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SECTION I - INTRODUCTION

In January 1986 AID requested that PATH utilize the services of an outside business person to assist in evaluating 12 subprojects that had been developed by PATH in accordance with its Grant No. PDC-002-G-SS-4184-00. The primary purpose of this grant is to establish health-related businesses in the private sector, primarily in Thailand and Indonesia. To fulfill AID's request, PATH hired Jonathan A. Green (the Consultant) for approximately 30 days of professional effort, approximately 15 of which were to be spent on site. The enclosed document is a draft report on these efforts.

In addition to work on the site, meetings were held in Washington and Seattle for orientation to the project and debriefing meetings are planned for Washington and/or Seattle.

At the orientation in Seattle, it appeared that there were 14 subprojects that needed to be considered. This compares with approximately 18 projects between the two countries that AID had been tracking as of their internal correspondence January 2, 1986 from Robert Dodson to Russell Henderson and to the 12 projects identified by Compton Chase-Lansdale upon which the Consultant based his proposed scope of work.

While it had originally been envisioned that the outside Consultant would merely evaluate each of the active projects identified by PATH as still being potentially viable, the actual effort deviated somewhat in that additional projects surfaced during the visits to the site and a substantial portion of the Consultant's efforts were devoted to assisting in turning various projects into closed, bankable deals. Also added was a request to evaluate the bank's and PATH's subconsultants.

The enclosed report, therefore, goes a bit beyond the original anticipated scope of work to suggest possible areas for clarification by PRE/PATH as well as a blow-by-blow description of subprojects, banks, agencies, and subcontractors together with suggestions for pushing projects to completion.

SECTION II - OVERVIEW

Conclusions and Recommendations

Decisions for PRE

Shifting Projects

Clarifying Policies and Objectives

General Operating Procedures

Banking Relationships
(see also Section IV - Meetings Regarding Banking in
Thailand and Indonesia)

General Observations

SHIFTING PROJECTS

1. Some of the major projects which have absorbed enormous energy from PAKH during the first year of the project are going to require either substantial additional research, applied research, or development before they will come to a stage which results in subprojects which can provide major value added economic activity to either Indonesia or Thailand. Specifically, the rabies vaccine, hepatitis B vaccine, and larvacide subprojects - while among the most significant from a long-term health impact in the countries involved (as well as in other AID target countries) - face major institutional and technical hurdles which will have to be resolved and which will require significantly more effort than was ever anticipated to be expended on any single subproject under the current grant. However, the work that has been expended so far has NOT necessarily been wasted and, indeed, much of it is extremely valuable from a health standpoint. Nevertheless, it is unlikely that these projects will go to commercial operation during the present life of the Grant. A detailed description of the situation regarding these projects appears in Section III - Project-by-Project Analysis -Projects to be Supplemented and/or Shifted.

Consequently, it is recommended that a detailed review of the status of five projects be undertaken in conjunction with the Science and Technology wing of AID as well as with Mission staff and that these projects be considered for funding on a long-term basis separately from the Health Link program.

CLARIFYING POLICIES AND OBJECTIVES

2. The objectives, structure, evaluation measures, etc. of the Grant are too wide-ranging and multi-faceted:

- . A primary thrust of the program is to promote the private sector economies of the target countries.
- . A second objective is to provide services or products related to health or nutrition to the lower-income sectors of the target countries.
- . A third set of other potential objectives or points which are mentioned in the Grant and might be used to measure the success of the effort include:
 - The writing of technical plans.
 - The writing of feasibility studies.
 - The placing of loan guarantees on new projects.
 - The number of new companies started.
 - The number of products introduced.
 - The expansion of output of existing products.
 - Reductions in price of existing health and nutrition-related products.
- . A fourth objective that seems to be implicit in the operating methods of PATH as the program has proceeded is the strengthening of private sector banks in their ability to undertake the financing of health and nutrition products by indigenous private-sector entrepreneurs.

It is recommended that these various objectives or measurements of program performance be prioritized and clarified by PRE and that these clarifications be accepted by PATH at as early a date as

possible. Among the items which require clarification are the term "low-income people," and "substantial relevance to the basic health or family planning needs."

GENERAL OPERATING PROCEDURES

3. The requirements in the grant for technical studies followed by feasibility studies (followed by loan applications) are confusing and should be reconsidered. At present, the "technical study" amounts to about half of what generally is viewed as a "prefeasibility study." (A prefeasibility study should establish the basic technical possibilities and economic sense of a public or private-sector project up to some level of confidence, perhaps +25 percent.)

"Feasibility studies" on the other hand, are designed to provide greater levels of confidence in the predictions of both cost and benefit for public sector projects perhaps to a level of +5 percent (although this value is determined on a case-by-case basis and is not a fixed part of the state of the art.) Feasibility studies are appropriate and necessary for major undertakings by the government sector for projects that may have a substantial portion of the benefit side coming from indirect and nonmonetized sources. Societal or national benefits which are externalities to the project itself are often important in a feasibility study and are usually a major part of the justification for a project.

A straight a business deal must stand entirely on its own two feet. Both income and benefits are measurable and cost should be determined before undertaking an investment. For these reasons, recent work in the business field has pretty much abandoned the concept of undertaking "feasibility studies" for potential business investments and, instead, has developed a somewhat more rigorously defined analysis that is now called a "business plan." The most important difference is that a business plan should explicitly expose

those elements of a proposed investment which are particularly sensitive and have a major impact on the success or failure of a future venture: In some business plans the marketing study is crucial; in others, interest rate changes, foreign exchange fluctuations, or cost of raw materials are critical; and these especially sensitive elements of the business plan will receive special and expanded attention.

In the case of Health Link, an additional complication exists: some projects come to the attention of Health Link which require or at least benefit from a loan guarantee but have already had substantial workup, feasibility analyses performed, or business plans prepared in order to qualify for private bank financing. In these cases, the need for a "feasibility study" by PATH is reduced or eliminated and instead all that is required is a thorough review of work already performed.

For all of these reasons as well as those cited under point No. 4 below, it is recommended that the requirements of the Grant relating to technical studies, feasibility studies, etc. be clarified and amended.

4. During the on-site investigation of the status of projects, a major source of potential new projects was presented to the Consultant. In particular, Mahidol University in Bangkok has already taken a number of aggressive steps and obtained permission to spin-off businesses which would be at most partially owned by the university (a government-owned institution) but which would be substantially (majority) owned by private sector actors. These investors could include

members of the university staff or unrelated entrepreneurs or private sector companies.

As could be expected, many of the best future projects in the health and nutrition fields for countries such as Thailand and Indonesia are being worked on at university levels where applied research is being performed to modify existing products or develop new products for local markets. Much of this work may also have application in other developing countries that are supported by AID programs, and in fact, some of the research is undoubtedly receiving at least indirect support from AID programs. If the model that is now being used in the United States by such institutions as Stanford University, the Massachusetts Institute of Technology, the Carnegie-Mellon University, etc., is followed in developing countries, the universities occasionally will participate in partial ownership of some of the projects that are an outgrowth of the research done by its staff.

It is felt by the Consultant that partial ownership by government-owned institutions, especially educational/research institutions, should not disqualify a company from participating in the Health Link program so long as the project is defined and developed on a free market, profit-making basis without the benefit of special government support in its competition with either imports or other private sector businesses. It is recommended that so long as a business is less than 40 percent owned by a government institution, it should be entitled to participate in the development of Health Link-type products utilizing Healthlinks' support provided that,

wherever possible, a provision be made for private sector participants to purchase half the government's share at some predetermined stage of the company's development so that the government-related institution's share would max out at 20 percent in the long run.

5. Some of the subprojects with long-term profit potential which are under development within university departments and which will need the technical input of university faculty and staff in order for them to move to successful commercial operation suffer from a shortage of venture or equity capital at their present stage. While substantial sums have been invested (both in money and technical time) by the university (this is one of the reasons why the universities have some right to claim an equity and/or royalty position from the fruits of this work), additional funds for commercializing the projects may not exist at the moment. It is at this point that the Health Link program can provide a valuable service by undertaking either a preliminary feasibility study or, preferably, the development of a preliminary business plan. If a promising idea turns out to have commercial viability, it will then be possible to obtain private-sector investment; and, at that point, it may be possible to charge the investors for the expenditures made for prefeasibility studies or business plans. Therefore, it is recommended that up to that point where university initiated concepts have been proven through PATH/Health Link study, a waiver should be provided with regard to the cost recovery section of the Grant provisions.
6. A variety of actors presently are involved in activities of a similar nature to that of PATH, and additional players are anticipated to come on board in the near future. Consequently, it is recommended

that the various Consultants, Missions, projects, mission personnel, Science and Technology personnel, other multinational agency personnel and their consultants, and PRE personnel convene on a semi-annual basis to discuss the work that is going on in the development of private sector businesses in Thailand and Indonesia in order to do the following things:

- . Identify areas of overlap.
- . Identify productive areas for cooperation.
- . Identify gaps in the process of developing private sector businesses.

BANKING RELATIONSHIPS

(See also Section IV - Meetings Regarding Banking in Thailand and Indonesia.)

7. The normal situation for a business person is to develop a long-term relationship with a major bank. By virtue of this long-term association the officials of the bank can learn to depend upon the quality of judgment and honesty of the borrower, and over the long-term a bank may finance the borrower in both very safe periods as well as during times of economic difficulty and increased risk. A bank that has provided continuing long-term services to a borrower, including during periods of some business difficulty, deserves the opportunity to finance high-quality projects, especially when the risk has been minimized by a U. S. Government guarantee. It verges on the unethical to have a borrower take a low-risk, guaranteed project to a new bank rather than giving his long-term bank the opportunity to participate in a worthwhile project.

Additionally, it has been found that opportunities for fruitful private sector investments in the health and nutrition fields have been "surface" by Chase-Manhattan Bank in Indonesia and recently by the Bangkok Bank in Thailand. It certainly would be improper to take these opportunities to another bank after the project was originally identified by a nonparticipating bank. Consequently, it is recommended that no restrictions be made prohibiting utilizing the domestic branches of foreign banks or any other major local banks, and that all major private banking institutions be encouraged to identify fruitful project opportunities for the Health Link program.

8. The present interest rate from private banks in Thailand is 15 percent for industrial investments. (It is 15-1/2 percent for both working capital and capital investments in nonmanufacturing sectors.)

On January 24, 1986, in Indonesia the prime rate was 22 percent at the private banks, although the actual rate to good customers often is reduced by two or more points depending on the strength of the security and the other factors used by the banks to evaluate an investment. On the other hand, in Indonesia the government owned banks are lending money at only 15 percent.

Given the present rate of inflation in Indonesia as well as the cost of money around the world, an interesting and paradoxical situation exists in the Indonesian banking scene: "free market" rates are available from the government-owned banks, while the privately owned banks are charging artificially high interest rates as a result of government restrictions on the money supply in Indonesia. The result of this peculiar set of circumstances (which is complicated even more by the fact that it is not impossible to obtain rates of 10 to 12 percent from off-shore banking institutions which utilize the world "free market" interest rates for dollars) is that many potential investors in plant expansion naturally prefer using government banks in Indonesia rather than privately owned banks - even with the incentive of a U. S. Government guarantee for half the borrowed amount!

Given that the primary thrust of the Health Link program is to promote realistically financed, private sector, profit-making enterprises in the health and nutrition fields, it is therefore recommended that no restrictions be placed on the technical assistance provided by Health Link or the loan guarantees that are associated with the Health Link program in terms of what bank is utilized to provide the loan, so long as that bank is able to perform the,

responsible functions of lender upon which the Health Link program depends. If it is felt that government-owned banks do not have the technical expertise to properly evaluate the quality of a borrower's project and provide sufficient protection for the guarantor, then this responsibility can be assumed by either the PATH staff, outside consultants or U. S. Government personnel.

GENERAL OBSERVATIONS

9. Much to the surprise of the Consultant, it was found that, at present, Indonesia seems a much more conducive area for successful implementation of the Health Link or other privatization efforts than Thailand. Two possible reasons for this may be that:
- . The technical input which is provided from outside the country has a much greater incremental impact in Indonesia (than in Thailand) because Indonesia's technical and professional expertise is spread more thinly over its large population.
 - . The recent sharp declines in oil prices seems to be causing a major change in the views of the Indonesian government as to the importance of the role of the private sector in Indonesia's economic development. This presents a major target of opportunity for enhancing the role of the private sector.
10. A substantial amount of the effort expended on a project such as Health Link may be devoted to ideas and concepts which do not carry through to a U. S. Government-sponsored loan guarantee. In addition, some of the prefeasibility studies and even business planning (feasibility study) effort may have been expended on specific firms that did not proceed with an investment. This does not mean, however, that the work had no effect. In many cases, the stirring up of interest in a concept becomes known within the community (these are very small business communities in both Indonesia and Thailand) and the effect is to hasten a competing firm in its development of a commercial venture in the area being worked on by the Health Link staff.

One such example of this "stirring the pot" effect was in the infant weaning food project in Indonesia. The Consultant made a special point of visiting the firm that "beat Health Link to the market" in order to determine whether their speed of implementation was affected by their knowledge of what PATH was doing with a competitor. This suspicion was confirmed to the Consultant. The balance of the meeting was then used to develop a relationship between PATH and the more aggressive firm which hopefully will generate rapid action on other nutrition-related Health Link projects.

Consequently, it is recommended that during the evaluation of the performance by PATH under the Health Link program, that the "stirring of the pot" effect be examined by the evaluators.

11. Although the Consultant specifically requested not to evaluate the overall performance by the institutions involved in implementing the Health Link program, a number of overview conclusions can and should be presented at this stage:

- . There is no question that a learning curve has been involved for all participants in this program. Even though PATH was well informed on the general subject of health and nutrition-related technology, the field is so broad and the specific opportunities to be applied in any particular economic system or country are so individual, substantial initial effort had to be expended in identifying the primary targets for successful investment in the specific countries identified for this project.
- . For each country, establishing additional relationships with the business community, the banking community, the government (a necessary contact point given the high degree of regulation of

business that exists in the target countries), as well as with the specific possible suppliers of technology from outside the target countries requires a certain amount of set-up time. This also slows down the implementation of project objectives, especially during the first year.

There is some learning curve time required in taking an institution such as PATH which has predominantly operated in the not-for-profit sector to focus their thinking and efforts on developing nonsubsidized profitable businesses in the health and nutrition fields.

As with any major new project, some of the staff members will perform better than anticipated while the performance of others will be disappointing. This is true whether the personnel assigned are long-term employees or new hires. Consequently, it can be expected that some of the effort, particularly in the early stages of a project such as Health Link, will be misplaced or ineffective. The Consultant believes that PATH would not necessarily disagree with this point and would point in particular to a disappointing experience with a key staff member in Thailand who had been hired to play an important coordinating role in that country. Thus, shaking down the organization has been part of the early phase of the Health Link program.

Some of the most important project ideas based on their potential impact on community health require the longest lead time in their implementation. This is not surprising in that they undoubtedly would have already been implemented if they were not

difficult to bring about. It was not possible for the Consultant to evaluate whether excessive energy was expended on these very important (from a health impact standpoint) projects to the detriment of less obviously major or crucial health-related projects and whether any misplacement of emphasis resulted in overlooking opportunities for investment in smaller and less dramatic subprojects.

- . Given the recent clarification to PATH of the objectives of FRE, i.e., achieving the most rapid possible level of investment in profit-making, private-sector, health and nutrition projects in the target countries or other AID-supported countries - a shift of emphasis by PATH staff probably will take place which will increase the likelihood that worthwhile investments can be made in health and nutrition-related areas of a fairly substantial nature prior to the expiration of the grant in September 1986.

12. HOWEVER, THE JURY IS STILL OUT; AND THE PROOF OF THE PUDDING WILL BE IN THE EATING.

SECTION III - MEETINGS WITH U. S. GOVERNMENT OFFICIALS

A. PRE Officials in Washington, D.C.

Meetings on January 13, 1986, Compton Chase-Lansdale and Bob Dodson.

At the meeting with Compton and Bob, the Consultant was informed that there were 12 projects in various stages of development that needed evaluation. The task assigned to the Consultant was to evaluate "whether these 12 projects were for real" in accordance with the phone call during the prior week.

At the end of the meeting with Compton, two other tasks were given the Consultant:

- . Assist in pushing projects to completion as rapidly as possible by providing whatever advice and assistance might be constructive; and
- . Evaluate the subcontractors from the local countries who are assisting PATH in the execution of the Health Link project.

The most important information was that AID hoped the Health Link project will succeed and does NOT want it to fail. Nonetheless, PRE is prepared to take action to terminate the grant, at least at the end of September 1986 and possibly even sooner, if it looks as though the funds that have been allocated can not be productively employed.

B. Meeting with Ms. Neal Pedan Head of the Bureau for Private Enterprise

The meeting with Neal Pedan was extremely important in enabling the Consultant to perform the assigned tasks with PATH both in Seattle and in the field. The discussion with Neal was the first time in the Consultant's experience in dealing with AID, that a senior official publicly delineated AID various roles of the subunits within the Agency and their relationship to the development process.

Ms. Pedan pointed out that over and above the value of the subprojects for improving the health and even the economy of the target

countries, a given subproject or program might not necessarily fit appropriately under the banner of PRE. She stated that PRE must concentrate on the business of improving the economies of developing countries by getting private sector businesses to function effectively, efficiently, and profitably in the shortest elapsed time. She indicated that if some worthwhile projects were not able to be implemented in the short run, perhaps they should more properly fit within the portfolio of activities of Science and Technology or some other portion of the Agency. She forcefully emphasized that PRE will avoid creating programs that depend on U. S. Government support to go on and on for an indefinite period of time unless there are clearly measurable accomplishments to match the objectives that have been established for these programs.

Ms. Pedan envisions PRE as an action-oriented implementer that strengthens the overall economic welfare of developing countries through the mechanism of strengthening the private sectors; and that the benefits derived from this economic strengthening will spread throughout the entire economy by improving employment, training managers, eliciting entrepreneurial talent, providing less expensive needed products for the consuming public, reducing foreign exchange requirements, and enhancing the diversification of power and, thus, the democratizing of the society. She emphasized that PRE does not object to longer-term development efforts, especially on subjects which require research and development: but Ms. Pedan indicated that this is not PRE's mission nor is PRE staffed to undertake such long-term assignments.

With reference to the Health Link project, she recognizes that it may be an worthwhile experiment with goals and objectives that both PATH and Agency staff had felt could be accomplished in the two-year period of the

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contracting Grant. If the assumptions on which the program had been initially established were wrong, and it was impossible to make a significant impact in the development of private sector businesses in the health and nutrition-related fields on a rapid basis through the mechanisms of Health Link, then the failure to achieve the desired results should be acknowledged and appropriate actions taken to terminate the activity. She ended by expressing her desire that the project succeed but affirmed her willingness to make the hard decision if it appeared that the results were not there.

C. "Market Niche" (Role) Analysis of PRE Functions from Discussions with Ms. Pedan

As a result of the Consultant's recent involvement in evaluating whether a fund for the commercialization of technology would serve a useful purpose in the development process of the private sector in Kenya, he was reasonably well-informed about this area of the AID's activities. Moreover, recent experiences during the Health Link subproject evaluation and an earlier PRE-sponsored program with the YPO provided some initial exposure to the role that is played by Science and Technology and the Country Missions respectively.

As a result of the conversations with Ms. Pedan and Mr. Chase-Lansdale as well as conversations with Mr. Ed Harrell on the commercialization of technology, it was possible for the Consultant to explain to PATH as well as to mission personnel who asked for debriefings on the Consultant's work during the field stages of his mission, what are the evolving roles of the various subunits of the AID organization. The explanation is illustrated in the chart shown below:

TIMING

LONG-TERM DEVELOPMENT IMPACT

MID-RANGE DEVELOPMENT IMPACT

IMMEDIATE ACTION

THE THRUST OF AID OPERATING UNITS/ACTIVITIES

1. Science and Technology
2. Long-term Mission Programs for Institution Building

1. Commercialization of Technology
2. Midterm Mission Programs for Institution Strengthening
3. Demonstration Projects, Etc.

1. PRE Private Sector New Enterprise or Product Development
2. PRE Privatization of SOE's
3. PRE Programs to Strengthen Existing Private Sector Enterprises
4. Emergency AID and FL 480 Assistance

ASSOCIATED CHARACTERISTICS OF EACH AID PROGRAM THRUST AREA

- a. Research and development of technologies & techniques that will have major long-term impact for developing countries but which require significant additional development before they will be translatable into actual operations.
- b. Long-term educational efforts to provide necessary human resources for the public and/or private sector of developing countries.
- c. Long-term institutional modification efforts to set the stage for privatization, deregulation and removal of market controls.
- d. Essentially programs undertaken in this market niche of AID's activities have a time horizon that may require four to as much as ten years (in the case of basic research efforts) before their full effects will begin to be felt by the general population.

- a. Very applied research and development of technologies which can be commercialized in developing countries in not more than four and preferably less than three years.
- b. Provide support for privatizations, deregulation, and removal of market controls - through the detailed mid-range planning of programs that are expected to be implemented beginning not more than three years from the initiation of the program.

- a. Pushing ideas with commercial potential into actual private sector, profit-making production in a period of not more than 2-1/2 years and preferably less than 2 years.
- b. Fulfilling this mission through a mixture of technical assistance in marketing, finance, production, and management technology proposed to existing and proposed private sector businesses; and by providing financial support in the form of (preferably) market rate loans. The development of venture capital sources where the financial system has not yet evolved to provide these services sufficient to support a private sector based economy.
- c. Strengthening the indigenous financial institutions to provide necessary financial services to a maturing private sector economy.
- d. Provide temporary emergency aid to assist in meeting food and other crises of a non-recurring nature.

In the language of the private sector, the above analysis resembles a description of the market niche objectives for various major program thrusts and/or operating entities of AID.

Just as private sector business unit must define and understand the market niche which they are best able to fill if they are to be profitable and successful, so too must nonprofit and governmental operating units clearly define the role that they can best play, their objectives, and the limits of their primary operating responsibility if they are to achieve the objectives set for the organization.

In the case of AID, various operating units can provide services to one or more of the three basic thrust areas of AID so long as they clearly understand in which thrust area they are operating and what, therefore, the time horizon must be for their efforts. Similarly, the individual technical specialists from the operating units could be detailed to provide specialized technical support outside of the basic thrust area of their their subcomponent. Here again, the distinctions between the thrust areas must be clearly understood by the individuals so that their work can meet the requirements of the particular unit for which they are temporarily working.

D. An Example from the Physical Sciences to Illustrate the Market Niche Analysis of PRE

To further clarify for PATH the above description of PRE's role in AID and its expectations for the Health Link program, the example of the "energy of activation" (E_{act}) in chemical reactions was described: in chemical reactions the energy level necessary to trigger a reaction is considerably more than that required to sustain it. In other words, to get a chemical reaction started, you must really turn up the burner under

the beaker in order to overcome the resistance of substances to combine to form a new product. Immediately after the reaction starts, however, it is possible to turn down the burner and provide a much lower level of energy but, the reaction will, nonetheless, continue to completion.

The Consultant stated his belief that in the formation of new businesses in the private sector and in the area of making major institutional changes in a nation's economy such as that involved in privatization, it is necessary to provide a great deal of "energy of activation (heat)" to get the process started. After the process has begun, however, while energy may still be required from outside the system to continue the process through to its proper completion, the level of energy does not have to be so great. Health Link was described to PATH as a program which is expected to provide that high level of initial energy - the "E_{act}" - which will begin an ongoing process of private sector economic development in the health and nutrition-related products field.

From the above analogies, and the earlier description of the Consultant's perception of the recently defined market niche decisions within the Agency, the reasons for PRE's very great interest in seeing that substantial tangible results in the form of increased private sector production in the health field within Thailand and Indonesia; PATH now better appreciates the necessity to demonstrate that the Health Link program can provide a worthwhile and efficient method for achieving Agency objectives. Based on the above understanding of evolving "market niches" certain projects have been recommended (in the following sections) to be possibly shifted out of Health Link and PRE into the Science and Technology wing of the Agency. The basic reason is that these projects probably require substantial applied research and development before they can reach the

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stage where they are susceptible to being pushed into actual commercialization through the efforts of either a "fund for the commercialization of technology" or the efforts of PRE.

One last point should be made based on the analogy between the role of PRE and chemical reactions: in chemical reactions the amount of extra energy - i.e., the size of the " E_{act} " factor - cannot be predicted from any known chemical theories. It can only be determined from experiments under which various levels of energy are gradually added until the reaction finally starts. Similarly, the effectiveness of the activities of PRE - given the relative newness of the overall thrust of its activities - cannot easily be predicted until they are attempted in several different contexts. These programs must, by definition, be experimental since this type of overall effort has not been attempted before on any scientific or continuous basis. Thus, it may turn out that the Health Link program should properly have been a three-year effort instead of a two-year effort because that is the amount of "heat" that it may take to initiate the process that Health Link was designed to get underway. On the other hand, the Consultant feels that two years is a reasonable length for demonstrating that the Health Link concept makes basic sense by achieving substantial measurable results during the first two years.

E. Measuring the Effectiveness of the Health Link Program

Some confusion exists with regard to whether or not the utilizing of the loan guarantee capacity associated with the Health Link project is a crucial and necessary element for judging the success of the project? The Consultant feels that if the Health Link program is able to achieve substantial additional production, distribution or lower cost access to health and nutrition-related products without even using any of the loan

guarantee facility, the project would be an especially great success. As will be described in the summary statement regarding the banks (see Section IV, Banks, below), the loan guarantee is not always of major value for potential investors and serves more as a good talking point and as an excellent method for eliciting interest on the part of potential investors in working with the Health Link contractor. The two primary cases in which loan guarantees will be used are 1) when the investing firms in new production capability are financially weak; and 2) when the projects are financially risky. These are not necessarily desirable attributes for the subprojects under the Health Link Grant.

F. Meetings with Other AID Officials

In various meeting with a wide range of AID officials, an equally wide range of "degrees of urgency" with regard to the Health Link program were exhibited. Some officials were very quick to say "well, you know, health projects take a long time to develop." Others seemed to feel that businesses should be created immediately and that the fact that PATH may only now - after 15 months of operation - be on the verge of getting businesses kicked off is clear evidence of a failure of the Health Link concept or the inability of the PATH organization to accomplish the project. The result of these differences of opinion on contractor performance is difficult to quantify, but it should be pointed out that either excess pressure for rapid measurable results or insufficient pressure for tangible achievement can result in confusion and partial paralysis on the part of an employee or contractor. Consequently, it is important that within the Agency a carefully reconsidered consensus be

achieved on exactly what are the demanded expected results of the Health Links program. This subject was addressed extensively in the policy-related issues of Section II

SECTION IV - DETAILED PROJECT-BY-PROJECT, BANK,
AND SUBCONTRACTOR ANALYSIS

Projects to be Supplemented and/or Shifted

Projects on the PATH List as of 14 January with the Best
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PROJECTS TO BE SUPPLEMENTED AND/OR SHIFTED

A. Hepatitis B Vaccine Subproject - Thailand and Indonesia

Meeting with Dr. Eddie Lembong, President Director, P.T. Pharos Indonesia Ltd. - 21 January 1986

1. Eddie Lembong is an intense and strong-willed, relatively young (42 to 44 years of age) head of a medium-large pharmaceutical company in Indonesia.
2. His feeling was that at present and in the near future, there is no market for the manufacture of Hepatitis B Vaccine in Indonesia.
3. He is already importing the Marc-Sharp-Dome product which retails for somewhere between \$50 to \$60 a dose and which requires three doses to provide immunity (total cost \$150-\$180). He believes that he will be able to obtain a much lower price from Marc at the present time if he is able to assure them of a much larger number of doses to be imported per year. This is the project he will propose for Health Link funding.
4. He questions the good sense of utilizing the plasma derived approach for manufacturing Hepatitis B Vaccine in Indonesia. This is based on two basic factors:
 - a. Since utilizing the plasma derived approach would probably require that for some period of time blood products would be exported from Indonesia to South Korea (the Wim Kalona approach), and since ethical or religious factors make this difficult, political/religious opposition might kill a staged program based initially on bulk export of Indonesian plasma and bulk import of Hepatitis B Vaccine (with local production to follow later). This question must be dealt with if the Korean/Kalona approach is adopted.

- b. He also raised an interesting question: "Shouldn't Indonesia wait for the much more powerful and probably more viable for the long-term approach of creating vaccine through recombinant DNA technology? "This process presently is being developed by Marc-Sharp-Dome but in the estimation of some, is perhaps four to ten years away from being exportable." This technology also would have wide uses for other industrial products."
5. Eddie recommended that Health Link support him in developing a distribution program for sales of a much-reduced price Marc-Sharp-Dome Hepatitis B Vaccine and that this could be achieved by guaranteeing much larger orders from Marc-Sharp-Dome. This would develop a middle-class market for the vaccine and would be a prelude to eventual larger-scale importation or manufacture of the product.
10. Meeting with Dr. Wim Kalona, President Director of P T. Wigo and P T Darya Varia Laboratia, also with Sonny Kalona, Francisco D. Alanpay, and Dr. A. Widjaya.
6. Dr. Kalona's group probably is the largest private pharmaceutical company in Indonesia. It is strong financially and technically. Dr. Kalona has more years of continuous service as a pharmacist than anyone else in Indonesia, but he is still the vigorous leader of his business.
7. Dr. Kalona proposed the following program for implementing the Hepatitis B project.
- . Work with/get agreement from the New York Blood Center or the Korean Group to import bulk quantities of plasma-derived Hepatitis B Vaccine.

Present a business plan for the importation and distribution as well as the quality control and dosage preparation of the bulk product to PATH by June 1.

Register the vaccine within six months after he makes application on June 1.

PATH is required, therefore, to confirm the United States FDA timetable for vaccine registration of the New York Blood Center product. Subsequent conversations with Dr. Henry Wilde indicated that this vaccine probably will never receive U. S. FDA approval because it is not likely to be sold in sufficiently large quantities in the United States to require this approval or to make the approval process cost-effective (Rich Mahoney disagrees on this point).

Dr. Kalona indicated during the discussion that the New York Blood Bank/Korean product will be difficult to sell if it only has Korean FDA approval which presently is the situation. This may lead to an impasse in the introduction of this product.

February 4 meeting with Dr. Henry Wilde and Don Douglas of PATH regarding Hepatitis B vaccine

8. Information recently had been received by PATH that a major cost breakthrough might be achieved in obtaining plasma-derived Hepatitis B Vaccine from the Korean source. This information is highly confidential. In all likelihood the Koreans have developed and produced a large amount of vaccine which cannot be sold for approximately six months until the results of chimpanzee tests are completed which will prove the safety of each batch of the vaccine. This

means that they may have produced a million or so doses which are now in the freezer waiting for sale.

9. In looking at Hepatitis B Vaccine from the standpoint of immunizing the high-risk group (new-borns), a number of cost factors were discussed. Because both Thailand and Indonesia have Red Cross groups that collect substantial amounts of blood with the hepatitis B antigen included, and this blood is now disposed of rather than used, the availability of blood from either country probably is sufficient to provide enough vaccine for both countries from blood donors in either country. This conclusion is based on utilizing the New York Blood Center - Korean Cheil Sugar Company approach which, as mentioned above, only has Korean FDA approval. This production method is the most advanced approach presently available and produces 16.5 adult doses or approximately 30 child doses from one milliliter of plasma. This means that a mere 61 liter or 15 gallons of plasma from high titer donors would produce a million adult doses or enough to immunize 330,000 adults. This new process of using high titer donors is an improvement of 30 to one over the Dutch Red Cross approach and an improvement of over 16 to one over the the Pasteure approach in terms of the amount of doses derived from each unit of plasma.

The equipment costs for a Hepatitis B Vaccine production facility are probably between \$800,000 and \$1,000,000. This undoubtedly is a conservative figure and could be less. A high-technology building also would be required of approximately 4,000 square feet; and, utilizing a maximum of \$200 U. S. per square foot, would require an additional \$800,000 investment.

If high titer blood and the New York Blood Center approach is utilized, it is more than possible to produce the 12,000,000 doses per year required in Indonesia and the 3,000,000 doses per year required in Thailand in one such facility. The total operating staff would be approximately six people.

Estimating the salaries for these six people at \$60,000, power at \$20,000, materials at \$10,000, and miscellaneous costs at \$10,000, the total annual operating expenses for production of 15,000,000 doses would be \$100,000 for operating expenses plus \$240,000 to amortize the \$1,600,000 capital cost. The total production cost, in other words, would be \$340,000 per year, (\$.0266 per dose) plus the cost of bottling.

Another major cost, however, would be the cost of chimpanzees (and their maintenance) which are required to test the safety of each batch of vaccine that is produced.

10. Based on Henry's breakdown of cost and capability of the technical approach, it appears that 15,000,000 doses could be produced at a cost of not more than \$1,000,000 per year when allowing \$660,000 for chimpanzee maintenance and bottling. This results in a dose price of somewhere between 6 and 7 cents per dose verses the current imported cost of \$25.00 per dose from Merc-Sharp-Dome. The answers as to why cost can be reduced to such an extent are related to various factors, but include the cost to amortize research and development of a new product method as well as the cost for obtaining FDA approval in the United States. Thus, even if the Korean Cheil Sugar Company were to make available vaccine at \$5.00 per dose, significantly larger distribution could be obtained if delivered dose prices could be

lowered to 50 cents a dose (\$1.50 per course of treatment) or to an even lower possible figure if the above analysis can be relied upon. (It must be recognized, however, that even this low price does not mean the governments in either country can afford or will undertake a total program to wipe out hepatitis B at this time.) Less than total utilization (i.e., lower sales) will raise unit prices. Fortunately, this vaccine is not highly heat sensitive and has reasonably easy to meet storage requirements.

Summary of Hepatitis B Subproject

- a. Hepatitis B is an often fatal disease. It is the one disease that has been almost certainly proven to cause cancer - cancer of the liver - and it was reported that approximately 20,000 such cases occur in Indonesia every year which could have been prevented had not the afflicted individual earlier suffered from hepatitis B. Beyond cancer, many patients die from the disease itself. Finally considerable cost to the society is generated by the sicknesses resulting from hepatitis B.
- b. While it might be possible to obtain the Korean-approved vaccine at \$5.00 per dose, this is not yet assured. However, it would prove out the New York Blood Center technology on a large-scale basis and insure that this method is presently the best, least-cost method for producing this needed vaccine and may even be superior to the recombinant DNA approach which is several years down the road. And the Korean Cheil Sugar Company has the sole worldwide license from the New York Blood Center to use this process!

- c. Some conflict exists regarding protein contamination of the vaccines produced using the Dutch Red Cross approach and the World Health Organization (WHO) is concerned about this issue. Dr. Wilde and other technical experts strongly disagree with the WHO as to the importance of this criteria, nonetheless, WHO's positions on these matters are taken very seriously in both Thailand and Indonesia. This is one of those situations where the regulatory bodies "cure the disease but kill the patient." A low-cost vaccine is very much needed for countries such as Indonesia and Thailand as well as in many other AID target countries. The cost in human suffering, lost productivity, and medical expense is enormous as a result of hepatitis B sickness, and a viable product exists that could be produced at a low price. The technology is relatively simple and well known for developing and producing Hepatitis B Vaccine but it is necessary to solve the institutional/technical conflicts between WHO, U. S. FDA, and the holders of licenses to produce these various vaccines in order to get them to the market.
- d. This subject probably should have the highest priority of the Science and Technology sections of AID and should be handled on an independently funded basis by AID, separate and in addition to the Health Link project provided that rapid action is taken.
- e. The project is a viable potential business in either Indonesia or Thailand but probably not both. Development of a successful method for producing low-cost vaccine, in one of these

two countries should be pursued with the stipulation that support provided will result in a process that can be utilized in other areas of the world that suffer from hepatitis B and which would desire to obtain access to the technology for producing their own vaccine; or, alternately, these countries would be supplied vaccine at a predetermined cost with a limited markup.

- f. It might be possible to make a deal with Thailand and Indonesia to have one country produce rabies vaccine and the other produce Hepatitis B Vaccine and then exchange them for use in both countries at a preferred rate. Negotiations for such an approach will require that top U. S. health officials work at fairly high levels in both governments. This subject should be brought to the attention of the Mission Directors in both countries and perhaps should be coordinated by the head of Science and Technology out of Washington.
- g. Thus far PATH has done excellent work in the Hepatitis B Vaccine area through the Health Link project even though no near term investment has yet been established. Nevertheless, if this work continues its present course, the opportunity to obtain an additional and competitive source of supply, which might drive the price of this very needed product downward to its ultimate low point (cents instead of dollars) may be lost in the process of obtaining the best possible result under the programmatic objectives of Health Link. For the reason given above - namely the large-scale world-wide importance of Hepatitis B Vaccine for AID-supported countries - it is most strongly recommended that a strategy session be held as soon as possible and that the PATH

organization proceed very cautiously (or hold off proceeding) until this strategy can be developed in conjunction with USAID's personnel.

After the overall strategy has been set, it may still be very possible for the Health Link project to provide for the immediate bulk importation and bottling of Hepatitis B Vaccine at a vastly reduced price to that which this vaccine presently commands. Health Link support would go toward the importation and distribution phase rather than the manufacture at this stage. Even if it turned out that bulk shipment to Indonesia or Thailand and bottling on site is not a cost-effective investment, the shipment of blind bottles for labeling and quality control as well as distribution may very well be a viable Health Link project.

B. Larvacide for Malaria Control - Thailand and Indonesia

January 20, 1986 Meeting with Tim Huisman, Area Director, Agricultural Chemicals, Abbott S.A.

1. At a brief meeting with Mr. Huisman of Abbott Labs, the question was raised regarding utilizing B.t. H-14 (BTI), a larvacide which is sold under the trade name Vectobac™, as an alternative to DDT use. One of the key problems pointed out by the Leona d'Agnes and discussed with Mr. Huisman were questions regarding the proper formulations for Vectobac (i.e., whether in powder, spray, floating discs, granuals, etc.) for use in the particular environments of Indonesia and Thailand. These questions have not yet been resolved by Abbott.
2. The second question discussed was the staying power or longevity of BTI and how often it would have to be reapplied in order to be effective. Mr. Huisman admitted that this was a problem and that

Abbott was developing a new product which is another variety of this larvacide called bacillus sphericus (BS), which they predict "will ultimately replace bacillus thuringiensis (BTI)." Presently they have developed a BS strain to replace BT but they have not yet had sufficient field testing to finally conclude that it is safe and has no side effects. Because it is a naturally occurring bacteria, in all likelihood it will be found to be safe and it has the advantage of much longer (three to ten times longer) life than the BT version which means that its cost for application and the amount required for use will be vastly reduced.

3. Mr. Huisman conceded that BT and perhaps even BS will be more expensive than DDT control methods and, given the reductions in its budget by the Indonesian Government for all programs, it may be very difficult to sell the more expensive product even though it is safer than DDT. Moreover, it is likely the government would wait for the BS version if possible.

January 22 meeting with Haryanto Adikoesoemo, Executive Director, Pt. Aneka Kinia Raya

4. This firm is a maker of various chemicals as well as a metal fabricating firm for heavy industries. They manufacture sorbitol (a stabilizer used in many foods), and lastly import chemicals for sale to other manufacturers
5. The firm has limited connections with the Ministry of Health but are confident that they can build up their contact base.
6. They are waiting for a feasibility study to determine the scale of government purchases of insecticides.

7. They are willing to start with a trial of larvacide sales by using just imported goods as demanded by sales. They would do this rather than even keeping stockpiles on hand.
8. Leona's feeling is that she thinks this product (larvacides) would need a subsidy.

January 29, 1986 Meeting with Dr. Sonsak Pantuwatana, PhD, Associate Professor, Department of Microbiology, Mahidol University, Thailand; and Amaret Bhumiratana, PhD, Department of Microbiology.

9. PATH staff and the Consultant met with the two professors in Thailand who have done the majority of work in this field. They presently are producing small quantities of both the BTI and BS versions of this larvacide at laboratory scale in a laboratory-type fermentation system. The two professors started in 1975 working on this project, beginning with the isolation of the microorganisms BTI and BS. Between 1980 and 1983 they began production of both substances. They recognized that some questions regarding the safety of bacillus sphericus have not yet been tested although there is little or no likelihood that this product will not be safe for vector control use. However, they estimate that two years of field trials will be required to establish safety, as well as to develop appropriate formulations and confirm their effectiveness against the target mosquitoes.
10. At present the Thai government is the only significant buyer of mosquito vector control products. (Vector control of insect pests is a government responsibility in almost every country including the United States.) The government buys DDT at a cost of \$170,000,000 from Indonesia (this product is bought probably from one of the target companies with which PATH is working in Indonesia).

At present in Thailand, the Ministry of Public Health is doing field trials along with the university. The Interior Ministry is responsible for mosquito control in urban areas.

11. One version of the BT bacteria group, BT_{HD1}, is a widely used for cabbage worms in Thailand, the United States, and elsewhere. At present it is imported in bulk and repackaged in small quantities which can be purchased for 200 baht by farmers (under \$8.00). Since in all likelihood wide spread mosquito control with BTI is probably two or more years away, but HD1 is acceptable now for wide-spread use, HD1 could possibly be commercialized in Thailand much sooner than the BTI and BS products.

It was estimated by Dr. Somsak and Dr. Amaret that the capital costs for getting into the commercial fermentation of HD1 would be approximately 100,000 baht (\$4,000,000). This product would not only be used in Thailand but would be exportable to other countries in the region. This could be a Health Link project.

12. Summary of Larvacide in Thailand and Indonesia

- a. BTI (Abbott trade name - Vectobac) is a bacteria that is produced through a fermentation process. In fermentation, major economies of scale exist and quality control and process control are very important. In spite of the fact that the local laboratory at the university in Thailand is producing some small quantities of the bacteria BS and BT, the availability of large-scale industrial fermentation facilities may not exist at present in either Thailand or Indonesia. Consequently, it may be very likely that even if larvacides become widely used for vector control programs of malaria carrying mosquitoes, the

active product will be produced in the labs of Abbott and shipped for formulation in the local countries!

- b. "Cost effectiveness has not been established for BTI. There is no recycling potential, and the operation cost of repeated applications, combined with the cost of the currently commercially available formulations, could impose serious constraints in its usage in developing countries. However, improved and longer-floating slow-release capabilities, coupled with inexpensive local production, may completely reverse the situation. Constraints on local production include the need for well-trained manpower; apprehensiveness of the local population about the use of microbial control agents; and a requirement that a fermentation plant be of adequate size to be cost-effective.

"With bacillus thuringiensis, production is by fermentation process and where sophisticated fermentation plants exist in developing countries, coupled with bioassay facilities which are essential for quality control, the possibility of local production may be considered.

"It should be emphasized, though, that this organism or other bacteria should not be produced on a cottage industry basis, or even in a crude industrial fermentation plant, for reasons of safety and efficacy. If local production is undertaken, it will be economically advantageous to use the same fermentation plant to produce a variety of microbial and other products useful for both agricultural and public health pests

and vectors. Where facilities for local production (fermentation) and quality control are inadequate, consideration should be given to the possibility of local formulation of imported, good-quality, stable, bacterial primary products. With all microbial pesticides, the maintenance of quality through bioassay is a key production factor; as is the need to carry out safety tests to insure that the product is not contaminated with microorganisms which might be pathogenic to man." (The above is all from the literature search and other investigations made by PATH staffer, Carl McEvoy and is contained in his memo of October 24, 1985. Emphasis by the Consultant.)

c. Based on the meetings with the professors in Thailand as well as the research done by PATH staff in Seattle, it is the Consultant's conclusion that a new tack will have to be taken or at least investigated with regard to larvacide production in the target countries. Two primary steps have to be investigated first:

- . The availability of excess fermentation capacity for this type of product in either of the two countries.
- . A measurement of the actual comparative costs from using these larvacidal products as opposed to DDT for mosquito control.

If no excess fermentation capacity exists, the Health Link efforts with regard to larvacide probably should be shifted to the production of agricultural bacterial agents which presently are in large demand, since the facilities that are constructed

to produce these products would serve as pilot plants for later production or larvacides for vector control of mosquitoes.

In addition, even for a proper business evaluation of establishing a formulation facility based on bulk imports of the raw bacteria, it is necessary to undertake a detailed feasibility study - first on paper - and then in the field, using typical environmental settings of Thailand and Indonesia to determine the actual cost for vector control using larvicidal products. These studies basically are environmental engineering efforts. The costs for which far exceed the scale of effort allotted for a particular subproject in the Health Link program.

Without establishing the actual cost for larvicidal vector control in typical local ecosystems by taking into consideration air movement of mosquitoes, climate, topography, agricultural activities, and other similar factors; and then comparing these costs with other forms of control; it is very difficult to imagine an investor making a major commitment to produce these products.

- d. As is the case with Hepatitis B Vaccine, this overall subject should be considered for a larger scale, independently funded program supplementing the work that has been done thus far by Health Link.

C. Rabies Vaccine in Thailand

Meeting with Rich Mahoney and other Health Link staff in Seattle, Tuesday, January 14, and January 15, 1986; and Supawat Chutivongse, MD, Director, Thai Red Cross, January 30, 1986

1. The basic goal has been and remains the production in Thailand of rabies vaccine utilizing the process developed by Institut Merieux of

Lyon, France. A private sector nonprofit organization, the Thai Red Cross, or a profit-making subcontractor to the Thai Red Cross were identified as the potential vaccine producer. This was necessitated by the fact that the Thai Red Cross can produce the vaccine without obtaining clearance from the government whose parastatal pharmaceutical company is very powerful and would object. The Thai Red Cross already produces some vaccines including low quality rabies vaccine using a less efficient process.

2. An agreement has been developed (and signed on February 11, 1986) which provides for the importation of unlabeled vials containing individual doses of rabies vaccine by Thai Red Cross from Institut Merieux. These doses will be supplied at the price of \$6.35 U. S. per dose CIF Bangkok, which compares very favorably to the current cost for the German product of \$13.00 per dose; and the Merieux products are superior to both the German version and vaccine presently being produced in Thailand.
3. Paragraph 3.2 of the agreement between the Thai Red Cross and Institut Merieux provides that upon the cumulative importation of 500,000 doses or at the end of 1987, whichever shall occur first, the Thai Red Cross shall have the option to purchase the vaccine in bulk form and obtain the necessary know-how and technology for processing and manufacture of such product in bulk in Thailand itself. Subsequent paragraph 4.3 states that the price for the product in bulk shall be mutually agreed upon by the parties upon such time as they shall be ready to deliver and accept the vaccine in bulk. In other words, at that point the Thai Red Cross has a right to either purchase in bulk

and then bottle on site or to obtain the technology for actually producing and bottling the vaccine on their own.

4. Although it originally was anticipated that the Thai Red Cross would utilize a for-profit private sector firm to produce the vaccine at some later date for its own distribution as well as for distribution by the Thai Red Cross, Dr. Supawat appears not to be particularly excited about private sector production of this or any other vaccine. This, however, conflicts with the difficulty that the Thai Red Cross would have in generating sufficient investment capital to produce the Merieux vaccine on its own.
5. Both in Seattle and in Indonesia the Consultant pointed out that without preestablishing a price for the importation of bulk vaccine that would substantially lower the price per dose, it is possible that in two years time the Institut Merieux will offer a price for the bulk product sufficiently high that it will not make any sense for the Thai Red Cross to attempt (on its own or through a for-profit firm) to have the bulk product bottled and labeled in Thailand. The Consultant was assured that the motives of the Institut Merieux would guarantee that this would not occur. The Consultant was assured by Dr. Supawat that he would attempt to raise the subject with Institut Merieux before the signing on February 11, 1986.

PATH reports that they initially wrote much more definitive contract provisions but that the Thai Red Cross softened the language in the document and Merieux, upon receiving it, jumped forward to agree.

6. Summary of Rabies Vaccine Subproject

- a. At present, there seems to be little or no further role for Health Link with regard to rabies vaccine in Thailand. Progress toward possible receipt of bulk shipments of vaccine and local value-added bottling is approximately two years away. Similarly, the production of vaccine in Thailand is two or more years away under the present agreement unless it is modified by the Thai Red Cross (which is doubtful).
- b. The work performed by the Health Link staff has achieved several major and important goals:
 - . Lower-priced, higher-quality vaccine has been introduced into the Thai market to treat the dreaded, much-needed, and often fatal rabies disease.
 - . In addition to increasing sales by the Thai Red Cross (a nonprofit private institution), a local private sector firm which distributes vaccines also will be receiving the lower-priced, higher-quality Institut Merieux product and thus this segment of their business is likely to expand.
 - . A program has begun which may ultimately lead to of the vaccine in Thailand by either a profit-making or not-for-profit private sector institution sometime after 1987.

PROJECTS ON THE PATH LIST AS OF 14 JANUARY WITH THE BEST PROSPECTS FOR IMPLEMENTATION

D. Low-Cost Manufacture of High Correction Lenses

23 January Meeting with Cyrille De Montvalon, Delegate to Pt. Vision Teknik Utama and Dominique Jumesur, President Director; and Daniel L. Kraushaar, Helen Keller International, Country Director

1. Presently this group is attempting to do a pilot project near Bogar to provide low-cost eye glasses and low-cost cataract operations. The problem has been that the local physicians have recently evidenced resistance to the project. This also may be coming from the optical shops who generally give a kick-back to the physicians who recommend them.
2. The project in Bogar has been approved at the top of the Ministry but the lower-level resistance has been able to stall it thus far.
3. Although the original program for high-correction lenses, such as are needed after a cataract operation, was based on the government's five-year plan to perform 500,000 operations, this large-scale program is not needed to support an immediate, smaller yet still a viable project.
4. A basic outline of a project which would require loan guarantees for 140,000,000 rupiahs (approximately \$120,000) was described. Based on the figures presented, the payback for this project is between three and four years.
5. A second project can be anticipated within a year as demand for the high-correction glasses is further developed in the more rural areas. This second expansion would require approximately \$60,000 for investment but would double the capacity of the first investment.

6. The company that we met with is owned by Lily Kasoen, but technical assistance is being provided by the French firm of Pt. Essilor. Essilor has guaranteed any equity commitments which will be made by the local Indonesian investor/owner.

Meeting 23 November with Lily Kasoen and Remco Droston of Deka Optalite

7. This firm is also owned by Remco and Lily and was inherited from Lily's father. It has a long history of activity in the eye glass business, producing both glass and frames.
8. The owners are expansion-minded. They have plans for a series of expansions in their eye glass business including a bifocal line (which will have an investment requirement of \$250,000) and their low-cost frames line (which would require between \$100-150,000). These future projects were identified as subsequent opportunities for Health Link support.
9. The representative of the Helen Keller Institute will prepare a scope of work for a feasibility study designed to test the market's absorptive capacity for production beyond that which is going to be made available under this first expansion project. This feasibility study may receive Health Link' support.

Meeting of Monday, January 27 with Bank Duta and the Eye Glass People

10. At the initiative of PATH staff and the Consultant, a meeting was held to introduce the potential eye glass investors to Bank Duta staff. The road map for obtaining the bank's review, a bank loan, and a U. S. Government guarantee were outlined and all parties went away from the meeting with their respective assignment. Leona

D'Agnes will stay on top of this process until it reaches its completion. It will receive PATH's highest priority.

11. Summary of Low-Cost Eye Glass Investments in Indonesia

- a. The participants in this project have a good track record of low-cost profitable production of necessary products. They have the technical capability to undertake several expansions in the eye glass field, all of which will be beneficial to the local economy, both by expanding a profitable business and by providing essential products at lower costs than presently exist within the Indonesian economy.
- b. Subject to review by Bank Duta of the financing arrangements, this first Health Link loan guarantee project is likely to proceed in the very near future.
- c. Health Link staff should continue to work with the Helen Keller Institute in order to bring additional investments onstream in the proper course of time.

E. X-ray Equipment Subproject - Thailand

Preliminary Meeting, 28 January, with Khun Kongsak Tatiyanukule, Directing Manager, Medical Industrial Domestic Company Limited (MID); and a follow-up visit to the production facility later in the week

1. With the exception of MID's machines, all other x-ray equipment presently is imported into Thailand. The price of these machines range from \$30,000-\$100,000 and more. MID presently is producing 24 units a year of an excellently rated x-ray machine that retails for approximately \$10,000. Eighty percent of the sales are to small privately owned clinics outside of Bangkok, in particular in northern Thailand. There appears to be a major demand for additional machines.

2. To confirm this increased demand, a market study is being conducted by TISCO, a private consulting firm located in Bangkok.
3. Khun Kongsak enjoys an excellent reputation in the Thai business and professional community. He has been in the x-ray business for 30 years. He began after graduating from high school when he took a job in the x-ray department of a large foreign-owned company. He was sent to the United States, Germany, and elsewhere for training. Seventeen years ago he started the MID Company and now has several family members in the business, two daughters and one son. One of them is a business person, another an engineer, the third a physicist, and his wife does accounting.
4. He has obtained Board of Investment approval for his new investment, which may total up to \$500,000 in borrowings. Although it may be reduced to \$400,000.
5. The project is enhanced by the fact that the location of the new facility will be near his primary markets in the north as he intends to establish his new factory in an industrial park in the Chaing Mai area.
6. It is contemplated that an ILF loan also may be provided to him on a somewhat concessionary basis to constitute part of the total borrowing.
7. In addition to manufacturing x-ray machinery, MID repairs all types of x-ray equipment as well as other fairly complex medical machinery. As a hands-on, from-the-bottom-up technician, Khun Kongsak provides excellent management and training in his company. This is a firm that is likely to succeed and grow substantially over the years. In the long run it could be a repository for the production of many

other types of medical equipment that combine electronics, metal fabricating, and plastic forming.

8. Because of the potential rapid growth of this firm, a detailed long-term business strategy plan should be developed. Health Link might assist in this process.
9. During the visit to his plant, the Consultant was favorably impressed by the operation of this light industrial facility. Cross training of personnel had taken place, workers clearly were high motivated and knowledgeable in the operation of relatively complex machinery. Khun Kongsak's son, the engineer, demonstrated a high level of proficiency in electrical engineering and electronics. Labor-management relations were outstanding with Khun Kongsak providing housing for workers from outside the Bangkok area and other amenities.
10. The tax situation in Thailand mandates the establishment of a new company for this investment. Establishing the amount of equity to be repositied in this new company in order to provide a proper debt to equity ratio is still open to negotiation. Although the basics of this proposition appear to be outstanding (assuming that the market study to be completed in early March bears out the projections of demand), the actual structuring of the deal will require skill and care.
11. At a meeting with the Vice President of Thai Farmers Bank, the consultant was reassured that the Vice President in Charge, Khun Ajarie will provide the proper assistance in seeing that the deal is properly structured. During the discussion with the bank, the Consultant raised the question of a blended rate, especially if an ILF loans might be provided for this project on a concessionary basis.

Although the ILF program is of no direct concern to U. S. AID, it would be advantageous for all concerned if a single loan was made for the project from the Thai Farmers Bank utilizing either syndication with ILF or a subloan from ILF to Thai Farmers Bank with an administrative fee being added by Thai Farmers Bank and a blended rate resulting overall.

12. Summary of the X-Ray Equipment Project in Thailand

- a. This project is likely to be the first done deal in Thailand. The loan guarantee will be somewhere in the neighborhood of \$200,000 against a \$400,000 loan. The resulting project is likely to be profitable and to result in side benefits for the economy of Thailand by enhancing the capability of a good small firm to grow into a major supplier of sophisticated equipment.
- b. If the suggestions on blended rate approach to financing are followed through, the implementation of this project by local PATH staff will be an excellent learning experience in terms of utilizing several of the instruments available to PATH for assisting and promoting worthwhile projects in the medical field.
- c. Completing this project in rapid order will result in a shake-down of the process for obtaining bank review and approval of Health Link projects and will greatly facilitate the process in the future. The ability to make additional projects come into being will be very much strengthened by being able to point to a completed deal that has been beneficial to all parties involved and this will have a very favorable public relations impact upon the Thai business community.

F. Medical Diagnostics in Indonesia

Meeting with Dr. Wim Kalona, President Director of P.T. Darya Varia Laboratoria, and his staff, 23 January 1986.

1. The Kalona group was described earlier Section III during the a detailed discussion of hepatitis B. The firm is substantial and is capable of undertaking large medical projects.
2. The technical staff of the firm has done a detailed economic analysis of five to seven diagnostic tests which could be commercialized in Indonesia. The combined sales would range from \$1/2-1 million U. S. annually, and the capital cost for getting into the business is relatively small (probably in the range of \$200,000 or less).
3. A key technical ingredient which still is missing from this project is the process by which latex is utilized as the medium for carrying the active diagnostic ingredient. This allows the diagnostic test to remain stable with a long shelf life during ordinary storage that is relatively unlimited. PATH is working to obtain this technology and undoubtedly will do so in the near future.
4. It was agreed that a detailed business plan for the largest selling of the diagnostic tests (pregnancy) would be completed by the Kalona group by March 15 and preferably by March 1. In addition, Dr. Wijaya, the technical leader of the group, is to go to New York City and make a technical review of various monoclonal diagnostic test methods. He also will study the latex technology. It will be PATH's job to tie down the availability of the monoclonals.
5. Summary of the Status of the Diagnostics Subproject in Indonesia
 - a. The consultant believes that if PATH is able to finalize the technology transfer of the latex technology, this project should

be fully designed and ready to go to the bank on or about the end of April.

- b. The Kalona group is financiall stable and able to execute this project.
- c. The development of diagnostic products in Indonesia will have a favorable health impact on the country immediatly and is likely to result in further local advances (either together with Health Link or independent of it) in the development of additional diagnostic material.

PROJECTS ON THE PATH LISTS AS OF 21 JANUARY WITH LESS CERTAIN PROSPECT FOR IMPLEMENTATION

G. Disposable hypodermic syringes in Indonesia and Thailand

Meeting on 4 February 1986, with Smart Powpaka, Marketing Manager, Thailand for Becton Dickinson and meetings with the PATH staff.

1. This project is an example of the role that the Health Link program can play in assisting an American-based company in setting up a joint venture with local business persons in a developing country. In the United States one firm dominates the disposable syringe market - Becton Dickinson (BD). Economies of scale are a major factor in this business, and consequently, the number of firms in the business has been rapidly declining as automation forces consolidation of the suppliers.
2. The Asian market presently is dominated by the Japanese with secondary market positions controlled by the Italians although they are far behind the Japanese in market share. Because this is a capital intensive business, Becton Dickinson has consolidated substantial parts of its North American operation in the United States and Puerto Rico. BD is planning to open a major facility in Taiwan to produce the syringe components for the Asian market. It is possible that assembly of components could take place at decentralized locations provided that this would assist Becton Dickinson in obtaining a larger market share in those countries; and consequently, it has been thought by PATH that it may be possible to establish assembly facilities in either Indonesia, Thailand, or in both countries. Unfortunately, at the present time, no firm word is available on whether or not the ability to breakdown the manufacturing process into

two stages (manufacture of the components and assembly) is truly feasible.

3. Complicating the picture is the fact that:
 - a. Mr. VanDusen, who had primary marketing responsibility for the Asian area, has recently left Becton Dickinson.
 - b. Becton Dickinson has just moved its headquarters to Hongkong and is not yet staffed up for the expected major push into Asia but is in the process of doing so.
 - c. The distributor for Becton Dickinson in Thailand is a subsidiary of ItalThai called MedicThai. MedicThai is headed by the somewhat difficult Mr. A. R. Maestrini, and this potential partner for Becton Dickinson in Thailand has been doing a very poor job in selling the Becton Dickinson product in Thailand.
 - d. Becton Dickinson has taken the approach that until a larger market share has been obtained in Thailand, it would not consider Thailand as a possible assembly site for its products.
4. At the meeting with Khun Smart it was also learned that various internal politics with regard to the Thai personnel that Becton Dickinson had initially chosen to consult for it has resulted in paralysis in the effort to date.
5. Summary of Disposable Syringe Production for Thailand and Indonesia
 - a. The first thing to be established is whether there is any basic sense in separating the location for manufacture of components and assembly of disposable syringes. It must be determined whether or not this is economically disadvantageous to such an extent that even the ability to enhance market penetration will

not overcome the obstacle. This is a primary task that must be accomplished by PATH.

- b. The Consultant outlined a strategy for Thailand with Mr. Smart which could be utilized to break the chicken-and-the-egg problem of a need for increased market share before Thailand would be considered as an assembly location. This approach would involve the creative use of Health Link feasibility/marketing front end funds to assist Khun Smart in implementing a test marketing plan that he has been developing for the Becton Dickinson products. Khun Smart has agreed to send a marketing plan to PATH by February 20, 1986. If the answer to question "a" above is affirmative, (i.e., it is possible to separate manufacture of components from assembly,) and if the marketing program for Becton Dickinson products appears reasonable, then PATH will support this test marketing effort on a cost-sharing basis with Becton Dickinson utilizing Health Link funding under the market research sections of the project. Negotiation to provide this assistance should include at the very least a preliminary commitment by Becton Dickinson that they will entertain assembly in Thailand on the basis of measurable penetration of the Thai market by their products.
- c. A successful test marketing campaign would lead to the establishment of productive value-added effort in Thailand. In turn, the investment can be utilized as a promotional device in obtaining further market penetration for the Becton Dickinson product line. Benefits from this would be the introduction of a locally assembled, high-quality, low-cost disposable syringe and

the consequent replacement of less safe reusable products as well as the displacement of totally import-based products from Japan and Italy.

- d. The situation in Indonesia is equally unclear and no definite prediction regarding the likelihood of syringe assembly in Indonesia can be made at this time.

H. Production of Interocular Lenses in Thailand

1. This project is stalled for a very interesting and almost laughable reason: the best source of technology for interocular lenses (which are sewn into the eye after cataract operations) is a firm in Huntington, West Virginia called CILCO, Inc. CILCO was founded by Jim Cook, a very independent, strong-minded, eye doctor. The firm was bought by a large United States firm, and this firm is now disposing of CILCO (perhaps to the former management) basically because of its inability to work comfortably with CILCO's founder. During this corporate restructuring, CILCO is too consumed with other matters to deal with the potential project that would be a joint venture in Thailand.
2. The potential partner in Thailand is Dr. Utahi Rutnin, founder of the Rutnin Eye Clinic. The owner is extremely strong professionally and financially with a high standing in the community and a good financial history.
3. Given the rapidly expanding demand for interocular lenses, this product should justify a substantial investment which, depending on volume, would be between \$300,000 and \$1,000,000.
4. Development of this project with the industry leader in the United States, CILCO, would result in cutting in half the current price for

interocular lenses from approximately \$150 to between \$40-\$60. In addition to generating profits in the private sector through the manufacture of this product, a great number of people could be added to the list of those who receive this needed treatment.

5. Summary of the Status of Interocular Lenses in Thailand

- a. A person familiar with West Virginia psychology should meet with Jim Cook, the President of CILCO as soon as possible. Having opened and closed three offices in West Virginia and having lived within 15 miles of its border, the consultant recommends that he be instructed to attempt to work with Dr. Cook.
- b. A backup source of technology should be located, in spite of the fact that Dr. Utahi Rutnin from Thailand has been completely sold on the CILCO product. (This is one of the dangers of concentrating only on the best available technology and not developing a backup if the best turns out not to be available.)
- c. This project should be implemented and can be implemented because the recipients of the technology in Thailand are both eager enough and strong enough to make it happen. This should continue to remain a high-priority project for Health Link and it is anticipated that it can be brought to fruition within the next four months.

J. Water Purification in Indonesia - Potable Aqua

Meeting 25 January with Suseno S. Reksodimidjojo, President Director, and John D. Napitupulu, Director, or Pt. Binuma Widya Karsa

1. An excellent market study was prepared by SRI with regard to the potable aqua technology which involves putting a tablet of iodine-based material into containers of drinking water in order to kill all

bacteria and viruses in the water. The market study indicated that there could be substantial interest in obtaining this product among individual users, perhaps sufficient to establish the viability of the project.

2. However, the market study is not sufficient to justify at the present time the expenditure of substantial monies in the formulation of the product in Indonesia if this formulation would require major capital costs.

Since capital cost is estimated at \$200,000 U. S., it is premature to proceed with manufacture and the local firm is totally in agreement on this point.

3. It is possible that a major market for this product would be military forces and other persons assigned to the field who are providing services on behalf of the government. Another market would be scouting groups and travelers from outside the country. At present, the local firm has not undertaken sufficient effort to indicate their commitment to making this project go. At the 25 January meeting, they were requested to develop a business plan for the importation of the product for a trial marketing effort which would establish the real dimensions of the market for this product.

One of the key ingredients which must be factored into the market plan is the cost of the product from its source in the United States, Wisconsin Pharmacal. This information was not available in Indonesia at the time of the consultant's meeting on this project and it remains a crucial determinant of the feasibility of the program. The market study indicated that approximately 20 rupiah per tablet is all the market will stand (approximately 2 cents a tablet); and if

Wisconsin Pharnacal's costs for production are greater than one cent, this will not be a viable project.

4. Considerable discussion was held with regard to how you would market this product; and at this point, the target firm in Indonesia seemed considerably more interested in the subject and enthused by the prospect of the project. It was suggested that the key term which the market study indicates would sell the product is the word "pure" as this is what consumers are looking for in an additive to drinking water. One name suggested was Sure-Pure. Certainly "potable qua" is not going sell in Indonesia as even in the United States very few people could define the term potable.

5. Summary of the Status of the Potable Aqua Project

- a. Additional work must be done by all parties: the business plan must be developed after obtaining cost information from the United States. A proposed advertising program would have to be developed as part of the business plan and a test marketing campaign undertaken. This process undoubtedly will occupy at least six months and it will not be until after that point that a decision could be made by any potential investor or loan guaranter as to the feasibility of investing in this project.

K. Diagnostics in Thailand

Meeting with Dr. Supawat Chutivongse on January 30, Director Thai Red Cross; meeting with Drs. Souzak and Amaret of the Department of Microbiology, Mahidol University on 29 January; and Dr. Natth, Office of director, Mahidol University on 31 January; and Dr. Boon Vanasin, Director Applied and Technological Service Center, Mahidol University, 8 February, 1986.

1. The Thai Red Cross is very interested in adding a diagnostic capability for producing a research required steroid for sale to research institutions as a control substance.
2. Dr. Natth is a person of very high scientific achievement and political power in Thailand. As director of a major university, he is highly respected in the society. He is well known throughout the world community in his field of dengue fever. In this regard, he has produced a vaccine at the pilot plant level that can produce 100,000 doses but which could be expanded to as many as 1,000,000 doses. This bench lab, pilot-level type facility is now producing 40 immunodiagnostic products on a small scale.
3. Dr. Natth has pioneered a business concept which can lead to "spinning off" profit-making private-sector businesses that are an outgrowth of work presently done at the university. (Some products already are sold to produce revenue.) To head this spinoff effort he has recruited a doctor by the name of Dr. Boon Vanasin who serves without pay at the university and who is a very successful businessman and physician. Dr. Vanasin left the university and medical fields because of the high degree of bureaucracy and because of his basic entrepreneurial nature. He now owns several hospitals and other nonrelated manufacturing firms.
4. Dr. Natth's long-term plans have included the development of an applied research facility on a new campus (the Salaya Campus) which includes land for an industrial park to be rented to private-sector firms for high technology, clean industrial production. This industrial site can be obtained on the following bases:

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- . Rent straight commercial, plus a possible donation to be university, plus the possible purchase of technical services through an agreement giving the company access to university equipment and expertise on a very favorable cost-plus basis, or
- . As a joint venturer with the university on a particular profit-making undertaking.

Thus far, only the first approach (straight commercial basis) has been used but the industrial park is relatively new.

5. It has been anticipated by PATH that a combination of one or more outside sources of technology would co-venture the production of diagnostics with a new company to be formed in Thailand for this purpose. It makes logical sense that the new company be partially owned by the university, partially owned by specific faculty members who have a major role to play in this business, and partially owned by a private firm that has a capability for marketing and distributing the produces that are produced. Ultimately, if Health Link were to become involved and if PHE were to insist on no government ownership (i.e., the university), it might be possible the university to receive a royalty for the work that it has already performed on the diagnostics project in lieu of taking an equity position.
6. Summary of Diagnostics in Thailand
 - a. The diagnostics field is wide open and susceptible to commercialization in Thailand.
 - b. In addition to servicing the local market, Thailand is sufficiently advanced technically to provide products that it might export to other countries in the region.

- c. The primary additional piece of technology that is required is the latex technology that is widely available in the United States from a variety of sources so that latex can be utilized as the carrier medium for the diagnostic agents. This insures long-term shelf life under normal storage conditions of the product.
- d. Putting together a deal with the university or its faculty and a private firm or new investors or some combination of these is a complicated undertaking. Everyone is willing to see it happen and in the person of Dr. Natth and Dr. Boon Vanasin both political and entrepreneurial power are present in abundance. However, pulling together the various pieces and structuring the deals in this area will be time-consuming and technically complex. Given the full plate of activities that PATH presently needs to attend to in Thailand, it is recommended that the effort provided to this and other university-related projects be supplemented by additional PATH staff or an outside consultant who periodically will assist Don Douglas in furthering these projects.
- e. If additional help is provided in the immediate future, and if policy clarification can be obtained from PRE with regard to the university's minority participation in commercial, for-profit investments, then it is anticipated that actual deals can be structured for diagnostics within the next six months and that they can be submitted to banks for financing before the end of the current grant period.

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L. Inexpensive Eye Glasses in Thailand

Meetings with Khun Narong Tankerdmonkol, Owner, Filter Optical Industry; and Khun Choochai Virakietkamjoran, Vice President; and Phichian Vikayanon, President of University Optical Company Limited.

1. Khun Narong was just recently turned down by the Thai Farmers Bank for a loan for the subject project - expansion of his low-cost eye glass manufacturing facility. The reasons given by the bank for turning him down include:
 - . Major questions with regard to the market study performed by TISCO, which was based on information provided by Khun Narong.
 - . No hard financial data on the Khun Narong's company (Filter Optics) as all his business is done in cash (not unusual for successful operation in Thailand).
 - . Khun Narong's personal credit has been damaged by a recent, nonrelated investment in a shrimp project which has not succeeded.
 - . The hard assets, namely the productive facilities at the existing plant, do not have a great deal of resale or collateral value for reasons which will be stated below.
 - . Questions as to why the plant did not add a second shift in order to increase production rather than adding additional equipment.
2. The equipment developed by Khun Narong for his existing plant works very well according to the PATH observers who have seen the plant, but all the equipment has been designed and built by Khun Narong utilizing used equipment from outside Thailand that has been reconstruction for use in his plant. This is the reason way it is not of

high-collateral value in the eyes of the bank. It does, however, indicate a high degree of capability and initiative.

3. The turn-down of this project by the bank was a major disappointment to PATH and, of course, to Khun Narong. The Thai Farmers Bank also was regretful that they could not approve this project as they have been looking forward to assisting with this program for some time, but the investment did not meet their normal tests. Because they could not ascertain the real worth of Khun Narong and because they were concerned that he may not have the management capability to handle an expanded production, they felt that no matter what the collateral, they would not make the loan nor encourage a guarantee by the United States Government.
4. Nonetheless, Khun Narong has impressed all the PATH staff with his sincerity and honesty. The Consultant also was favorably impressed by Khun Narong's personality which is quiet, simple and open.
5. Based on the experience of this turndown by the bank, PATH has altered its approach in working with potential local firms who might require a loan guarantee or technical support and will henceforth utilize the Thai Farmers Bank to do a background check on financial capability before getting deeply involved with a potential investor.
6. In reviewing on this matter one fact struck the Consultant: Khun Narong's eye glass factory and the business as a whole appears to be highly successful and profitable. More important, he is still able to provide the lowest-cost eye glasses in Thailand. Consequently the Consultant insisted, and PATH was very willing to attempt, or reopening the subject even though it originally have been considered closed after the bank's turndown.

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Further study of his history reveals that Khun Narong's weakness from a banking standpoint was not inconsistent with the view that he can produce a good product and has basic personal integrity: Khun Narong started working in a factory producing eye glasses as a young teenager and never left this line of work. He has not had much schooling but is a craftsman, mechanic and artisan of the old school who has expanded into manufacturing. He represents a true success story. He started his own frame shop and manufacturing enterprise about eight years ago and expanded into lenses when this proved to be successful. He is now ready to take on a larger market and is looking forward to importing some advanced technology once the larger market and the expansion of his present plant has proved successful. The new technology he would look to is the manufacture of plastic lenses, their hardening, and the manufacture of shatter-proof glasses which can be exported. He had indicated that he would be making these moves on a gradual basis after the first step - expansion of his existing machinery at a cost of about \$400,000 - has proved to be successful.

7. The original contacts with Khun Narong had been under the ILF program which is funded by the Ford Foundation and provides for low-interest, subsidized loans for worthwhile medical projects in developing countries. This fact undoubtedly led to the view that the Health Link program (which superseded the ILF loan program) was, to some extent, a grant-type program rather than a strictly business proposition. As can be seen below, this attitude probably was communicated to the partners that, prior to the meeting requested by the

Consultant for 4 February, had not yet surfaced. These partners are the Universal Optical Company people.

8. At the meeting of February 4, the following items were learned:
 - a. Universal Optical, as opposed to Filter Optical, has received a BOI approval for eye glass manufacture.
 - b. Universal has future plans to go forward into the mid end of the market although it plans initially to concentrate on the lower end.
 - c. The Universal Optical Company Limited is part of a pretty-good sized conglomerate that includes Siamo Franc Company Limited, Bangkok United Development Company Limited, Telecom. Development Company Limited, Rattanadhane Company Limited, and Agricultural Machinery Company Limited. The firm is a rather sophisticated business enterprise by any standards.
 - d. Universal and Filter are in some way "sister companies".
9. At the February 4 meeting the Consultant emphasized that before a loan could be processed by Thai Farmers Bank and guaranteed by the United States Government, the following would have to take place:
 - a. Clarification of the ownership of the investment - who is the borrower, beneficiary of the investment, and the security for the investment?
 - b. Where does the investment that is proposed fit into the long-term plans of Filter and Universal?
 - c. What is the management plan for the expanded operation of Filter/ Universal?

It was pointed out that if these questions are answered satisfactorily, it may be possible to process a loan for a properly

designed project in the low-cost eye glass field or even in the mid-cost field with some additional capacity at the low end. It was emphasized, however, that the investment must be able to stand on its own two feet as a profit making operation.

10. Summary of Inexpensive Eye Glasses for Thailand

- a. If it can be restructured, this project is a perfect one for Health Link on a number of counts. First it provides a necessary product at a low price. Second it has the potential to transform a mom and pop type industry started by a hard-working, capable entrepreneur into a substantial business with long-term potential for the future. Third, there is a need for technical assistance in making the management and technical moves that are required for this expansion to take place.
- b. If the marketing estimates by TISCO are reexamined and reconfirmed and still justify a substantial expansion of the low-cost eye glass business in Thailand, or if it can be demonstrated that additional demand exists for these products outside Thailand, then PATH should continue to work with the combined Universal/Filter Companies to structure a realistic and feasible project for expanding the eye glass business in Thailand.
- c. If it is possible to develop a reconstructed business proposal with reasonable equity and debt-to-equity ratios, which can sustain a free market rate of interest, and if this process can be facilitated by PATH staff and the Health Link program, it will be a prime example of the ways in which Health Link can

function: namely not only is it necessary to transfer technology in the specific production function areas, but also to transfer management technology to highly entrepreneurial but relatively inexperienced managerial personnel in the developing world.

M. Inexpensive Surgical Equipment in Either Indonesia or Thailand

Although this project was on the PATH list during the Consultant's meeting with PATH on January 14 and 15, 1986, a memo of January 14 very properly eliminated this as a primary area of interest for the Health Link program. The reasons for this are the very great concentration of expertise in the Black Forest of Germany and, for the last ten years, in Pakistan. It has taken over ten years for Pakistan to penetrate this industry and they have done so only as a result of the the relocation location of several of the Black Forest experts to Pakistan. Other medical equipment, not of a surgical nature, will be described in the following section of the report.

NEW PROJECTS WHICH SURFACED DURING THE FIELD VISIT

It is the Consultant's experience that finding and doing deals is a never ending process. One proposition leads to another, one idea spins off several new ideas, and aggressive players in the entrepreneurial game will usually produce or find new and unexpected opportunities in every field they explore. Some of the ideas listed below are brand new and only arose during the field visits by the Consultant, others had received some consideration in the past but had been rejected because they did not initially appear to be within the scope of the Grant, and still others are a direct outgrowth of work being performed with potential entrepreneurs on projects either listed in the active files above or on projects that have been abandoned for various reasons before getting this far on the active list.

N. Tetracycline Manufacturing Plant in Indonesia

1. At a meeting with Bank Duta (see report of meeting with Bank Duta in Section IV below), the Consultant emphasized to the bank the continuing interest of PATH and the Health Link program in additional projects not yet under active consideration. The bank agreed to talk to its clients and surface worthwhile projects which might be of interest to Health Link. One such project was described by the bank as being a major antibiotic manufacturing facility in the \$20 million range and put together by one of the bank's most important customers in the pharmaceutical field. (The name of the client was NOT mentioned.) Later, at the initial meeting with Win Kalona's group, P. T. Darya Varia Laboratoria, to discuss the Hepatitis B and Diagnostics projects, the question was raised as to what other major undertakings were being contemplated by the P. T. Darya group? They responded that they had some other undertakings planned on a scale

much larger than the diagnostic project. Two and two came together, and the question was asked whether or not it was an antibiotics' production facility. With much excitement the Kalona group described their most ambitious and important current undertaking and one in which they have already expended substantial funds: a facility to produce 220 tons of tetracycline per year, of which 200 tons will be for tetracycline hydrochloride and 20 tons for tetraphosphate, with a capacity for 10 percent increase in production capacity as experience brings the potency of the drug from the projected 25,000 grams per cubic meter to the theoretical potential of 28,000 grams per cubic meter. (Imports to Indonesia in 1983 amounted to 204 tons of tetracycline, most of which came from Europe and some from China.)

2. The technology involved in producing tetracycline is large-scale fermentation with very tight quality control of the process. Large amounts of power and even larger amounts of water for process cooling are required for such production. Consequently, a four hectare site near a dam in West Java was acquired for the project.
3. The status of the project is that an agreement has been reached between the Kalona group, supplemented by a number of key investors with both economic and political muscle and an outside company, Pharmachin Engineering SRL, a diversified Italian company with principal interests in pharmaceutical materials and know-how. Detailed engineering drawings and a model of the project are in the possession of the Kalona group.
4. Historical data on demand for tetracycline indicate that it is growing at 10 percent per year on a compound rate. It has wide application as an antibiotic and enjoys a comparatively lower price

versus other antibiotics, which assures continued high usage in Indonesia. Next to penicillin, tetracycline is the highest volume antibiotic consumed in Indonesia.

5. The total project cost is estimated to be 22,578,840,000 rupiah, or approximately \$20 million. Of this amount, 1,200,000,000 rupiah are for working capital, and 14,000,000,000 rupiah are for machinery and equipment. Most of this latter figure will require foreign exchange.
6. The financing proposed for the project involves a 15,120,000,000 rp. bank loan (67%) and 7,458,840,000 rp in equity (33%). Of these amounts, approximately \$4 million of the almost \$7 million in equity has been raised and the bank loan has been negotiated for the borrowed portion. Approximately \$3,000,000 U. S. of "equity" or near equity is required to move the project off the drawing boards and into construction.
7. Based on the projected profitability and the proposed financial plan, the payback period for the loan is five years after start-up of operation. This includes a reasonable provision for interest during construction. The return on a discounted cash-flow basis based upon the proposed financing plan is 18.7 percent after taxes. Depreciation has been conservatively valued and it is likely that after the first ten years of operation (and all throughout the plant's life) a substantial reserve will exist of additional value represented by the real value of the assets as opposed to their depreciated value. The return on equity utilizing the proposed financial plan as a basis is 25.7 percent after tax for a period of ten years. Because this project is too large for Health Link, the Consultant immediately contacted Compton Chase-Lansdale to inquire what the types of loan

facilities are available through PRE's programs. It was learned during this phone conversation that PRE does have the facility to provide convertible debentures that are designed to "strengthen the balance sheet." Furthermore, it was stated that grace periods were possible in loan repayment in order to assure adequate cash flow to repay primary bank loans and allow for solvency during the early years of operation.

8. Summary of Tetracycline Manufacturing Plant Project.

- a. It may well be possible to carve out a subcomponent of the tetracycline project for Health Link participation. This subproject would be the development of a pilot plant, the functions of which would include producing the fermented antibiotic from locally available materials. This pilot plant research then would enable the main plant to cut its costs and increase returns if locally available materials are found which are suitable for full-scale operation. The pilot plant could also be used in the early stages to shake down the operation and to produce competitively priced tetracycline in small quantities to serve part of the local market. Lastly, the pilot plant would later be shifted into the production of relatively small quantities of other fermentation products; this could include larvicides, other antibiotics, etc. This subproject is presently under examination by PATH staff.
- b. This type of project should fit very well within the objectives of AID, PRE, and Health Link: it would be 100 percent privately owned, result in the introduction of a major new industrial

technology with wide application for many products in a developing country, contribute to the growth of a potentially major private sector industrial company which could play a major developmental role in the nation's economy, and it would produce a less expensive product that is of great importance to the health needs of the country and region.

- c. The potential economic strength of the venture is preliminary indicated by the commitment of external financing that has been offered to date.
- d. Assistance to this project would further the likelihood of other Health Link projects being implemented by the Kalona group.
- e. Consequently, it is recommended that substantial effort be made to find a way for this project to go ahead and for AID to participate in its development.

0. Potential Medical Related Projects Generated by Research and Development Activities Presently Under Way by the Mahidol University in Thailand

1. The original meeting with Dr. Natth, Rector of the University, which was described above in the diagnostics portion of the report identified major areas for potential Health Link activity. As indicated above, the University under Dr. Natth recognizes that Thailand is ready for the commercialization of the technology coming out of its own university. Moreover, the university is concentrating on producing the trained scientists, engineers and operators that are required for any industrial production on a large and sophisticated scale. Dr. Natth has created the University Service Center at Mahidol with a volunteer director from the private sector who is a very successful businessman, Dr. Boon Vanasin. This University

Service Center was established to arrange and serve as a conduit for various kinds of potentially profit-making activities going on at the University. Dr. Natth has also developed a new campus at Salaya, which includes an associated industrial park which has just opened up and has its first actual industrial operations underway.

2. Among the ideas that Dr. Natth has been considering for commercial operation are:

- . Contract research.
- . Production of diagnostics.
- . Production of larvicides.
- . Testing of various drugs and other products for safety and efficacy.
- . Breeding and maintenance of animals needed for laboratory research and product testing.

3. In addition, Dr. Boon Vanasin has been looking to commercialize a number of other ideas which include:

- . The manufacture and repair of medical equipment.
- . An industrial toxicology lab.
- . An entrepreneur workshop similar to that developed by the Carnegie-Mellon University for its faculty (and similar to those of M.I.T. and Stanford) in which space and facilities will be made available to faculty members with profit-making operations. This facility will support and enable entrepreneurial faculty members to get into business without the need to build new facilities during their start-up phase.
- . The creation of computer software.

4. Dr. Vanasin introduced the Consultant and PATH staff to Professor Dr. Chusak Vejbaesya, M.D., Ph.D., Director of Research and Development, Project on Biomedical Instrumentation, that is part of the Medical School of the University. Dr. Chusak has been involved in actually building usable medical instruments utilizing staff available to him at the University. Among the instruments that he has been making are dialysis machines and fetal heart monitors.

Dr. Chusak is capable of building approximately two dialysis machines per year with his current staff. The cost of these machines is about one-third the price (\$100,000) for comparable Japanese instruments (\$300,000) and one-fourth the price of comparable U.S. instruments (\$400,000). These instruments were seen in service providing vitally needed medical support to kidney patients in the hospital, and they were performing alongside the imported versions with no difference in efficiency. While examining these instruments, it was noted that the dialysis solution, which is an I.V. type solution, is also manufactured at the University but only for its own use. This presents another area for possible project development in the private sector.

Dr. Chusak appears to be a classic professor type whose interest is primarily research and teaching and, consequently, it is extremely difficult for him to spare the time to produce as many instruments as the country needs or which he is capable of producing if his time were devoted to straight production.

5. Dr. Vanasin recognizes the need to bring in private sector business persons who can operate a business who will then utilize the technical skills of University personnel for the process technology.

Recognizing, however, that substantial investment has already been made by the University in the products which are prepared to be commercialized, it is only fitting and proper that some of this work be recognized as an equity contribution to a potential commercial venture. An important dividend which commercializing these research efforts of University faculty would bring is the opportunity for faculty members to supplement the presently very meager salaries by doing consulting or by obtaining an equity participation in commercial ventures that are spinoffs of their work, thus assuring the continued strength of the University faculty.

6. Summary of the University of Mahidol Potential Projects.

- a. The commercial viability of these projects should be examined by PATH under the Health Link program.
- b. Health Link is an appropriate mechanism for assisting in the commercialization of research work and development work performed at the University in the medical and nutrition related areas.
- c. Because of the effort expended to date, the University system should be entitled to receive at least a royalty on commercial ventures and quite possibly an equity position of not more than 40 percent of ventures which are commercialized. AID should permit Health Link support of commercially viable ventures which begin with a University equity ownership of up to 40 percent provided that buyout provisions exist to reduce the quasi-public institutional position to 20 percent within five years after the beginning of commercial operation.

- d. Because the initial work to prove commercial viability must be undertaken prior to identifying the other equity participants in each operation, these project should be exempted from the requirement that the initial prefeasibility studies and/or follow-on technical studies and business plans be reimbursed prior to their initiation. Provisions for reimbursement should be waived until the private investors come in and should then be recompensed by the private sector investors after their entry into the project.
- e. Because the time demands for structuring these new businesses are more extensive than the simple joint ventures envisioned when the Health Link program was initiated, and because of the heavy demand on the staff in Thailand to push forward with existing projects, it may be necessary to employ additional in-house staff or outside consultants to assist in bringing these projects into commercial operation.
- f. It should be possible to have one or more projects underway and submitted to banks for financing of the debt portion within the remaining life of the grant.
- g. Strong consideration should be given to utilizing the industrial park at Salaya as a site for some of the other Health Link projects that are planned but which presently have no relationship to the University. The basis for utilizing the site should be on straight commercial terms. The synergy derived from close proximity to the University may be significant.
- h. Some of the projects envisioned by the University should be presented to firms which are investing in other Health Link

projects for their consideration as investors/operators. This is particularly true of the medical machinery which should be presented to Khun Kongsak (MID) for his consideration as a manufacturer.

P. The Production of HD1, a Close Relative of HDI in Thailand.

1. As mentioned above in the discussion on larvicides, HD1 is a larvicide utilized in the agricultural industry on a wide-scale basis in Thailand and elsewhere. It is particularly useful for controlling cabbage beetles. Since existing demand is presently met by foreign sources, and the fermentation technology for producing HD1 is the same as that required for BTI (the mosquito-malaria-control larvicide), the production of HD1 should be considered for two reasons:

- . To develop the industrial technology and infrastructure for the fermentation of various larvicidal products, and
- . To increase the nutritional welfare of Thailand by providing a needed pest control product at the farm level.

2. Summary of HD1 Production Project.

It is recommended that the chemical firms who might be ultimately interested in producing larvicide for mosquito control be approached with the prospect of producing HD1 as a first product and that if this project turns out to be feasible, Health Link participate in the development of this project.

Q. Production of Dental Products in Indonesia

Meeting with Mark A. Edleson of BAI, Inc. and Hamid Djojonegoro, Director of Perindustrian Bapak Djenggot and Pt Ultra Prima Abadi.

1. During discussions with BAI, which is a consultant to PATH on business matters and feasibility studies, the Consultant raised the

question as to whether or not BAI had any other clients who might need the benefits of a loan guaranty to assist in expanding businesses in health, pharmaceutical or nutrition areas. Mark indicated that they had a client who was contemplating an investment in dental products, the first stage of which would be toothpaste. At present there is only one major manufacturer of toothpaste in Indonesia and this investment would provide an equally good product at a lesser cost. Based on subsequent meetings with Hamid and other BAI staff, a project was identified for possible Health Link loan guaranty participation.

2. At present all the feasibility work on this project has been done. The bank loan has been sought from the firm's traditional banker, Chase Manhattan; and, provided there is sufficient collateral, a very favorable rate of interest has been negotiated. In return for a loan guaranty of between \$250,000 and \$500,000, the firm has agreed to participate in various public health related activities regarding dental hygiene. These activities include an educational program in the schools which will include free dental supplies from the firm, public interest advertising regarding the importance of proper dental hygiene techniques, and the development of other products in addition to toothpaste such as dental floss and pumice, which are very much needed in Indonesia.
3. Summary of Toothpaste Project
 - a. The firm in question is strong but the provision of a loan guaranty will achieve additional public purposes and free up collateral for the firm's other investments in public health.

- b. By making the loan guaranty to the firm's existing bank, competition in the banking system is enhanced and Chase is brought into the Health Link program in a constructive way so that it can surface additional potential Health Link type projects.
- c. If approvals are not denied for various policy reasons, this project should be able to go ahead with great rapidity and the guaranty should be safe.

R. Additional Eye Glass Projects in Indonesia

1. Summary of Additional Eye Glass Projects in Indonesia

- a. The second project to be undertaken would be a marketing analysis and test marketing program utilizing technical assistance from the Helen Keller Institute who are presently on the scene in Indonesia. It should be highly advantageous to have such strong technical participation in this field at a relatively modest cost.
- b. The fruits of this market development work should yield an additional investment project involving expansion of the first Health Link investment in high correction eye glasses. (Capacity will be almost doubled from that which is achieved with the \$140,000 investment by the addition of another \$60,000 of equipment.)
- c. A third project being investigated as a corollary project to the expanded production of high correction, low cost eye glasses is the production of lower cost bifocal lenses and the production of additional low cost frames.

- d. It is anticipated that within six to 12 months, one or more of the three projects in the eye glass area can be ready for application to the bank for funding and for possible loan guaranty.

S. Surgical Plaster Production in Thailand

Meeting of 31 January, 1986 with Khun Chatchai Chantawongvut, Managing Director for Worldco Company Limited.

1. Summary of Surgical Plaster in Thailand

- a. Current imports amount to approximately 10 million baht per year with a potential market of 25 million baht per year for surgical plaster. This is basically a result of the high proportion of young people in the society and the large number of motorcycles and other precarious vehicles that are utilized on a daily basis.
- b. This project has been stalled because of the change of staff in the Bangkok office but it should be possible to activate rapidly now.
- c. Khun Chatchai of Worldco Company Limited reported that the investment to get into this business should be approximately 10 million baht (\$400,000) and that the Worldco firm was already attempting to obtain technology from a Swiss firm.
- d. The prospects for this investment cannot yet be firmly evaluated but because of the business astuteness of Kuhn Chatchai and the strong demand for the product in Thailand, all of which is imported at high cost, this project should be pursued further by PATH staff.

T. An Additional Diagnostics Project in Thailand

1. Summary of Additional Diagnostic Project in Thailand

- a. The Consultant arranged a meeting between a representative of the owners of the Bangkok bank and PATH staff. It turned out that this individual had been approached with regard to raising funds for a diagnostic project at another university in Thailand. The project involves producing a diagnostic product necessary for research. PATH staff is investigating this project but no information is available at this time. However, the contact with the Bangkok Bank may lead to other projects being identified and surfaced without violating the primary relationship with Thai Farmers Bank.

U. Projects which may Increase Health by Adding Nutrition Supplements to Existing Food Products - Indonesia

1. Meeting with PT Aneka Kimia Raya, 22 January 1986. The production of Vitamin C in Indonesia was discussed and it was noted that if a cut of price by 50 percent could be established through local production, then this could be added to the sorbitol product presently being produced by PT Aneka Kimia Raya. PATH staff will follow up, although it is too early to determine whether this project will become viable.

Meeting of 24 January with Mr. Atir A. Haslin, SH, Director and K. P. Nadkarni, Director of Business Development, of Mecosin, a pharmaceutical firm. A meeting of 27 January, 1986 with Handy Rusli, Managing Director of PT Indofood Interna Corporation.

2. The meeting with P.T. Indofood was to establish, first, whether or not they had been triggered in getting their weaning food to market by the work of PATH with a competitor. This was confirmed during the

meeting. In addition, because P.T. Indofood had moved more rapidly than the firm with which PATH was working, the Consultant recommended that additional efforts in the nutrition field be developed with this firm. A proposal was to be sent by PATH staff to Mr. Rusli to start the process of developing additional Health Link projects which could be undertaken in the time remaining on the grant. This hopefully will revive the Vitamin A supplement-to-foods subproject.

3. Summary of Additional Food Products and Vitamin Additives in Indonesia.

It is anticipated that it may well be possible to develop one or more additional Health Link subprojects which can be implemented and for which a loan guaranty will be required by working with P.T. Indofood on a high intensity basis. This process could either be to add vitamin supplements to some of their existing foods or to bring out new food products with high nutritional value for youngsters beyond the weaning food stage.

V. Surgical Plates in Thailand

1. Summary of Surgical Plates in Thailand

- a. This project does not yet have a solid in-country corporate sponsor, although a key orthopedic doctor is interested in putting together an investment group to invest in this project.
- b. Surgical plates, which are used for the repair of broken bones, are a precisely machined product which is very labor intensive to produce. The technical expertise is known and available to

PATH and is being pursued by them in order to put this project together.

- c. The present prospects for this investment are not known but the project should continue to be pursued by the PATH staff.

MEETINGS REGARDING BANKING IN THAILAND AND INDONESIA

W. Bank Duta Indonesia

Meeting of 21 January 1986 with Amirullah Sumadhie, Assistant Vice President, Corporate Banking Division; and Achmed Dudiono, Assistant Manager.

1. Amarullah (Amir) is in the corporate loan section. He handles larger projects for the bank, namely those in excess of \$300,000 U. S. It had been his understanding that the Health Link program was only to cover a maximum project loan of \$200,000 U. S. (whether that refers to the size of the guarantee or the total loan is unclear). Consequently, he had assigned the Health Link project to his small business section to look for customers for the loan guarantees. Leona D'Agnes and the Consultant corrected the misimpression and emphasized how pleased they now were to be working with the proper corporate level people. Mr. Amir committed himself to handle this program in the future as opposed to his small business group.
2. The prime rate in Indonesia was 22 percent as of late January 1986 and occasionally there is a risk premium of up to two percent added to the prime rate. Depending, however, on the nature of the client and the amount of collateral, it is also possible to quote a rate of prime less some amount.
3. The break between "small business" and "major projects" is \$300,000 U. S. of total loan.
4. Inflation in Indonesia is now down to three to four percent annually.
5. The price of loans is based on a package analysis which involves all factors including compensatory deposits, other services purchased from the bank, etc.

6. Prime rates are expected to be 19 to 20 percent in approximately one month (after the 21 January meeting). Some corporations presently are looking for and obtaining even lower rates at the present time.
7. With regard to Bank Duta's loan portfolio: as a percentage during 1985, the real property investments declined, especially for office space. (Throughout the banking system, housing continued to use a lot of the available funds, especially from the savings banks.) Bank Duta now is concentrating in the trading sectors. This occupies 50 percent of their present portfolio. Industrial sector loans are viewed as a big prospect for the future. At present the corporate section of the bank serves the following five sectors:
- . Trading and services
 - . Industrial
 - . Oil and gas
 - . Real estate assets and construction
 - . Financial institutions
8. The problem in banking in Indonesia is allocation of loans throughout the system. Basically a few top corporate clients exist and everyone is fighting for them. The banking system is not necessarily penetrating to less well-known players.
9. While PATH cannot work with the Development Finance Corporation, Bank Duta is able to work with nonbank financial institutions which offer lower rates. Bank Duta also syndicates their loans. Consequently, it is conceivable that a package could be put together which would be a blend of rates from a variety of institutions with Bank Duta as the lead. This should be explored by PATH.

10. Mr. Amir asked whether loans could be available for new hospitals. And this was answered negatively.
11. Bank Duta has agreed to search again through its customer list to identify major project opportunities that were thought originally to be too large for the Health Link program.

Additional Information Regarding Banking in Indonesia

X. Meeting of January 22, 1986 with Mark A. Edleson, Business Advisory Indonesia (BAI)

1. With Regard to Collateral - Banking practices in Indonesia are characterized by high collateral requirements. Banks prefer cash first of all. They are only now beginning to use asset-based collateral. Personal guarantees are never checked.

Banks will take shares, power of attorney, or any other device in order to avoid the legal recourse of trying to collect a bad debt. In summary the banks are very security conscious.

2. Mark Edleson said that it was a serious mistake to exclude the local branches of foreign banks, in particular Chase, from participation in the Health Link program. Many good firms and many good projects go to Chase but are stymied by a lack of sufficient collateral, and the Health Link project unnecessarily puts limitations on itself by not utilizing Chase as one of the working banks in the program.

Y. Sources for Equity, Asian Development Bank

The Consultant pointed out to PATH staff that although venture capital companies do not really exist in Thailand or Indonesia, there is a facility that has been established by the Asian Development Bank at the Siam Commercial Bank in Thailand to provide equity support for worthwhile projects. This subject should be looked at as a potential factor in putting together complex financing deals. Similar kinds of institutional initiatives are underway by

AID and these should be communicated to the Health Link staff so that they will be able to take advantage of additional equity support on behalf of their projects and clients.

2. Thai Farmers Bank Policies

February 5, 1986 meeting with Khun Ajarie Visessiri, First Vice President Business Development Department, Thai Farmers Bank

1. Khun Ajarie sits on the Advisory Committee to PATH in Thailand. She occupies a very important position in the bank and has over 160 people working for her in development of new business for her bank. She is an ideal person to have on the Advisory Committee: she is bright, professional, honest, and holds a powerful position in the bank.
2. In Thailand you cannot rely on financial statements because of tax avoidance. Thus, the use of financial statements to evaluate a potential project seeking a loan from the bank is minimal. The bank relies on the following four elements listed in order of importance.
 - . The person and his or her personal reputation.
 - . The project finances.
 - . Collateral.
 - . The balance sheet.
3. Receivables rarely are acceptable for collateral. On the other hand personal guarantees are very important and usually are expected, not only from the president or managing director of the firm but also from all the active directors or major stockholders.
4. With Regard to Rates - There are two basic rates or prime rates in Thailand:
 - . The minimum overdraft rate (MOR) (presently 15.5 percent)
 - . The minimum loan rate (presently 15.5 percent)

- . In addition there is a special rate for loans that will generate new factories, and the maximum permitted rate currently is at 15 percent.

The minimum overdraft rate is adjusted daily (or at some similar short interval). The minimum loan rate, on the other hand, is adjusted usually every year but occasionally every six months if negotiated into the loan agreement. BOI investment approval of strength of collateral does not affect the rate.

5. With Regard to Export Credit - The Bank of Thailand has an export credit facility: an exporter will discount a letter of credit to a commercial bank which then rediscounts it to the Bank of Thailand, leaving a two percent margin for the commercial bank. The maximum borrowable amount for this type of loan is 70-80 percent of the face value of the letter of credit.
6. In Thailand at present there is very little commercial paper used by banks to raise money. Mostly this is done between banks themselves. The interbank rate as of January 2 was 15.5 percent (leaving little or no margin for loans that are being made). However, by January 29, the rate had fallen to 12 percent, and consequently, it is likely that the rates for commercial loans will fall substantially in the upcoming months.
7. With Regard to Processing of Loan Applications - The example of the x-ray investment was utilized:
 - a. The bank will be able to do the workup in approximately two weeks after receiving the TISCO market study. It then will take one week for the loan committee to review it.

- b. In general there are two loan committees at the bank which committee reviews a loan is determined on the basis of the size of the loan being sought. The breakpoint between the two committees is a confidential matter in the bank. However, for loans of less than 4,000,000 baht (\$160,000 U.S.) a decision can be made by an individual (probably a Vice President) within the bank.
8. At the request of the Consultant and the PATH staff, Khun Ajarie is sending out a notice regarding the Health Link program to 350 of its key clients. Khun Ajarie had not really realized until our meeting that Health Link can provide loan guarantees for expansions of existing facilities even on projects where no technology transfer is needed. Health Link can take a minor guaranteeing position in projects. (See the deal proposed for the toothpaste project in Indonesia.) In such cases, it may not even be necessary for Health Link to perform a feasibility study (as that kind of work would have been done independently in order to acquire bank financing), but PATH would have to review the project closely.
9. Perhaps the most important item discussed was the question of blending various sources of funding for loans to worthwhile Health Links projects.
- a. Upon discovering that PATH was considering making an ILF loan at a relatively low rate (something under the 15 percent that the Thai Farmers Bank presently is charging) as part of the total loan package for the x-ray equipment project, the Consultant raised the question of whether it would be possible to make one loan from Thai Farmers Bank and provide a blended rate at

something less than the 15 percent that the Thai Farmers Bank planned to charge (given current rates). Khun Ajarie said that this was definitely possible and that it could be done either as a form of syndication or perhaps on some other basis. The key point is that it is far better for a project to have only one loan at one rate than to have several loans with differing maturities and differing rates or terms. Even more important, however, is the fact that PATH is not in the business of banking as its primary activity. Its primary activity is in developing projects, providing technical assistance, sponsoring research, and actually performing and developing applied research in the health and population fields. Thus, it is not in a position to go about enforcing collection of loans that it makes and would find it very uncomfortable to have to foreclose on one of its loans. Even the monitoring function that banks perform on their clients is generally outside the day-to-day operating routine of the PATH organization. Consequently, it is the Consultant's opinion that utilizing a bank such as Thai Farmers Bank to provide the actual loan and then assure its proper administration was highly desirable from several standpoints.

- b. Although Khun Ajarie stated that their normal charge for administering someone else's loan would be two percent, she also indicated that this would be negotiable (when the Consultant teased her about it). Negotiability should be particularly true in the case where the bank would make a loan to a project such as the x-ray facility in the amount of \$200,000 and charge 15 percent. In this case the Bank would have to absorb the full

administrative costs on that \$200,000. If the loan turned out to total \$400,000, of which \$200,000 came from Thai Farmers Bank and \$200,000 from the ILF, the costs of administration would be little or no greater for the \$400,000 loan than it would be for the \$200,000. Thus, the markup for the \$200,000 should only be perhaps 1/2 a percent.

c. Utilizing the above example, the following would be the effect of a Health Link loan of \$200,000 at, say 9-1/2 percent and a Thai Farmers Bank loan of \$200,000 at 15 percent:

i. ILF loan of \$200,000 at 9-1/2 percent plus 1/2 percent to Thai Farmers Bank for administration.	<u>RATE</u> = 10%
ii. Thai Farmers Bank loan of \$200,000 at 15 percent.	= 15%
iii. Blended rate for a \$400,000 loan using weighted average which includes administrative fee for Thai Farmers Bank.	= 12.5%

It is the Consultant's recommendation that if ILF funds at substantially lower interest rates are going to be used for any of the Health Link projects, the only approach should be that:

- . The terms and conditions be the same with the only exception being interest rates.
- . That the money be provided on a blended rate basis which ties the prime banking institution into the full enforcement of sound commercial practices on the part of the borrower.
- . If this or some similar approach is not taken, I would recommend against the U. S. Government loan guarantees for ILF-funded project.

AA. Evaluation of the Effectiveness of the Loan Guarantee Concept in Indonesia and Thailand

1. As established for Health Link, the loan guarantee is a rather blunt instrument for providing incentives to investors to enter new businesses or expand production in the health and nutrition fields. In the case of Thailand, the blunt instrument is more of a whiffle bat than a baseball bat. The reasons for this are that in Thailand the loan guarantee has no effect on the actual interest rate that a customer is going to pay. The rates are set by the government for the private banking sector and it is not possible for the bank to deviate from those rates (according to the Thai Farmers Bank personnel).

In the case of Indonesia, on the other hand, the guarantee appears to provide some potential for reducing the rate below the prime rate established in the banking system since the prime rate apparently includes some risk premium as part of its calculation (unlike the situation in the United States where the risk premium is generally added to the prime rate). Depending on the cash flow implications of the loan guarantee program as established between AID and Chase, it may be preferable for the U. S. Government to act as a member of a syndicate wherein the local bank in provides loans to potential investors. This is especially true if the U. S. Government must actually obligate the amounts that are utilized for loan guarantees and provide these funds to Chase in the form of either deposits or government securities. Under the syndicate approach whereby the U. S. Government became part of the syndicate making the loan, the rate for the United States bank's portion of the loan could

be the lost interest from Chase, the interest on government bonds, etc.

2. Loan guarantees can be of some use if an individual investor is somewhat short of collateral but still possesses the basic management skills and an excellent project idea. However, most of the players the Consultant met in the fields of nutrition and health are fairly substantial firms and could probably come up with enough collateral if pressed to the wall. The effect of the loan guarantee, then, is to allow investors to expand somewhat in other sections of their business in addition to the expansions undertaken as part of the Health Link program.
3. Where loan guarantees may turn out to be particularly important is if PATH is successful in pulling together some of the projects that are being developed by nonprofit institutions such as the universities.
In this case, some of the investors may well be professionals and technicians who do not have sufficient capital to provide collateral, and in these start-up companies (even where the majority of the company's ownership is in the hands of a major existing operating entity) the loan guarantee may be of great use.

EVALUATION OF LOCAL SUBCONTRACTORS

In conformance with the request of Compton-Chase Lansdale, the Consultant made a brief evaluation of the work of the subconsultants from Indonesia and Thailand who are assisting PATH in its work.

BB. Business Advisory Indonesia (BAI)

1. The staff of PATH has great respect for BAI's capabilities. In general this respect is well deserved as the staff at BAI is highly experienced, highly motivated, and well organized.
2. In terms of who enjoys the confidence of whom: in general, Indonesian firms looking for a partner to provide technology will go to PATH. On the other hand, when a U. S. firm is looking for an Indonesian partner, they are likely to go to BAI first.
3. The method by which BAI is contracted to Health Link is not ideal. They are contracted to do specified pieces of work for relatively low fees: fees in general that are less than they could get from commercial clients not supported by a government agency. BAI feels that it is capable of doing everything that PATH is asked to do under the Health Link program with the expectation of providing expertise in the specific area of health products.
4. In most cases when BAI contracts with a private firm it establishes an incentive basis for its fee. While some out-of-pocket and base costs usually are required from the client, many times a three to five percent success fee is BAI's primary compensation in return for putting a deal together. Offering this kind of proposal to Indonesians is very attractive as they respond favorably to the incentive concept. So does BAI.

5. As an operating concept for future U. S. Government guaranteed type loan programs, Mark Edleson recommended that the loan guarantee be held off until final negotiations, and only then should it be offered as a kicker. A payment from the borrower should then be made in return for the provision of the loan guarantee.

6. Summary of Business Advisory Indonesia

BAI generally is filling a very good role although it is a limited one. It probably would be possible for an agency such as AID to contract with BAI to perform business promotional services (not necessarily limited to the health and nutrition fields) and make the basic method of compensation a percentage fee for successful deals. This percentage fee might be in the form of either cash or in the form of cash and/or equity in the venture that is created.

It could even be partially in the form of a royalty on sales of the enterprise that is created. Under such circumstances, BAI would probably be the prime contractor but it would be wise for AID to provide funds through a separate grant that does not reduce the amounts to be earned by the deal makers (BAI) wherein the subconsultant would provide technical expertise (similar to that which PATH is providing vis-a-vis the specific fields of health of nutrition).

CC. Survey Research Indonesia (SRI)

1. Survey Research is a first-rate market research firm. This is almost their total area of activity and they have offices in London and throughout Asia. The key person that PATH has been dealing with in Indonesia is Farquhar Stirling, and he is a top-notch professional.

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His work is consistently of the top quality. Based on their performance to date, this firm should be used by AID and other AID contractors wherever market research is required where they have offices.

DD. Thai Investment and Securities Company Limited (TISCO)

Meeting of January 30, 1986

1. Thai Investment and Security Company Limited (TISCO) is young and apparently bright. However, their work on the eye glass project relied too heavily on the information provided by the potential borrower, Khun Narong of Filter Opticals. When the bank checked individual distributors who purchase glasses from Filter, they found that the assumptions of sales after expansion were not justified by the information they obtained. This does not mean that the market is not there, but it is possible that TISCO over-estimated the situation. The firm probably will provide adequate service but they will have to be monitored somewhat closely.

**SECTION V - SUMMARY OF PROJECT-BY-PROJECT, BANK,
AND SUBCONTRACTOR ANALYSES**

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PROJECTS TO BE SUPPLEMENTED AND/OR SHIFTED

A. Summary of Hepatitis B Subproject

- a. Hepatitis B is an often fatal disease. It is the one disease that has been almost certainly proven to cause cancer - cancer of the liver - and it was reported that approximately 20,000 such cases occur in Indonesia every year which could have been prevented had not the afflicted individual earlier suffered from hepatitis B. Beyond cancer, many patients die from the disease itself. Finally considerable cost to the society is generated by the sicknesses resulting from hepatitis B.
- b. While it might be possible to obtain the Korean-approved vaccine at \$5.00 per dose, this is not yet assured. However, it would prove out the New York Blood Center technology on a large-scale basis and insure that this method is presently the best, least-cost method for producing this needed vaccine and may even be superior to the recombinant DNA approach which is several years down the road. And the Korean Cheil Sugar Company has the sole worldwide license from the New York Blood Center to use this process!
- c. Some conflict exists regarding protein contamination of the vaccines produced using the New York Blood Center approach and the World Health Organization (WHO) is concerned about this issue. Dr. Wilde and other technical experts strongly disagree with the WHO as to the importance of this criteria, nonetheless, WHO's positions on these matters are taken very seriously in both Thailand and Indonesia. This is one of those situations where the regulatory bodies "cure the disease but kill the patient." A low-cost vaccine is very much needed for countries such as Indonesia and Thailand as well as in many other

AID target countries. The cost in human suffering, lost productivity, and medical expense is enormous as a result of hepatitis B sickness, and a viable product exists that could be produced at a low price. The technology is relatively simple and well known for developing and producing Hepatitis B Vaccine but it is necessary to solve the institutional/technical conflicts between WHO, U. S. FDA, and the holders of licenses to produce these various vaccines in order to get them to the market.

- d. This subject probably should have the highest priority of the Science and Technology sections of AID and should be handled on an independently funded basis by AID, separate and in addition to the Health Link project provided that rapid action is taken.
- e. The project is a viable potential business in either Indonesia or Thailand but probably not both. Development of a successful method for producing low-cost vaccine in one of these two countries should be pursued with the stipulation that support provided will result in a process that can be utilized in other areas of the world that suffer from hepatitis B and which would desire to obtain access to the technology for producing their own vaccine; or, alternately, these countries would be supplied vaccine at a predetermined cost with a limited markup.
- f. It might be possible to make a deal with Thailand and Indonesia to have one country produce rabies vaccine and the other produce Hepatitis B Vaccine and then exchange them for use in both countries at a preferred rate. Negotiations for such an approach will require that

top U. S. health officials work at fairly high levels in both governments. This subject should be brought to the attention of the Mission Directors in both countries and perhaps should be coordinated by the head of Science and Technology out of Washington.

- g. Thus far PATH has done excellent work in the Hepatitis B Vaccine area through the Health Link project even though no near term investment has yet been established. Nevertheless, if this work continues its present course, the opportunity to obtain an additional and competitive source of supply, which might drive the price of this very needed product downward to its ultimate low point (cents instead of dollars) may be lost in the process of obtaining the best possible result under the programmatic objectives of Health Link. For the reason given above - namely the large-scale world-wide importance of Hepatitis B Vaccine for AID-supported countries - it is most strongly recommended that a strategy session be held as soon as possible and that the PATH organization proceed very cautiously (or hold off proceeding) until this strategy can be developed in conjunction with USAID's personnel.

After the overall strategy has been set, it may still be very possible for the Health Link project to provide for the immediate bulk importation and bottling of Hepatitis B Vaccine at a vastly reduced price to that which this vaccine presently commands. Health Links support would go toward the importation and distribution phase rather than the manufacture at this stage. Even if it turned out that bulk shipment to Indonesia or Thailand and bottling on site is not a cost-effective investment, the shipment of blind bottles for

labeling and quality control as well as distribution may very well be a viable Health Link project.

B. Summary of Larvacide in Thailand and Indonesia

- a. BTI (Abbott trade name - Vectobac) is a bacteria that is produced through a fermentation process. In fermentation, major economies of scale exist and quality control and process control are very important. In spite of the fact that the local laboratory at the university in Thailand is producing some small quantities of the bacteria BS and BT, the availability of large-scale industrial fermentation facilities may not exist at present in either Thailand or Indonesia. Consequently, it may be very likely that even if larvacides become widely used for vector control programs of malaria carrying mosquitoes, the active product will be produced in the labs of Abbott and shipped for formulation in the local countries.
- b. "Cost effectiveness has not been established for BTI. There is no recycling potential, and the operation cost of repeated applications, combined with the cost of the currently commercially available formulations, could impose serious constraints in its usage in developing countries. However, improved and longer-floating slow-release capabilities, coupled with inexpensive local production, may completely reverse the situation. Constraints on local production include the need for well-trained manpower; apprehensiveness of the local population about the use of microbial control agents; and a requirement that a fermentation plant be of adequate size to be cost-effective.

"With *Bacillus thuringiensis*, production is by fermentation process and where sophisticated fermentation plants exist in developing countries, coupled with bioassay facilities which are essential for quality control, the possibility of local production may be considered.

"It should be emphasized, though, that this organism or other bacteria should not be produced on a cottage industry basis, or even in a crude industrial fermentation plant, for reasons of safety and efficacy. If local production is undertaken, it will be economically advantageous to use the same fermentation plant to produce a variety of microbial and other products useful for both agricultural and public health pests and vectors. Where facilities for local production (fermentation) and quality control are inadequate, consideration should be given to the possibility of local formulation of imported, good-quality, stable, bacterial primary products. With all microbial pesticides, the maintenance of quality through bioassay is a key production factor; as is the need to carry out safety tests to insure that the product is not contaminated with microorganisms which might be pathogenic to man." (The above is all from the literature search and other investigations made by PATH staffer, Carl McEvoy and is contained in his memo of October 24, 1985. Emphasis by the Consultant.)

- c. Based on the meetings with the professors in Thailand as well as the research done by PATH staff in Seattle, it is the Consultant's conclusion that a new tack will have to be taken or at least investigated with regard to larvacide production in the target countries. Two primary steps have to be investigated first:

- . The availability of excess fermentation capacity for this type of product in either of the two countries.
- . A measurement of the actual comparative costs from using these larvacidal products as opposed to DDT for mosquito control.

If no excess fermentation capacity exists, the Health Link efforts with regard to larvacide probably should be shifted to the production of agricultural bacterial agents which presently are in large demand, since the facilities that are constructed to produce these products would serve as pilot plants for later production or larvacides for vector control of mosquitoes.

In addition, even for a proper business evaluation of establishing a formulation facility based on bulk imports of the raw bacteria, it is necessary to undertake a detailed feasibility study - first on paper - and then in the field, using typical environmental settings of Thailand and Indonesia to determine the actual cost for vector control using larvacidal products. These studies basically are environmental engineering efforts. The costs for which far exceed the scale of effort allotted for a particular subproject in the Health Link program.

Without establishing the actual cost for larvacidal vector control in typical local ecosystems by taking into consideration air movement of mosquitoes, climate, topography, agricultural activities, and other similar factors; and then comparing these costs with other forms of control; it is very difficult to imagine an investor making a major commitment to produce these products.

- d. As is the case with Hepatitis B Vaccine, this overall subject should be considered for a larger scale, independently funded program supplementing the work that has been done thus far by Health Link.

C. Summary of Rabies Vaccine Subproject

- a. At present, there seems to be little or no further role for Health Links with regard to rabies vaccine in Thailand. Progress toward possible receipt of bulk shipments of vaccine and local value-added bottling is approximately two years away. Similarly, the production of vaccine in Thailand is two or more years away under the present agreement unless it is modified by the Thai Red Cross (which is doubtful).
- b. The work performed by the Health Link staff has achieved several major and important goals:
- . Lower-priced, higher-quality vaccine has been introduced into the Thai market to treat the dreaded, much-needed, and often fatal rabies disease.
 - . In addition to increasing sales by the Thai Red Cross (a non-profit private institution), a local private sector firm which distributes vaccines also will be receiving the lower-priced, higher-quality Institut Merieux product and thus this segment of their business is likely to expand.
 - . A program has begun which may ultimately lead to of the vaccine in Thailand by either a profit-making or not-for-profit private sector institution sometime after 1987.

PROJECTS ON THE PATH LIST AS OF 14 JANUARY WITH THE BEST PROSPECTS FOR IMPLEMENTATION

D. Summary of Low-Cost Eye Glass Investments in Indonesia

- a. The participants in this project have a good track record of low-cost profitable production of necessary products. They have the technical capability to undertake several expansions in the eye glass field, all of which will be beneficial to the local economy, both by expanding a profitable business and by providing essential products at lower costs than presently exist within the Indonesian economy.
- b. Subject to review by Bank Duta of the financing arrangements, this first Health Link loan guarantee project is likely to proceed in the very near future.
- c. Health Link staff should continue to work with the Helen Keller Institute in order to bring additional investments onstream in the proper course of time.

E. Summary of the X-Ray Equipment Project in Thailand

- a. This project is likely to be the first done deal in Thailand. The loan guarantee will be somewhere in the neighborhood of \$200,000 against a \$400,000 loan. The resulting project is likely to be profitable and to result in side benefits for the economy of Thailand by enhancing the capability of a good small firm to grow into a major supplier of sophisticated equipment.
- b. If the suggestions on blended rate approach to financing are followed through, the implementation of this project by local PATH staff will be an excellent learning experience in terms of utilizing several of

the instruments available to PATH for assisting and promoting worthwhile projects in the medical field.

- c. Completing this project in rapid order will result in a shake-down of the process for obtaining bank review and approval of Health Link projects and will greatly facilitate the process in the future. The ability to make additional projects come into being will be very much strengthened by being able to point to a completed deal that has been beneficial to all parties involved and this will have a very favorable public relations impact upon the Thai business community.

F. Summary of the Status of the Diagnostics Subproject in Indonesia

- a. The consultant believes that if PATH is able to finalize the technology transfer of the latex technology, this project should be fully designed and ready to go to the bank on or about the end of April.
- b. The Kalona group is financially stable and able to execute this project.
- c. The development of diagnostic products in Indonesia will have a favorable health impact on the country immediately and is likely to result in further local advances (either together with Health Link or independent of it) in the development of additional diagnostic material.

PROJECTS ON THE PATH LIST AS OF 21 JANUARY WITH LESS CERTAIN PROSPECTS FOR IMPLEMENTATION

G. Summary of Disposable Syringe Production for Thailand and Indonesia

- a. The first thing to be established is whether there is any basic sense in separating the location for manufacture of components and assembly of disposable syringes. It must be determined whether or not this is economically disadvantageous to such an extent that even the ability to enhance market penetration will not overcome the obstacle. This is a primary task that must be accomplished by PATH.
- b. The Consultant outlined a strategy for Thailand with Mr. Samart which could be utilized to break the chicken-and-the-egg problem of a need for increased market share before Thailand would be considered as an assembly location. This approach would involve the creative use of Health Link feasibility/marketing front end funds to assist Khun Samart in implementing a test marketing plan that he has been developing for the Becton Dickinson products. Khun Samart has agreed to send a marketing plan to PATH by February 20, 1986. If the answer to question "a" above is affirmative, (i.e., it is possible to separate manufacture of components from assembly,) and if the marketing program for Becton Dickinson products appears reasonable, then PATH will support this test marketing effort on a cost-sharing basis with Becton Dickinson utilizing Health Link funding under the market research sections of the project. Negotiation to provide this assistance should include at the very least a preliminary commitment by Becton Dickinson that they will entertain assembly in Thailand on the basis of measureable penetration of the Thai market by their products.

- c. A successful test marketing campaign would lead to the establishment of productive value-added effort in Thailand. In turn, the investment can be utilized as a promotional device in obtaining further market penetration for the Becton Dickinson product line. Benefits from this would be the introduction of a locally assembled, high-quality, low-cost disposable syringe and the consequent replacement of less safe reusable products as well as the displacement of totally import-based products from Japan and Italy.
- d. The situation in Indonesia is equally unclear and no definite prediction regarding the likelihood of syringe assembly in Indonesia can be made at this time.

H. Summary of the Status of Interocular Lenses in Thailand

- a. A person familiar with West Virginia psychology should meet with Jim Cook, the President of CILCO as soon as possible. Having opened and closed three offices in West Virginia and having lived within 15 miles of its border, the consultant recommends that he be instructed to attempt to work with Dr. Cook.
- b. A backup source of technology should be located, in spite of the fact that Dr. Utahi Rutnin from Thailand has been completely sold on the CILCO product. (This is one of the dangers of concentrating only on the best available technology and not developing a backup if the best turns out not to be available.)
- c. This project should be implemented and can be implemented because the recipients of the technology in Thailand are both eager enough and strong enough to make it happen. This should continue to remain a high-priority project for Health Link and it is anticipated that it can be brought to fruition within the next four months.

J. Summary of the Status of the Potable Aqua Project

- a. **Additional work must be done by all parties: the business plan must be developed after obtaining cost information from the United States. A proposed advertising program would have to be developed as part of the business plan and a test marketing campaign undertaken. This process undoubtedly will occupy at least six months and it will not be until after that point that a decision could be made by any potential investor or loan guarantor as to the feasibility of investing in this project.**

K. Summary of Diagnostics in Thailand

- a. **The diagnostics field is wide open and susceptible to commercialization in Thailand.**
- b. **In addition to servicing the local market, Thailand is sufficiently advanced technically to provide products that it might export to other countries in the region.**
- c. **The primary additional piece of technology that is required is the latex technology that is widely available in the United States from a variety of sources so that latex can be utilized as the carrier medium for the diagnostic agents. This insures long-term shelf life under normal storage conditions of the product.**
- d. **Putting together a deal with the university or its faculty and a private firm or new investors or some combination of these is a complicated undertaking. Everyone is willing to see it happen and in the person of Dr. Natth and Dr. Boon Vanasin both political and entrepreneurial power are present in abundance. However, pulling together the various pieces and structuring the deals in this area**

will be time-consuming and technically complex. Given the full plate of activities that PATH presently needs to attend to in Thailand, it is recommended that the effort provided to this and other university-related projects be supplemented by additional PATH staff or an outside consultant who periodically will assist Don Douglas in furthering these projects.

- e. If additional help is provided in the immediate future, and if policy clarification can be obtained from PRE with regard to the university's minority participation in commercial, for-profit investments, then it is anticipated that actual deals can be structured for diagnostics within the next six months and that they can be submitted to banks for financing before the end of the current grant period.

L, Summary of Inexpensive Eye Glasses for Thailand

- a. If it can be restructured, this project is a perfect one for Health Links on a number of counts. First it provides a necessary product at a low price. Second it has the potential to transform a mom and pop type industry started by a hard-working, capable entrepreneur into a substantial business with long-term potential for the future. Third, there is a need for technical assistance in making the management and technical moves that are required for this expansion to take place.
- b. If the marketing estimates by TISCO are reexamined and reconfirmed and still justify a substantial expansion of the low-cost eye glass business in Thailand, or if it can be demonstrated that additional demand exists for these products outside Thailand, then PATH should continue to work with the combined Universal/Filter Companies to structure a realistic and feasible project for expanding the eye glass business in Thailand.

c. If it is possible to develop a reconstructed business proposal with reasonable equity and depth-to-equity ratios, which can sustain a free market rate of interest, and if this process can be facilitated by PATH staff and the Health Link program, it will be a prime example of the ways in which Health Link can function: namely not only is it necessary to transfer technology in the specific production function areas, but also to transfer management technology to highly entrepreneurial but relatively inexperienced managerial personnel in the developing world.

NEW PROJECTS WHICH SURFACED DURING THE FIELD VISIT

- N. Summary of tetracycline manufacturing plant project.
- a. It may well be possible to carve out a subcomponent of the tetracycline project for Health Link participation. This subproject would be the development of a pilot plant, the functions of which would include producing the fermented antibiotic from locally available materials. This pilot plant research then would enable the main plant to cut its costs and increase returns if locally available materials are found which are suitable for full-scale operation. The pilot plant could also be used in the early stages to shake down the operation and to produce competitively priced tetracycline in small quantities to serve part of the local market. Lastly, the pilot plant would later be shifted into the production of relatively small quantities of other fermentation products; this could include larvicides, other antibiotics, etc. This subproject is presently under examination by PATH staff.
 - b. This type of project should fit very well within the objectives of AID, PRE, and Health Link: it would be 100 percent privately owned, result in the introduction of a major new industrial technology with wide application for many products in a developing country, contribute to the growth of a potentially major private sector industrial company which could play a major developmental role in the nation's economy, and it would produce a less expensive product that is of great importance to the health needs of the country and area.
 - c. The potential economic strength of the venture is preliminary indicated by the commitment of external financing that has been offered to date.

- d. Assistance to this project would further the likelihood of other Health Link projects being implemented by the Kalona group.
- e. Consequently, it is recommended that substantial effort be made to find a way for this project to go ahead and for AID to participate in its development.

O. Summary of the University of Mahidol Potential Projects.

- a. The commercial viability of these projects should be examined by PATH under the Health Link program.
- b. Health Link is an appropriate mechanism for assisting in the commercialization of research work and development work performed at the University in the medical and nutrition related areas.
- c. Because of the effort expended to date, the University system should be entitled to receive at least a royalty on commercial ventures and quite possibly an equity position of not more than 40 percent of ventures which are commercialized. AID should permit Health Link support of commercially viable ventures which begin with a University equity ownership of up to 40 percent provided that buyout provisions exist to reduce the quasi-public institutional position to 20 percent within five years after the beginning of commercial operation.
- d. Because the initial work to prove commercial viability must be undertaken prior to identifying the other equity participants in each operation, these project should be exempted from the requirement that the initial prefeasibility studies and/or follow-on technical studies and business plans be reimbursed prior to their initiation. Provisions for reimbursement should be waived until the private investors

come in and should then be recompensed by the private sector investors after their entry into the project.

- e. Because the time demands for structuring these new businesses are more extensive than the simple joint ventures envisioned when the Health Link program was initiated, and because of the heavy demand on the staff in Thailand to push forward with existing projects, it may be necessary to employ additional in-house staff or outside consultants to assist in bringing these projects into commercial operation.
- f. It should be possible to have one or more projects underway and submitted to banks for financing of the debt portion within the remaining life of the grant.
- g. Strong consideration should be given to utilizing the industrial park at Salsya as a site for some of the other Health Link projects that are planned but which presently have no relationship to the University. The basis for utilizing the site should be on straight commercial terms. The synergy derived from close proximity to the University may be significant.
- h. Some of the projects envisioned by the University should be presented to firms which are investing in other Health Link projects for their consideration as investors/operators. This is particularly true of the medical machinery which should be presented to Khun Kongsak (MID) for his consideration as a manufacturer.

P. Summary of HD1 Production Project.

- a. It is recommended that the chemical firms who might be ultimately interested in producing larvicide for mosquito control be approached with the prospect of producing HD1 as a first product and that if

this project turns out to be feasible, Health Link participate in the development of this project.

Q. Summary of Toothpaste Project

- a. The firm in question is strong but the provision of a loan guaranty will achieve additional public purposes and free up collateral for the firm's other investments in public health.
- b. By making the loan guaranty to the firm's existing bank, competition in the banking system is enhanced and Chase is brought into the Health Link program in a constructive way so that it can surface additional potential Health Link type projects.
- c. If approvals are not denied for various policy reasons, this project should be able to go ahead with great rapidity and the guaranty should be safe.

R. Summary of Additional Eye Glass Projects in Indonesia

- a. The second project to be undertaken would be a marketing analysis and test marketing program utilizing technical assistance from the Helen Keller Institute who are presently on the scene in Indonesia. It should be highly advantageous to have such strong technical participation in this field at a relatively modest cost.
- b. The fruits of this market development work should yield an additional investment project involving expansion of the first Health Link investment in high correction eye glasses. (Capacity will be almost doubled from that which is achieved with the \$140,000 investment by the addition of another \$60,000 of equipment.)
- c. A third project being investigated as a corollary project to the expanded production of high correction, low cost eye glasses is the

production of lower cost bifocal lenses and the production of additional low cost frames.

- d. It is anticipated that within six to 12 months, one or more of the three projects in the eye glass area can be ready for application to the bank for funding and for possible loan guaranty.

S. Summary of Surgical Plaster in Thailand

- a. Current imports amount to approximately 10 million baht per year with a potential market of 25 million baht per year for surgical plaster. This is basically a result of the high proportion of young people in the society and the large number of motorcycles and other precarious vehicles that are utilized on a daily basis.
- b. This project has been stalled because of the change of staff in the Bangkok office but it should be possible to activate rapidly now.
- c. Khun Chatchai of Worldco Company Limited reported that the investment to get into this business should be approximately 10 million baht (\$400,000) and that the Worldco firm was already attempting to obtain technology from a Swiss firm.
- d. The prospects for this investment cannot yet be firmly evaluated but because of the business astuteness of Kuhn Chatchai and the strong demand for the product in Thailand, all of which is imported at high cost, this project should be pursued further by PATH staff.

T. Summary of Additional Diagnostic Project in Thailand

- a. The Consultant arranged a meeting between a representative of the owners of the Bangkok bank and PATH staff. It turned out that this individual had been approached with regard to raising funds for a diagnostic project at another university in Thailand. The project

involves producing a diagnostic product necessary for research. PATH staff is investigating this project but no information is available at this time. However, the contact with the Bangkok Bank may lead to other projects being identified and surfaced without violating the primary relationship with Thai Farmers Bank.

U. Summary of Additional Food Products and Vitamin Additives in Indonesia.

- a. It is anticipated that it may well be possible to develop one or more additional Health Link subprojects which can be implemented and for which a loan guaranty will be required by working with P.T. Indofood on a high intensity basis. This process could either be to add vitamin supplements to some of their existing foods or to bring out new food products with high nutritional value for youngsters beyond the weaning food stage.

V. Summary of Surgical Plates in Thailand

- a. This project does not yet have a solid in-country corporate sponsor, although a key orthopedic doctor is interested in putting together an investment group to invest in this project.
- b. Surgical plates, which are used for the repair of broken bones, are a precisely machined product which is very labor intensive to produce. The technical expertise is known and available to PATH and is being pursued by them in order to put this project together.
- c. The present prospects for this investment are not known but the project should continue to be pursued by the PATH staff.

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