se dejará la máquina funcionando con la llave de la gasolina cerrada hasta que se agote la que hay en el carburador. Además se lavará con agua el cuerpo de

OLO/lr.

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IEE.
UNEX

OMS - 33.

I. GENERALIDADES.

1.- **Antecedentes:**

Entre más de 1.300 productos incluídos hasta el presente en el Programa de Evaluación y Prueba de Nuevos Insecticidas de la Organización Mundial de la Salud, a fin de descubrir algunos que podrían reemplazar satisfactoriamente a aquellos que los anofelinos vectores son resistentes, se ha destacado definitivamente el OMS-33, llamado también Arprocarb, Propoxur y antes, Bayer 39007.

2.- **Características.**

El OMS-33 es un carbamato, cuyo nombre químico es Ortho-Isopropoxyphenyl-Methylcarbamato. El OMS-33 técnico es de color amarillo claro con un ligero olor fenólico característico, no objetable. Es comparativamente volátil e inestable en condiciones alcalinas. Puede ser clasificado como un insecticida que actúa por contacto, y por su marcada acción fumigante, es capaz de matar mosquitos, sin que estos posen sobre la superficie rociada. Tiene un efecto residual intradomiciliar muy efectivo, en los primeros tres meses después de su aplicación. El OMS-33 es el menos tóxico de los carbamatos para el hombre y los animales de sangre caliente en general; puede causar una depresión de la colinesterasa sanguínea, sin embargo, las personas se dan cuenta rápidamente de que han absorbido cantidades tóxicas, debido a los dolores de cabeza, náusea, sudoración, mareos, adormecimiento de la boca, nariz y garganta, malestar general, visión borrosa, nerviosidad, etc.

La cantidad mínima letal, para matar por contacto es 0.1 g/m2.- En condiciones regulares de humedad y temperatura, el OMS-33 rociado pierde el 5% por día, debido a su acción fumigante, dependiendo, naturalmente, de la clase de superficie rociada.

Si se aplica 2 g/m2, con la pérdida de 5% por día, se llega a 0.1 g/m2 en el día 60º. Esto dependerá, indudablemente, de la clase de superficie rociada; así por ejemplo, la madera retiene las partículas del insecticida mejor que cualquier otro material.

Lo anterior indica, lógicamente, que a mayor efecto fumigante, habrá menor efecto residual persistente. Pero, el mayor efecto fumigante dará como resultado, una mayor mortalidad, por lo menos en las primeras cuatro semanas después del rociamiento, sin que los mosquitos hayan reposado en las superficies tratadas. Las pruebas efectuadas en el Salvador, Irán y Nigeria fueron concluyentes al respecto.

2.- Algunas indicaciones útiles en el manejo y uso del OMS-33.

a.- El baño y cambio de ropa diario es imprescindible para rociadores, jefes de brigada y todo trabajador que permanezca en contacto con el OMS-33. Si un jefe de sector o supervisor observa el rociamiento con este insecticida, o alguno lo ha manipulado, debe bañarse completamente y cambiar de ropa.

b.- Al preparar la pasta, solamente se deja caer el insecticida, sin sacudir la bolsa, a fín de evitar el polvo de OMS-33 que se desprendería y llegaría hasta el rociador.

c.- Las bolsas vacías de OMS-33 no se acumulan como las de DDT, una encima de otra, sino que se guardan en la primera bolsa vacía, para que al final de la jornada el jefe de la brigada las controle y las queme.

d.- Es necesario agitar la bomba con mayor frecuencia que en el caso del DDT, puesto que el contenido de polvo suspensible es del 50%, mientras el del DDT, es sólo del 25%.

e.- La distancia de la boquilla a la superficie rociada no debe ser comprobada en el momento de rociar, a fín de evitar que el jefe de brigada, jefe de sector, o algún otro, entre en contacto con el insecticida.

f.- Jamás se debe guardar la pasta de OMS-33 para el día siguiente porque no se suspende bien. La suspención ya preparada, puede guardarse de un día para otro, pero es preferible evitarlo.

g.- Los moradores de la casa no pueden ni deben permanecer en los cuartos durante el rociamiento y sólo podrán volver a ellos, dos horas después, como mínimo, si son niños y una hora después si son adultos.

h.- Es necesario barrer el suelo de la casa rociada, con abundante agua, a fín de evitar el polvo, que de todos modos contendrá partículas de OMS-33. Este barrido debe repetirse para recoger todos los insectos que caen al piso, y luego enterrar o quemar la basura.

i.- No deben rociarse las casas o cuartos que tengan enfermos en cama, que no puedan ser trasladados afuera o a otra casa. El rociador volverá en cuanto el enfermo esté recuperado o pueda ser cambiado de lugar.

j.- Toda vez que el rociador o algún otro trabajador entre en contacto con el OMS-33, o sea el insecticida llegue a su piel, debe lavar la parte con insecticida en forma inmediata, con abundante agua limpia.

k.- Está absolutamente prohibido fumar o comer antes de lavarse las manos y cara, toda vez que el trabajador esté en contacto con el OMS-33, sea rociador, Jefe de brigada, jefe de sector.

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tor, supervisor o cualquier otro.

l.- Las habitaciones que sirven para almacenar el OMS-33 no pueden ser utilizadas como dormitorio, ni en casos excepcionales porque si bien es cierto que el insecticida está envasado en bolsas de plástico de 800 gramos y 24 bolsas en una caja de cartón, existe siempre el peligro de que haya fugas de OMS-33, sumamente peligrosas.

m.- Inmediatamente después de que el rociador o algún otro trabajador o morador tenga síntomas de intoxicación con OMS-33, tales como náuseas, dolor de cabeza, vómitos, mareos, parestesias (adormecimiento) de la boca, nariz y garganta, malestar general, sudoración, visión borrosa, nerviosidad, etc., debe ser retirado del lugar y bañado completamente. Si aún así no comienza a recuperar, se le administrará tintura de belladona, de acuerdo con la siguiente dosificación.:

0	- 1	año	3 gotas
1	- 3	años	6 gotas
3	- 5	años	8 gotas
5	- 10	años	12 gotas
10	- 15	años	15 gotas
15	& más	años	20 gotas.

Se pueden repetir estas dosis cada hora, hasta tres veces como máximo. Si no responde el tratamiento anterior, se inyecta en forma intramuscular 2.5 c.c. de atropina a los adultos.

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358

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V. RECOMENDACIONES A LOS HABITANTES.

El rociamiento de las viviendas con OMS-33 exige un mínimo de cuidados, que deben ser estrictamente cumplidos en su totalidad. Es importante recordar que es un rociamiento con insecticida de acción residual prolongada; de manera que el OMS-33, una vez aplicado, permanecerá en las superficies rociadas 90 días, al cabo de los cuales, será nuevamente rociada la casa.

Se recomienda cumplir las siguientes recomendaciones:

1.- Los muebles serán sacados fuera de la vivienda en lo posible, excepto si son demasiado pesados o es imposible hacerlo.

2.- Los alimentos, el agua, los utensilios y trastos se sacarán de las habitaciones o cuartos y se mantendrán cubiertos mientras dure el rociamiento. Una vez terminado el rociamiento, los utensilios y trastos deben ser lavados con abundante agua y jabón.

3.- Los habitantes o moradores deben mantenerse fuera de la casa durante el rociamiento; nadie debe permanecer en los cuartos, excepto el personal del SNEM. Sólo podrán entrar a la vivienda una hora después de terminada la aplicación de OMS-33 los adultos; los niños podrán entrar dos horas después, como mínimo.

4.- Una hora después de terminado el rociamiento de la vivienda, los habitantes deben regar abundante agua en los pisos y barrerlos completamente. La basura y los insectos muertos deben ser enterrados o quemados, a fin de evitar que los animales domésticos, principalmente las aves, se alimenten con ellos.

5.- Todos los habitantes y especialmente los niños deben lavarse las manos y la cara con bastante agua y jabón antes de tomar los alimentos. Esta medida higiénica debe ser practicada diariamente y en toda ocasión de servirse alimentos o de prepararlos.

6.- Es importante cuidar que los animales domésticos no coman los insectos muertos, por lo menos durante tres día después del rociamiento.

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VI. RECOMENDACIONES PARA ROCIADORES.

Sin perjuicio de conocer ampliamente y cumplir todas las recomendaciones e indicaciones dadas, el Rociador de OMS-33, debe también cumplir estrictamente las siguientes:

1.- Usará casco y camisa con mangas largas durante el trabajo de rociamiento, inclusive cuando prepara la pasta y la suspensión y cuando se desplaza de una casa a otra.

2.- A fin de evitar la acumulación de OMS-33 en el cuerpo, el rociador se bañará completamente cada día, al finalizar su trabajo.

3.- Los uniformes deben lavarse preferiblemente a diario, y si esto no es posible, se lavarán a como dé lugar, día por medio, evitando así la acumulación de insecticida.

4.- Durante la preparación de la suspensión se evitará el contacto con el insecticida. Durante el rociamiento se evitará en lo posible cualquier contacto directo con el insecticida debido al viento o a escape de la bomba, etc.

5.- Si por cualquier causa cae el insecticida sobre el rociador durante el rociamiento debe contener la respiración o apartarse lo antes posible.

6.- En caso de tener contacto con el insecticida en polvo o en suspensión, debe lavarse inmediatamente con bastante agua y jabón.

7.- Está absolutamente prohibido fumar y tomar alimentos durante las horas de trabajo.

8.- Antes de las comidas, o tomar agua, o fumar es necesario lavarse bien las manos y la cara con abundante agua y jabón.

9.- Al terminar el rociamiento de la casa, debe hacer las recomendaciones a los habitantes con mucha claridad y tener la seguridad de haber sido entendido.

10.- Durante el lavado del equipo, debe evitar contacto con los residuos de insecticida y sobre todo, evitará que el agua con estos residuos caiga sobre ríos, lagunas, canales, piletas, bebederos, etc. El agua con los residuos debe ser arrojada a lugares donde no haya posibilidad de que la lluvia vuelva a lavarla hacia el curso de agua o depósito.

11.- En caso de sentir trastornos o molestias, deberá avisar inmediatamente al Jefe de Brigada.

12.- El Rociador es responsable de las bolsas de OMS-33 que recibe. Al finalizar el trabajo entregará todas las bolsas vacías y rendirá cuenta del insecticida consumido.

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VII. RECOMENDACIONES PARA JEFES DE BRIGADA.

El Jefe de Brigada debe conocer tanto o más que el Rociador todas las recomendaciones e indicaciones que se han dado. Sin embargo, hay -- instrucciones específicas que debe cumplirlas estrictamente.

1.- Tendrá a su cargo el control almacenamiento y uso adecuado del OFS-33.

2.- Será responsable de que el Rociador cumpla con todas las normas, principios, instrucciones y recomendaciones.

3.- El lavado del equipo debe ser necesariamente supervisado por el Jefe de Brigada, de acuerdo con la secuencia establecida.

4.- Llevará la suficiente cantidad de tintura de belladona y cuidará de que sean administradas las dosis indicadas, en caso de que se presenten síntomas de intoxicación entre los trabajadores del SNEM o entre los moradores.

5.- En el aviso previo de casas, anotará el número de la casa y el nombre del jefe de familia. En la distribución del trabajo diario aparecerán estos datos.

6.- Cuando al jefe de brigada le falte tiempo para el anuncio previo de la vivienda, ordenará al motorista, si la brigada lo tiene, que participe o ayude en el aviso de un número determinado de casas.

7.- Será responsable de que cada uno de los Rociadores de su brigada cumpla con el baño diario y el cambio interdiario o día por medio de la ropa.

8.- Los casos de renuencia serán, en lo posible, resueltos por el - Jefe de Brigada. En caso contrario, dará parte inmediata al Jefe de Sector.

9.- Igualmente, cuando se encuentren casas cerradas procurará por todos los medios posibles conseguir que sean abiertas, y sólo después de agotar esfuerzos, dará parte inmediata al Jefe de Sector.

10.- Cualquier incumplimiento de las normas, indicaciones o recomendaciones por parte de los Rociadores, será corregida inmediatamente por el Jefe de Brigada. Informará al Jefe de Sector en casos de reincidencia.

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VIII. RECOMENDACIONES PARA JEFES DE SECTOR.

La experiencia ha demostrado que el cumplimiento de las normas establecidas, de las indicaciones y de las recomendaciones, ha sido la causa principal, por no decir la única, de los casos de intoxicación e intolerancia, tanto en el público como dentro del propio personal del SNEM. Las quejas del público se originan generalmente en la falta de cumplimiento por parte del personal del SNEM de estas normas, relacionadas con las recomendaciones a los moradores, manipulación del insecticida, aseo personal, conducta, modales, etc.

El Jefe de Sector, como funcionario responsable de un cierto número de brigadas, debe cumplir y hacer cumplir las siguientes recomendaciones.

1.- Efectuar supervisiones completas, comenzando con la revisión del equipo y presentación personal, verificando la hora establecida de iniciación del trabajo, preparación de la pasta y de la suspensión, técnica de rociamiento, recomendaciones a los moradores, lavado de equipo y baño diario de los rociadores y Jefe de Brigada.

2.- Supervisará al Jefe de Brigada cuando éste supervise a los Rociadores. Cualquier incumplimiento de las normas por el Jefe de Brigada será corregido inmediatamente por el Jefe de Sector, lejos de la presencia del Rociador. Debe tener presente el Jefe de Sector, que supervisar no es fiscalizar, sino verificar la calidad del trabajo y corregir las fallas y faltas, enseñando.

3.- Verificará el desempeño del Jefe de Brigada en los casos de renuencia, de intolerancia o intoxicación, y en la solución de los problemas que se presenten.

4.- En caso de dificultades o problemas serios, ayudará al Jefe de Brigada a solucionarlos, en forma efectiva, y no simplemente ordenándole.

5.- Será responsable del almacenamiento adecuado del OMS-33 y de su distribución oportuna a las Brigadas. Asimismo, verificará el almacenamiento del insecticida a nivel de Brigada.

6.- La supervisión del rociamiento con OMS-33 tendrá prioridad sobre cualquier otra actividad propia del Jefe de Sector.

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RUMJGK/AMEMBASSY COLOMBO 0589
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AIDAC

E.O. 12065:N/A

TAGS:

SUBJECT: INSECTICIDE PROCUREMENT-FENITROTHION, 40 PERCENT

REF: NEW DELHI 15853

1. SUBJECT PRODUCT IS ELIGIBLE FOR PROCUREMENT UNDER AID REGULATIONS FOR MALARIA CONTROL EFFORTS.

2. IEE, INITIAL ENVIRONMENTAL EXAMINATION FORM, MUST BE SUBMITTED TO AID PRIOR TO PROCUREMENT AND USE. VANCE
BT
#0491

P L A G U I C I D A S

DISPONIBILIDAD Y DEMANDA PARA 1 9 8 3
INSECTICIDAS SOLIDOS (KILOGRAMOS).

PRODUCTO	CONSUMO 1982	EXISTENCIA	ESTIMADO 1983	VALOR UNITARIO $	DEFICIT KG.	DEFICIT $
ALDRIN 2.5%	338,277	80,051	280,051	3.	* 5,000	15,000
BASUDIN	60,067	43,801	66,600	0.67	22,999	15,409
CLORAMEP 2.5% G.	127,500	45,708	141,666	0.56	95,958	53,736
" 5% P.	4,900	- - -	6,900	0.91	6,900	6,279
" 5% G.	84,731	207	94,252	0.81	94,045	76,176
CURATER 3% G.	14,697	- - -	16,900	19.60	* 680	
" (Exportac.)	106,260	- - -	150,000	" "	* 4,500	102,564
CURATER 5% G.	50,149	2,346	57,671	" "	* 3,001	
" (Exportac.)	58,903	- - -	78,000	" "	* 3,900	135,260
CURATER 10%	14,306	- - -	14,500	" "	* 1,450	28,420
DISYSTON 10% G.	70,992	8,510	85,000	5.50	* 7,649	42,070
CYTROLANE 2% G.	1,932	- - -	2,400	0.96	2,400	2,304
DIPTEREX 95%	17,417	6,345	21,500	2.90	15,155	43,950
FOLIDOL M-2	708,432	147,062	920,000	2.69	* 21,004	56,501
FURADAN 3%	31,510	- - -	34,800	1.00	34,800	34,800
FURADAN 5%	44,367	- - -	49,000	1.39	49,000	68,110
LANNATE 90%	12,000	8,200	13,300	10.36	5,100	52,836
LORSBAN 25% G.	262,200	69,114	290,000	0.57	220,886	125,905
MATABABOSAS	85,000	- - -	110,000	1.00	110,000	110,000
MOCAP 10% G.	7,600	1,400	8,400	0.76	7,000	5,320
NEMACUR 5%	4,600	- - -	15,000	1.52	10,000	15,200
ORTHENE 95%	2,310	120	2,541	22.00	2,421	53,262
THIMET 10%	9,968	2,420	11,000	1.16	8,580	9,953
UNDEN 50 P.M.	351	- - -	200	15.00	200	3,000
VOLATON 15% G.	42,596	1,900	55,000	5.70	* 800	4,560
" 25% G.	600,939	84,437	690,000	" "	* 15,140	86,298
" 25% P.	218,192	32,384	230,000	" "	* 4,941	28,164
SUB-TOTAL	2,980,196	534,005	3,429,881	- - -	685,444	
					* 68,065	1,175,077

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INSECTICIDAS LIQUIDOS (LITROS)

PRODUCTO	CONSUMO 1982	EXISTENCIA	ESTIMADO 1983	VALOR UNITARIO $	DEFICIT LTS.	DEFICIT $
ALDRIN 24 CE.	15,773	3,099	15,773	3.00	* 3,042	9,126
AZODRIN 5 CS.	40,133	4,851	44,590	7.50	39,739	298,042
DISYSTON 8 LC.	4,189	- - -	5,000	5.50	* 4,000	22,000
FOLIDOL M.48	39,401	9,362	43,800	2.69	* 16,530	44,465
MALATHION 57%	12,118	446	13,464	3.50	13,018	45,563
THIMET LC- 8	2,216	- - -	2,450	5.50	2,450	13,475
VOLATON 50 E.C.	17,926	4,402	20,000	5.70	* 8,000	45,600
SUB- TOTAL	131,756	22,160	145,077	- - -	55,207 * 31,572	478,271
TOTAL						1,653,348

* Expresado en Kilogramos de Material Técnico.

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AREA AND INSECT	INSECTICIDE	POUNDS OF ACTIVE INGREDIENT TO APPLY PER ACRE UNLESS OTHERWISE INDICATED	WHERE AND WHEN TO APPLY	SAFETY RESTRICTIONS
NONCROP LANDS1/ AND STRUCTURES				
Mosquito larvae	Chlorpyrifos	0.0125-0.05	To standing water containing mosquito larvae.	Chlorpyrifos at 0.05 lb. per acre is intended for use on waters or over land with medium to heavy vegetative cover where valuable shrimp, crabs, or fish do not occur.
	Fenthion	0.05		
	Fuel oil, #1 or 2	1-14 gal.		
	Methoprene	0.02-0.027		
	Parathion	0.1		
	Temephos	0.01-0.05		
Mosquito adults	Carbaryl	0.025-0.05	Apply as ULV aerosol, mist, spray, or fog.	Dosages of fuel oil below 7 gal. per acre will be effective only if applied by properly trained personnel using adequate equipment. Do not apply more than 1 gal. per acre on water containing emergent vegetation.
	Chlorpyrifos	0.025-0.05		
	Fenthion	0.1		
	Malathion	0.1-0.5 0.15-0.5 ULV		
	Naled	0.1-0.25		
	Propoxur	0.05-0.07		
	Pyrethrins + Piperonyl Butoxide	0.002 + 0.01 to 0.008-0.04		
	Resmethrin	0.007		
	Carbaryl Chlorpyrifos Fenthion Malthion Methoxychlor Propoxur	See label.	Apply as residual spray on non-agricultural vegetation or structures used as resting sites by mosquitoes.	

1/ Does not include areas grazed or cut for hay.

AREA AND INSECT	INSECTICIDE	POUNDS OF ACTIVE INGREDIENT TO APPLY PER ACRE UNLESS OTHERWISE INDICATED	WHERE AND WHEN TO APPLY	SAFETY RESTRICTIONS
RANGE				
Mosquito adults	Carbaryl	0.25-0.5	Apply as ULV aerosol mist, spray or fog.	
	Malathion	1/0.1-0.5		
	Pyrethrins + Piperonyl Butoxide	Approx. 0.002 + 0.01 0.008 + 0.04		
PASTURE				
Adult mosquitoes	Carbaryl	0.25-0.5	Apply as ULV aerosol, mist, spray or fog.	
	Fenthion	0.05-0.1		
	Malathion	0.1-0.5 0.15-0.5 ULV		
	Naled	0.1-0.25		
	Pyrethrins + Piperonyl Butoxide	0.002 + 0.01 0.008 + 0.04		
Mosquito larvae	Methoprene	0.02-0.027	Apply with aerial or ground equipment. Apply methoprene each time the pasture is flooded.	

MOSQUITOES

AREA AND INSECT	INSECTICIDE	POUNDS OF ACTIVE INGREDIENT TO APPLY PER ACRE UNLESS OTHERWISE INDICATED	WHERE AND WHEN TO APPLY	SAFETY RESTRICTIONS
RICE FIELDS 1/				
Mosquito larvae	Methoprene	0.02-0.027	Apply to standing water in fields.	Do not apply Methoprene after rice reaches heading stage.
	Parathion	0.1		
HOUSEHOLD				
Adult mosquitoes	Allethrins Chlorpyrifos Malathion Permethrin d-Phenothrin Resmethrin Pyrethrins + Piperonyl Butoxide	See label.	Apply as space spray as needed. (Some of these materials are available in aerosol spray cans)	

1/ For application where other crops are concerned, consult the product label for limitations.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

MAY 3 1983

OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

Larry Cooper
ncy for International Development
artment of State
fice of Health RP709
shington, D.C. 20520

ear Mr. Cooper:

With reference to the telephone conversation on the morning of ay 2, 1983 regarding insecticides and mosquito control in the USA, we ave enclosed a copy of the mosquito control recommendations section rom the 1982 U.S. Department of Agriculture Guidelines for the control on insect and mite pests of foods, fibers, feeds, ornamentals, livestock and households. These recommendation represent most of the principal registered compounds used today in the United States. Some additional principal compounds are listed below for the indicated mosquito stage and site of application.

Mosquito Larvae
Bacillus Thuringisensis var. israelensis
Flit Mosquito Larvacide oil
Malathion
Methoxychlor

Mosquito Adults - Household - Space Spray
DDVP
Methoxychlor
Naled

Mosquito Adults - Household - Residual Spray
Malathion
Methoxychlor
Propoxur
Sumithion (Anophelene species only)

With respect to your questions on the status of Landrin and Actellic, neither compound is registered at present for control of mosquitoes in the United States. The mono layer compound you inquired about is not registered for control of mosquito larvae.

If there are any further questions concerning any other compounds for mosquito control in the United States, we will be glad to be of assistance to you.

Yours truly,

Dr. Alexander R. Tarr

for Herbert S. Harrison, Chief
Insecticide/Rodenticide Branch
Registration Division

ECONOMIC ANALYSIS

Dr. Ronald Vogel/James Jeffers June 1, 1983

I. INTRODUCTION

Investments in health in El Salvador presents some rather special problems due to the prevailing conditions of mass violence, rather continuous civil and social unrest, and political uncertainty. Stress and anxiety levels are very high. The probability of mass conflict and resulting large volume of human casualty remains great. Under such circumstances economic patterns and processes are more greatly distorted than in the usual case of a developing country. In view of this, non-economic factors such as considerations for safety, survival and avoidance of conflict, (political or social) dominates resource allocation and pricing decisions which under ordinary circumstances would adhere more closely to a strict economic motivations and rationals. Thus under the circumstances prevailing in El Salvador there is substantial unemployment of both capital and labor. The combinations of capital and labor are employed are clearly not optimally efficient in production. Government land reform policies that are being undertaken during the current period (while they are expected ultimately to lead to realization of greater efficiency and equity) have altered labor, land, and capital proportions leading to substantial distortions in patterns of absolute and relative prices.

Matters are further complicated in the case of the proposed project in that it impacts virtually on the entire range of the health care delivery system. The objectives of the health delivery system are extremely broad in scope. For example, in 1983, the Government of El Salvador, publicly declared the following basic objectives for its health care system:

(1) The lowering of the mortality rate for those groups most affected, particularly in rural areas and in marginal urban areas.

(2) Reduction in the incidence of those types of illness susceptible to control by either vaccination or by changes in the environmental and by health education.

(3) Control of population growth so that it coincides with the exigency of social and economic development.

(4) Reduction in morbidity, especially for the most vulnerable groups, namely, infants, pre-school children, children in schools, and those persons who are economically active.

(5) Protect the population's health, with special attention directed to those groups who are most vulnerable.

(6) Make available to the population an adequate diet that will have the ulmost nutritional content.

(7) Ameliorate the physical environment, reduce the incidence of infectious-contagious diseases, and eliminate air and water pollution.

(8) Take a holistic view of personal health that covers both mental and physical health.*

In order to achieve these basic objectives, the GOES proposes the following strategies:

(a) Expand health services coverage in already existing facilities, and in those that will soon be built;

(b) Improve the physical environment, with priority given to the provision of potable water, the control of vector-borne disease, and the insurance of the proper disposal of human and animal waste;

(c) Mount campaigns against those illness that are susceptible to control by means of immunization and create permanent program for such;

(d) Increase the control of malaria;

(e) Give more emphasis to infant-maternal programs;

(f) Set up mechanisms that will allow the national health system to function more effectively;

(g) Facilitate as much as possible the development of human capital;

(h) Increase emphasis upon health-education for the people;

(i) Reform and improve administrative services at the institutional level.

The proposed USAID project directly bears upon most of these objectives and strategies. Indeed, the proposed project will strengthen virtually all aspects of the Salvadorean health care delivery system which serves roughly 85 percent of the total population.

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* Ministerio de Hacienda, Ley de Presupuesto General, 1983, p.129.

There are significant project direct benefits which are intended to eventually result in government expenditure reduction e.g., the cost savings eventually resulting from an efficient MIS system leading to better inventory control and reduced wastage. However, the bulk of project benefits will be received by the mass population through the medium of more and better health services leading to reduced mortality, morbidity, pain and suffering and anxiety. Ultimately these health benefits will be realized in the form of increased physical and mental productivity on the part of nearly all of the population

II. METHODOLOGY

A. Maintained Hypotheses

1. The health of the population (i.e. up to 85% percent) will directly benefit from the proposed project.

2. Ultimately the health benefits of the project will increase the productivity of the population.

3. The increase of productivity can be roughly measured as percent increases or reduced rates of decreases in Gross National Product (GNP) over the life of the project.

B. Discussion

Note that the last assumption in section II.A. above recognizes that during the life of the project, actual GNP may decline due to political and broad economic circumstances. The contention is that project benefits, ceteris paribus, are positive and can be measured at this point in time as potential increments to GNP over the life of the project. Thus principal attention in the cost/benefit approach followed with respect to the proposed project is focussed on forcasted positive increments in GNP over the life of the project.

The discounted aggregate increment to GNP when compared to discounted costs over the life of the project constitutes a cost/benefit analysis of a rather gross sort which appears to be the most appropriate approach for analyzing the economic value of a broad sectorial intervention of the type the proposed project represents.

The internal return, the annual rate of increment in GNP, which equates discounted costs and benefits must be positive. In addition, rates of increase also must be reasonable in the sense that prospects for achieving them must appear feasible as a result of undertaking the project. Therefore, the sensitivety analysis that seems most appropriate concerns variations in the discounted benefits measured as increments to GNP which depend on the levels of population coverage and rates of growth in GNP over the life of the project.

The approach followed below presents discounted cost data under alternative assumptions concerning rates of inflation incorporated into the discount rates used. Next, the discounted benefits of the project

are presented in a sensitivety analysis framework which incorporates alternative levels of population coverage and potential rates of growth in GNP. Finally, these discounted benefits are compared with discounted costs, both of which are presented in present value terms and the feasibility of incremental GNP growth rates is assessed in connection with levels of project population coverage or impact.

III. DISCOUNTED COSTS AND BENEFITS

A. Discounted Costs

Apart from the recurrent costs identified in association with the various project components, the GOES required contribution to the project is $8.33 Millions (M) calculated at the official rate of exchange $1 = 2.5 colones. For simplicity, it is assumed that this sum will be expended during the first year of the project. In addition, of the total $25.0 Million AID contribution, $23.5 Million is in the form of a loan. This loan must paid back at the end of 40 years, and interest is to be paid at the rate of 2 percent during the first 10 years and at 3 percent for remaining 30 years. Thus the total costs to the GOES include $8.33 M of matching initial contribution, plus interest payments over the 40 year loan period, plus repayment of the $23.5 M loan at the end of 40 years.

In order to discount the future values of interest payments and re-payment of the loan principle to the present, two alternative interest rates are used, 3 and 8 percent. These rates have been offered in the interests of providing a "spread" of rates reflecting the cost of capital. The 3 percent rate is taken as the "real cost" of capital excluding inflation. The 8 percent rate incorporates an estimated 5 percent world inflation rate. Thus the 8 percent discount rate is a nominal interest rate reflecting the real cost of capital (opportunity cost reflecting the marginal efficiency of capital which under present conditions is very low in El Salvador), plus the rate of world inflation estimated to average 5 percent over the period of the loan.

The total cost of the project to El Salvador is as follows:

1.($8.33M) representing the initial matching contribution.

2. ($23.5M) $(1.02)^{10}$ - $23.5M = $5.15M representing interest payments on the loan for the first 10 years.

3. ($23.5M) $(1.03)^{30}$-$23.5M = $33.54M, representing interest payments on the loan required during the last 30 years of the 40 year loan period, and

4. $23.5M, representing repayment of loan principal.

These values must be discounted by 3 and 8 percent respectively to yield a spread of present values. These present values are presented in Table E-1 below.

TABLE E-1

Present Values of Project Costs to El Salvador at Alternative Discount Rates, ($1000)

Type of Cost	3%	8%
1. Initial $8.33M	---	---
2. 10 years of interest at 2%	3.83	2.39
3. 30 years of interest at 3%	10.28	1.54
4. Payment of $23.5M of loan principal after 40 years.	7.20	1.08
SUB-TOTALS	21.31	5.01

Source: Calculations of the authors.

The total costs equal the sub-totals plus the initial $8.33M GOES matching contribution. Hence, the present values of the costs of the project to El Salvador are $21.31M + $8.33M = $29.64M at a 3 percent discount rate, and $5.01M + $8.33 = $13.34M at an 8 percent discount rate, respectively.

B. Discounted Benefits

Benefits are calculated as the monetized increments to GNP which vary according to the levels of population covered (10 to 85 percent) and the rate of increment to GNP. Two rates of increments to GNP are presented for purposes of this analysis, 1 and 5 percent. GNP figures used are for 1981 and total population 4,969,000 also pertains to that year. The results of these calculations are presented in Table E-2 below

TABLE E-2

Sensitively Analysis of Benefits Accordint to Percent of Population Covered and Incremental Rates of Productivity, ($1000)

% Population	Incremental Productivity .01	.05
.10	3,512	17,558
.20	7,023	35,115
.30	10,535	52,674
.40	14,049	70,214
.50	17,558	87,789
.60	21,070	105,350
.70	24,582	122,908
.80	28,093	140,466
.85	29,849	149,246

Source: Calculations by the authors.

Basis of calculations follows the equation: V = (P x C) I x GNP/P); where V = monetary nominal value, P = population in 1981, C = % population coverage, I = incremental productivity in GNP, and GNP = Gross National Product in 1981.

The figures in Table E-2 show the undiscounted monetized benefits of the project according to levels of population impact and potential levels of increments to G.N.P. The next step that is necessary in order to convert project benefits to present values is to discount these benefit streams.

Many or most of the benefits of the project will last beyond the 2 years of life of the project. Improvements in MIS, vehicle maintenance, inventory control and logistics and supply management will extend far beyond the life of the project. The equipment and vehicles purchased have an estimated useful life ranging from 10 years in the case of vehicles, to perhaps 20 years in the case of many items of equipment purchased under the project. Because of the difficulty in sorting out all the various periods of impact of the project benefits and discounting each by an appropriate discount rate, it is necessary to make some simplyfing assumptions. First, it is assumed that all project benefits are realized in just two years, i.e., during the life of the project. Second, that the appropriate discount rate is the higher of the two rates used previously in discounting project costs. Thus, the rate of discount used to discount project benefits is 8 percent (compounded) in each of the the two years of the life of the project).

Note that these assumptions are rather conservative in that they tend to understate the present value of project benefits relative to costs, since they involve a very brief period of project benefits and the higher of the two discount rates is selected for discounting benefits.

Table E3 below presents the results of discounting the values presented in columns 2 and 3 of Table E-3 by 8 percent, assuming that these nominal monetized benefits occur in both years of the project.

TABLE E-3

Sensitivety Analysis of Discounted Benefits over Two Years Life of Project According to Levels of Population Coverage and Incremental Rates of Productivity ($1000)

% Population	Incremental Productivity	
	.01	.05
.10	6,263	31,311
.20	12,524	62,619
.30	18,787	93,932
.40	25,053	125,210
.50	31,311	156,551
.60	37,573	181,867
.70	43,836	219,178
.80	50,097	250,488
.85	53,229	266,145

Source: Calculations of the authors.

Basis for Calculations follows the equation: P.V. = V/ 1.08 + V / (1.08); where P.V. = present value and V = nominal benefits in each year depending on .01 or .05 incremental productivity as preesented in columns 2 and 3 of Table E-2 above.

C. Discussion of Comparison of Discounted Costs and Benefits

Comparising the results of Table E-3 with the results obtained in connection with Table E-1, note that in almost all cases the present value of project benefits exceed the present value of project costs. The most reasonable discount rate would appear to be 8%. Given this rate the present value of project costs is $13.34M (see the paragraph immediately following Table E-1). With only a one percent increase in productivity, the project would have to impact only on slightly more than 20 percent of the population in order for project benefits to exceed project costs in present value terms.

Note that choosing a discount rate higher than 8 percent would reduce the present value of project costs more than the present value of project benefits. This is the case, because project costs extend over an interval of 40 years and project benefits are held to only two years as a matter of conservative assumption for purposes of this analysis.

It is believed that the project will impact favorably on roughly 85 percent of the population. However, even if the project were to impact favorably on only 50% of the population, incremental productivity as a result of this project could be less than 1/2 of 1 percent and still realize a present value of project benefits in excess of the present value of project costs. Single year monetary costs at .5 of 1 percent of incremental productivity and assuming 50 percent population coverage would produce a present value of benefits of approximately $15.7M, which is in excess of $13.34M, the present value of project costs.

516