Telecommunications Training Needs Assessment

in the Philippines, Indonesia, and Thailand

The Academy for Educational Development

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FOREWORD

This telecommunications training needs assessment has been carried out on behalf of the APEC Working Group on Telecommunications and the APEC Human Resources Development Working Group. Funding was jointly provided by the U.S. Agency for International Development (AID) sponsored APEC Partnership for Education and the Bureau of International Communications and Information Policy in the U.S. Department of State.

The Academy for Educational Development was contracted for this project under the AID Indefinite Quantity Contract for Education, Training, and Human Resources Development.

The overall objective of this study was to determine the extent to which telecommunications training needs are being met in the Philippines, Indonesia, and Thailand; and to make recommendations on the establishment of a permanent, self-financed APEC telecommunications training course in the region.

This report identifies the major training related issues facing the telecommunications sector in the three countries visited, and makes recommendations for the creation of regional training programs.

The programs recommended in this report are designed to enhance the training endeavors of telecommunications providers, by focusing on needs that were clearly identified at numerous meetings with telecommunications providers in the countries visited.

ACKNOWLEDGEMENTS

STUDY TEAM

The Study Team was composed of three members, each of whom has over 30 years of experience in different aspects of the telecommunications industry, including policy analysis, technology, economics, management, human resources, and training. They were:

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SECTION 1

INTRODUCTION

The demand for expanded and improved telecommunications to maintain high economic growth rates has caused many Asian countries to embark upon large scale development programs. This has, in turn, correctly fostered the realization that upgrading the knowledge and skills of telecommunications workers to cope with this growth, and the new technologies it brings, is critical.

At various APEC meetings, it was recognized that a serious lack of trained people in the telecommunications sector was beginning to emerge in some member economies, and that a greater focus on training was necessary if economic growth was to be sustained.

As a result, the APEC Working Group on Telecommunications and the APEC Human Resources Development Group developed an initiative for a telecommunications training needs assessment in three ASEAN countries. With funding assistance from the U.S. Agency for International Development and the U.S. Department of State, an assessment was carried out in the Philippines, Indonesia, and Thailand during July, 1993. This report is a result of that assessment. It analyzes information received during many meetings, interviews and field visits, and makes recommendations based on this analysis.

The assessment was conducted in two stages. The initial stage involved on-site and telephone interviews of personnel in major U.S. telecommunications companies to determine their perceived needs and interests related to training in ASEAN countries. Prior to visiting the companies, a list of topics for discussion was sent to each company representative outlining specific topics to be discussed (see Appendix A). Discussions were open-ended and participants were encouraged to express their ideas and opinions. Two weeks were devoted to collecting data from the U.S. companies and 13 companies were contacted during that time (see Appendix B).

The second stage of the study involved visits to selected training facilities and on-site meetings with personnel at key telecommunications companies and government organizations in the Philippines, Indonesia, and Thailand. Specific meetings in each country were requested by the Study Team based upon its discussions with U.S. firms, the Team's personal knowledge of the region, and suggestions from the Department of State. These meetings were then arranged by the APEC Working Group on Telecommunications representative in each country to be visited (Appendix C). Prior to the visits, a list of proposed topics for discussion was forwarded to the APEC representatives (see Appendix D).

SECTION 2

EXECUTIVE SUMMARY

2.1   General

Rapid economic growth in Asia has been accompanied by the need for rapid expansion of basic telephone services and an increased demand for advanced telecommunications services. Governments that have been unable to expand the infrastructure because of ccnstraints on external borrowing and other factors, have come to realize that it is essential to assign priority to the telecommunications sector. Failure to do so acts as a hindrance to national development.

To overcome the problem faced by state-owned monopolies in financing capital expansion programs, countries are making increasing use of the privatization process or allowing the private sector to participate by the use of BOT[1] or BTO programs. One of the best known examples is the case of Thailand, where the government-owned telephone monopoly has authorized the private sector to install three million lines at an estimated cost of US$ 5.0 billion. This participation is under BTO agreements which will permit the concession holders to manage and operate the system under 25 year revenue sharing agreements.

Accelerated growth cannot be achieved by merely signing turnkey contracts with vendors and installing immense amounts of plant and equipment. To be successful, it is absolutely essential for large investments to be made in upgrading the skills of existing employees, and recruiting and training new employees. The Study Team found that almost all of the organizations involved in telecommunications expansion programs recognized the importance of this factor. However, several problem areas were identified as follows:

- An insufficient number of graduate engineers entering the market place in all high technology areas. For example, in Thailand, the colleges and universities graduate approximately 4,000 engineers each year, but demand is estimated at 7,000. Trained technicians are in even shorter supply.[2] In Indonesia, of the 40,000 workers in the electronics industry, only 16,000 have received vocational training and only 320 are university graduates.

- Competition (offers of more attractive compensation packages) for trained engineers causes movement within the industry.

- Language comprehension difficulties occur when course instruction is given in English, or suppliers manuals are written in English.

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[1]BOT: Build, Operate, and Transfer. BTO: Build, Transfer, and Operate.

[2]Source: Far Eastern Economic Review, March 11, 1993.

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- Weaknesses exist within the training process including: poor career paths for trainers, inadequate course development, and inadequate laboratory equipment.

- There is a disparity between the recognition of training needs and a commitment of resources to address the needs.

2.2 Country Overviews

- **General**

Three ASEAN countries were chosen for the telecommunications training needs assessment: the Philippines, Indonesia, and Thailand. They were visited by the Study Team in the order given.

All were actively engaged in programs to provide additional telephone lines and improved services as rapidly as possible. A brief summary of each country follows.

- **The Philippines**

At the end of 1992, there were approximately 1.2 million telephones in service[3], or an average penetration (telephones per 100 population) of 1.4 percent. The Philippine government has a National Telephone Development Program to increase telephone lines in service to 2.75 million by 1998. If achieved, this will increase the telephone penetration to 4.0 percent. Future plans are for the penetration to be increased to 6.2 percent by 2004, and 10 percent by 2010.

The largest provider of telecommunications services is the private sector Philippine Long Distance Telephone Company (PLDT). PLDT accounts for over 94% of all telephones in the country, and is the principal supplier of domestic and international long distance services. PLDT had planned to install 1.2 million lines of additional capacity by 1997, but because of the sharp focus on national telephone expansion, has revised its plans to expedite the program for completion by 1995.

PLDT currently has 18,000 employees, and has introduced a "zero growth" employees policy. This will require PLDT to embark on a major program of training for the new systems that are to be introduced, and to upgrade the skills of the present work-force.

There are two major telecommunications training centers, the PLDT training center, which offers over 100 courses, and the government-owned "Telecommunications Training Institute" (TTI) which was founded in 1962. TTI is operated by the Department of Transport and

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[3]PLDT Corporate profile dated May 6, 1993

Communications (DOTC) and offers 33 courses which range from four days to ten weeks duration.

- **Indonesia**

Telecommunications in Indonesia has been branded as one of the "bottlenecks" to national development[4]. Access to telephone service is one of the lowest in the region with an installed capacity of 1.6 million lines and a national average line penetration of 0.8 percent. The government plans to increase the number of lines to 7 million by 1999, but it has been projected that the demand could reach over 9 million by that time[5], thus there will continue to be a shortfall between supply and demand.

Domestic and international telecommunications services are provided by two state-owned limited liability companies, PT Telekomunikasi Indonesia (PT TELKOM), and PT INDOSAT. Overall jurisdiction rests with the Ministry of Tourism, Posts, and Telecommunications (MTPT). PT TELKOM employs 40,000 persons, and PT INDOSAT 1,600.

For Indonesia to successfully complete its long term telecommunications development objectives, it will require an increase in trained personnel plus major re-training programs to manage and operate the new technologies to be introduced. International lending agencies funding telecommunications projects have recognized the importance of human resource development and training, and are providing assistance to both MTPT and PT TELKOM.

Almost all telecommunications training is conducted in Bandung. At Bandung there are three separate institutions: a Telecommunications Training Center operated by PT TELKOM; an MBA school (Bandung School of Management - STMB); and an Institute for Telecommunications Technology (STT TELKOM). These institutions are described in section 3 of this report.

- **Thailand**

There are over 2 million lines of installed capacity in Thailand. There is also a recorded waiting list of over 1.5 million subscribers. In a bold decision to solve the telephone shortage, the government has allowed the private sector to undertake a significant role in telecommunications infrastructure development through the award of two BTO concessions that will provide an additional three million lines over the period 1993 to 1997.

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[4]Mr. Setyanto P. Santosa, President Director, PT TELKOM Indonesia. Seminar on "New Approaches to Meet Growing Demands in Telecommunications Services", Bangkok, November 1992.

[5]Source: Japan International Cooperation Agency (JICA)

For the period of the government's Eighth Five Year Plan (1997 - 2001), it is planned to install an additional six million lines. To raise the capital required to carry out a program of this magnitude, it will be necessary for domestic telephone services, provided by the state-owned Telephone Organization of Thailand (TOT), to be privatized[6].

This rapid growth will place great demands on the sector for trained personnel, and effective recruitment and training programs will be crucial to the successful implementation and operation of the improved and expanded system.

The Telephone Organization of Thailand (TOT) is the monopoly provider of basic telephone service and has more than 19,000 employees. TOT has its own well established training center with a staff of 258, of whom 87 are instructors. The training center expects to pass 6,000 students through its system during 1993.

The Communications Authority of Thailand (CAT) is the state enterprise responsible for international telecommunications services and postal services. It also has a well established training center and offers approximately 50 courses annually in telecommunications subjects. In 1992, training courses in these subjects were completed by more than 1,200 people.

The BTO providers are the TelecomAsia Corporation Ltd. (TA) and Thai Telephone and Telecommunications Co., Ltd. (TT&T). Both of these companies have recognized the importance of training if they are to successfully implement and operate the new networks, and are in the process of setting up training centers. In the case of TA, assistance in this effort will be provided by TA's strategic partner NYNEX. The strategic partner of TT&T is Nippon Telephone and Telegraph International (NNTI).

2.3   Findings

● **General**

The training facilities operated by the major telecommunications organizations in all three countries are well established and provide a wide range of courses which are applicable to the needs of the students. In all cases, training provided by the telecommunications organizations is supplemented by vendors as part of equipment procurement.

● **Instructional Methods**

In general, the Study Team found that most instruction was confined to traditional lecture-driven methodology. For example, Computer Based Training (CBT) was observed only in Bandung,

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[6]Khun Roungroj Sriprasertsuk, Chairman, TOT. Seminar on "Approaches to Meet Growing Demands in Telecommunications Services", Bangkok, November 1992.

at PT TELECOM. Self paced or self instructional materials were not readily apparent in any of the training facilities. The Team considers that training would be enhanced by the introduction of advanced learning techniques such as instructional TV, teletraining, or any type of distance learning. This would be particularly helpful where attempts are made to decentralize training to reduce costs, as in Indonesia.

⊙ Productivity

The number of telecommunications lines per employee is frequently used as a measure of productivity. In one case, the Team observed that, as a matter of policy, the ratio would be used to measure the level of productivity (i.e., if the number of lines per employee increases, it is assumed that employee productivity is increased). The goal is commendable but when achieved, could mean that a large number of employees would be displaced from their present job activity. When a "no lay-off" policy exists, it creates an excellent opportunity for re-training workers and upgrading their skills.

⊙ Commitment

Funding for the enormous expansion programs underway in all three countries is limited, and difficult choices are necessary when allocating monies to needed aspects of the expansion. However, if adequate funding for training is not provided early, the eventual result will be poorly managed projects, and excessively high costs in areas such as maintenance, repair, and customer service.

It is necessary, therefore, for organizations to establish well defined goals and to commit funds to support all aspects of training. If this is not done, the issue becomes one of pay now or pay later at a higher price. In some cases goals were either established, or in the process of being set up. Elsewhere, a greater focus on the commitment of resources to training would help to smooth the difficult job of implementing an accelerated expansion program.

⊙ Human Resource Planning

Although the work of the Team was focused on training needs, the closely related subject of human resource planning emerged during many discussions.

It was suggested to the Team that the demand for more engineers and more highly educated technical people may be misleading as much of the day-to-day work in the industry does not require such a high level of education. The Team was told on several occasions that much of the work could be done by far less educated people. For example, entry level jobs were being filled by college graduates, and in some cases, applicants were not hired if they did not have a college or university degree. In some instances, secretaries had to show evidence of having

obtained an advanced degree. In the view of the Team, this suggests that more effective human resource planning, and particularly job evaluation, is needed to address the issue. The Team did not have sufficient time to explore this issue further.

2.4   Recommendations

- **General**

As a result of more than 40 meetings and interviews with telecommunications providers and related government organizations in the three countries visited, the Team concluded that there is a need for expansion of training activity.

The following 12 broad categories of training needs have been identified as those which are not being adequately addressed by existing or planned training activities. They are listed in order of priority based on the frequency with which they were mentioned during the Study Team's discussions, and upon the collective judgement of the Study Team members. The longer list of specific needs is shown in Appendix I.

- General Understanding of the Telecommunications Industry

- English Language Instruction

- Strategic Planning

- Human Resource Development

- Marketing and Sales

- Management and Supervisory Skills

- Technical Standards

- Frequency Management

- "Spirit of Service" (customer relations)

- Training (for trainers and training development personnel)

- Project Management

- Telecommunications Industry Trends

The 12 categories listed were identified in all three countries as those for which training is needed. It should be noted that while English language training ranks second on the list, the Study Team made no attempt to address this need. The Team feels that English language training is beyond APEC's immediate ability to address, and the subject more rightly is an issue to be dealt with by the educational and institutional planners of each country.

To address these identified needs the Study Team recommends three specific actions as follows:

1. **Develop an APEC Telecommunications Training Course, called the APEC Telecom Century (ATC) Course**

2. **Implement a Regional Plan to introduce the Course**

3. **Appoint an APEC Training Administrator**

These are fully explained in section 4, but briefly, the rational for each recommendation is as follows:

⊛ **APEC Telecom Century (ATC) Course**

The single most often mentioned training need was for a course that would provide a general understanding of the telecommunications industry. Accordingly, it is recommended that the APEC Telecom Century Course be developed in order to provide training in the various basic functions of the industry.

The target audience for this training in the Philippines, Indonesia and Thailand, is conservatively estimated at approximately a total of 10,000 students. The Course should be modeled after one currently being given by the NYNEX corporation in the USA. It would be an intensive four week program designed to familiarize managers with virtually every aspect of a telephone · company's business (see Exhibit 4-1).

Facilities in which the course could be taught already exist in each of the countries and only minor modifications would be necessary at each location. The Course would be open to all APEC members on a tuition fee basis with a specified number of tuition-free seats allocated to the place where the course is taught.

APEC TELECOM CENTURY COURSE (ATC)

YEAR 1　　YEAR 2　　YEAR 3　　YEAR 4　　YEAR 5

GETTING
STARTED

ATC ENVIRONMENT IN THE THAILAND

GETTING
STARTED

ATC ENVIRONMENT IN INDONESIA

GETTING
STARTED

ATC ENVIRONMENT IN THE PHILIPPINES

EXHIBIT 2-1

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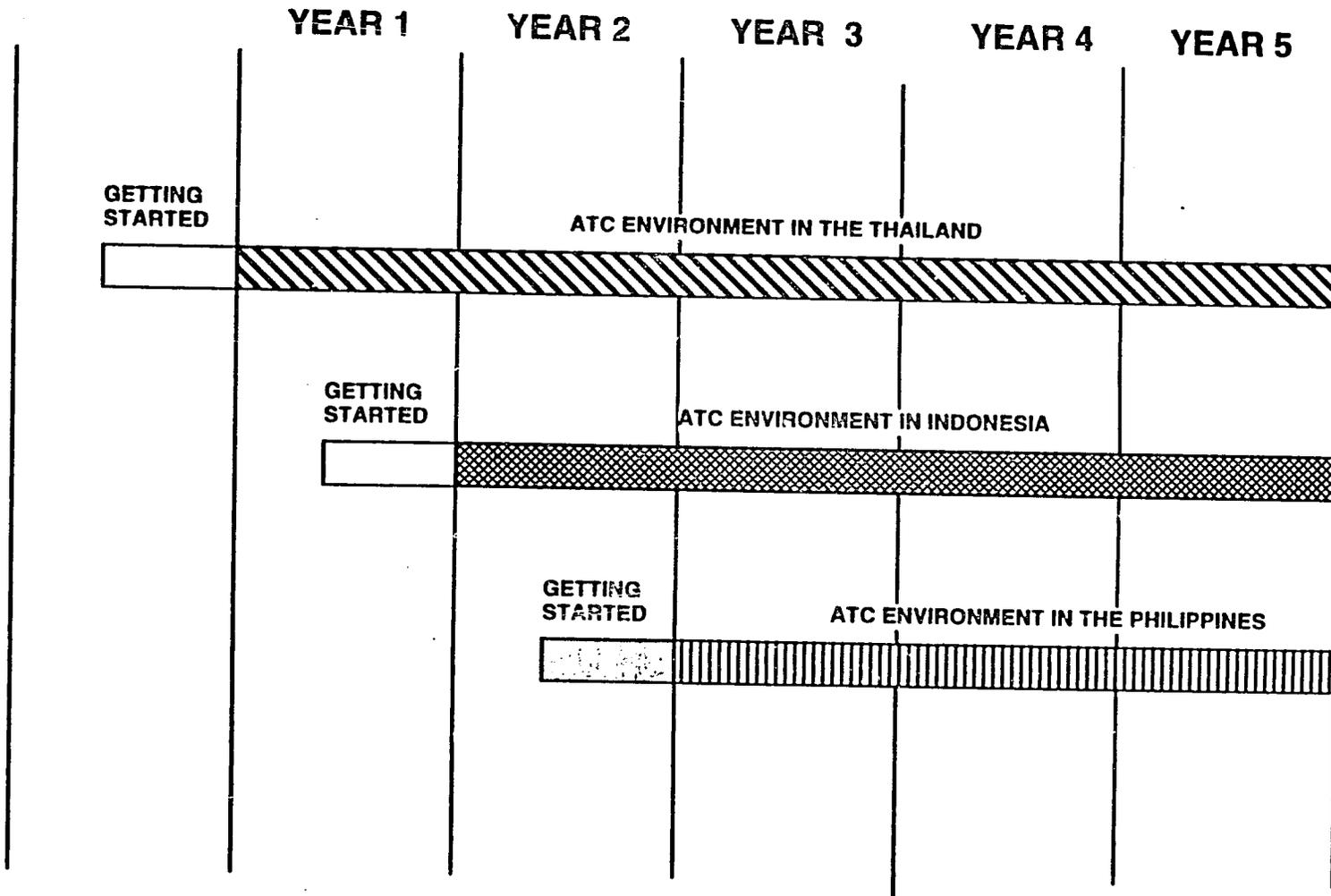
● **Regional Plan.**

The APEC Telecom Century Course is intended to serve the needs of all APEC members. To introduce the course will be a major undertaking, and a regional implementation plan is, therefore, needed. Key features of the plan are as follows:

- Approach NYNEX for help in adapting their overview course for APEC.

- Arrange for appropriate training of an in-country instructor.

- Phase in course offerings at separate locations in three countries over a three year period. Initiate a pilot ATC course in Thailand offered eight times during the first year. Offer a second identical version in Indonesia in year 2. In year 3, offer another identical version on the Philippines (see Exhibit 2-1). Additional offerings in other countries could be considered depending on future demand.

- Conduct the course in only one country in the first year. Thailand should be the initial country to introduce the course, due to the immediate availability of adequate training facilities, as further described in section 4.2.

- Limit participation to 16 students per session.

- Limit session to eight per year.

- Allocate four tuition-free seats to host members.

- Encourage senior level managers to attend peer level class sessions.

● **APEC Training Administrator**

Most of the training needs identified in the study are common to all three members visited by the Team. If each member attempts to address its own needs, a significant amount of duplicative training development will result. Funds are always limited, and each nation will be hard pressed to fully meet its own requirements. To maximize the use of available funds, the appointment of an APEC Training Administrator is recommended.

One of the most important functions of the Training Administrator would be to identify and communicate information to members on an on-going basis about exceptional or superior courses already offered within the APEC membership. Currently, APEC has no way to effectively evaluate and recommend courses offered by members. With information provided by the Training Administrator, members would be able to attend courses in various countries or purchase the rights to offer those courses themselves, thereby meeting the remaining training needs identified in this report. Using existing courses would have the benefit of providing immediate training

and would be lower cost than having each country develop courses for all of their training needs. Because these training needs vary among members, this report does not include those different costs.

Although this sharing of information through the Training Administrator is recommended for both large and small group courses, it is especially important for specialized audiences. Many of the training needs identified -- such as frequency management, train the trainer, and telemarketing techniques -- can be met by existing courses currently available from within the APEC membership. An additional benefit from this approach is the likely increase in attendance in these courses which would lead to economies of scale for the providers.

In the instance where future training needs are identified and for which there are no course offerings by APEC members, this report recommends that the Training Administrator, with the assistance of the APEC Working Group, determine the appropriate action. The costs of such future courses are not included in this report, but might be offset by the surplus funds generated after year 3 from the ATC course.

The Training Administrator should be located in Singapore with the APEC Secretariat.

2.5   Cost Summary

The five year cost summaries (in U.S. dollars) reflect the costs for implementing the "APEC Telecom Century (ATC)" course as well as the costs associated with the APEC Training Administrator. The implementation schedule for these classes is shown in Exhibit 4-2.

Since the proposed APEC training curriculum must be self-sustaining, certain major assumptions had to be made. Time constraints did not permit us to validate these assumptions. If the assumptions do not hold, further studies will be necessary to determine how to achieve a self-sustaining project.

The most important assumptions are:

- NYNEX will be amenable to providing assistance.

- Each member hosting the training program will provide free of charge, (1) fully equipped classrooms, (2) utilities, and (3) some logistic support. In return, the host member would receive four free places in each course.

- Each class session will train 16 students, and there will be eight sessions annually.

- Compensation for the course instructor and Training Administrator would be met by funds generated from course fees.

- The tuition fee per student would be US$ 1,275.

The total projects costs and revenues over the life of the project are shown below. The first table presents the actual expenditures; the second table the actual revenues.

	Start Period	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Expense	0	105,556	128,275	182,612	190,941	199,439	806,823
Start-up costs	172,121	65,542	76,546	0	0	0	314,209
Total	172,121	171,098	204,821	182,612	190,041	199,439	1,121,032

Costs are in US $

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The estimated revenues which would offset the expenses and start-up costs are as follows:

	Start Period	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Total Revenue	0	134,109	290,630	494,204	533,113	575,438	2,027,494

Costs are in U.S. $

These actual costs can be used for budget planning purposes. However, for purposes of determining the break-even point (the time at which revenues begin to exceed expenditures making the Course self-sustaining), a slightly different method of calculation, called the Present Worth of Expenses and Revenues, needs to be used. (For a discussion of the different methods of calculation, see Section 5.2). Based on these Present Worth calculations, it is projected that the Course will become self-sustaining in Year 3; thereafter, the program will generate a net positive balance each year (see Exhibit 5-3).

As the cash flow becomes positive in the third and subsequent years of operation, it is envisioned that these funds will be used to support additional APEC telecommunications training activities. Alternatively, the funds could be used to develop and deliver more subject-specific courses when a need is identified.

SECTION 3

INFRASTRUCTURE AND TRAINING STATUS

3.1 THE PHILIPPINES

3.1.1 Introduction

The telecommunications infrastructure of the Philippines is undergoing major change as a result of efforts by the government to increase the number of working lines, and to expand service in the rural areas. An executive order enacted in July will permit new entrants to serve designated franchise areas. These new service providers must furnish adequate services to rural areas in addition to urban business centers. The order is intended to foster an improved balance in national telecommunications development.

The National Development Plan target is to increase the number of telephones from the current level of 1.2 million to 2.75 million by 1998. This will increase the present penetration of 1.4 per 100 population to 4 per 100. Future plans are to increase the penetration to 6.2 percent by the year 2004, and 10 percent by 2010.

The dominant telecommunications provider is the private sector Philippine Long Distance Telephone Company Inc., (PLDT). PLDT, first established in 1928, has over 94 percent of the domestic market, and is the dominant international carrier.

A variety of smaller carriers provides international, data, telegraph, telex, satellite, paging, and cellular switching service. They include: Digitel Telecommunications, Capital Wireless International, Eastern Telecommunications Philippines Inc., Philippine Global Communications Inc. (Philcom), Globe Telecommunications, Liberty Communications, Pili)ino Telephone Corporation (Piltel), Extelcom, and The Philippine Telegraph and Telephone Company (PTT).

In an effort to develop rural services, the government has completed a backbone transmission network throughout the Philippines. This is part of a National Telecommunications Program (NTP), consisting of three major regional projects which will result in the development of telecommunications services nation-wide, rather than in densely populated urban areas as at present.

It is intended that concessions will be awarded for the management and operation of the local networks in each of the three NTP regions. Thus far, the only award made has been for a facilities management contract to Digitel for the Luzon (NTP1-1) region. Under this agreement Digitel will make lease payments to the government, and at the end of an agreed term, will be allowed to purchase the system from the government.

3.1.2 Existing and Planned Training Activities

● **General**

The telecommunications industry has little difficulty in acquiring educated people for the jobs that they offer. Most entry level positions require a college degree.

Two major training centers, both in Manila, are currently in operation. One is operated by the government's Department of Transportation and Communication (DOTC), and the other is operated by The Philippine Long Distance Telephone Company.

The smaller telecommunications providers such as Digitel, Capital Wireless International, Eastern Telecom Philippines Incorporated, Philcom, and the Philippine Telegraph and Telephone Corporation, have much smaller training facilities. Some of these companies share their training at common locations. Since these companies may grow at a faster pace in the future as a result of new telecommunications policies, their training needs and training facilities will also need to grow correspondingly.

Details of the PLDT and the DOTC training facilities are as follows:

The Philippine Long Distance Telephone Company (PLDT)

● **General**

The Philippine Long Distance Telephone Company (PLDT) is by far the largest local exchange and long distance service provider in the Philippines. PLDT currently has 127 central offices serving 133 cities and municipalities, and at the end of 1992, PLDT had approximately 1.2 million telephones in service. Plans under the X-6 project to add an additional 1.2 million lines capacity, in a program originally planned for completion by 1997, has been revised for completion in 1995.

● **Facilities**

PLDT's training facilities are located in two locations in the Makati section of Metro Manila. While one facility does most of the technical training, some technical training is performed in the central office environment where switching and transmission equipment are available. Some management courses are conducted at other locations. In addition, many courses are conducted in other cities on a rotational basis.

- **Staffing, Organization, and Training**

PLDT's training staff consists of 72 people of whom 38 are involved in technical training, and 34 in non-technical training. Fifty percent of the staff are instructors and those remaining provide supporting and administrative services. Instructors are recruited from line positions and form the core trainers. In addition there is a pool of over 150 guest instructors. Course development methodology was expressed as a training need.

All training is primarily conducted in the English language and in some cases "Taglish" (combined Tagalog and English) is used where necessary. Course material and textbooks in English present no problem, and there is no pressing need to change any material or video screens to Tagalog.

The curriculum consists of 138 courses ranging from two to 30 days, and courses are developed and presented by the instructors. These courses are conducted in 18 classrooms of which eight have been decommissioned because of commercial electrical power failures, known as "brown-outs".

Training paths have been created which indicate a well organized approach to career development. Over the past three years, 80 percent of PLDT's 18,000 employees have attended the training center. In 1982, 702 courses were completed and in 1993, 740 have been conducted to date. Considering the brown-out problem, this is quite an achievement.

Some specific small courses are contracted to outside training firms. Students have attended courses in Germany which have lasted 17 months and included a requirement for them to learn German. A few have attended USTTI courses in the United States.

The total annual cost of PLDT's training activities is approximately US$ 1.0 million.

The Telecommunications Training Institute (TTI)

- **General**

The Telecommunications Training Institute was founded in 1962 under a United Nations development project. It was refurbished in 1981 as a result of a major grant from the Japanese International Cooperation Agency (JICA) for the Rural Development Telecommunications Projects 1 and 2 (RDTP 1 and RDPT 2). The Department of Transportation and Communications took over operation of this facility in 1986.

● **Facilities**

TTI is located in the Valenzuela section of Metro Manila on a three acre site consisting of ten buildings, including supporting buildings and dormitories for 96 students.

● **Staffing, Organization, and Training**

TTI currently has a staff of 75 people of which 28 are instructors and the remaining 43 are management, administrative, and maintenance personnel. The training section consists of technical, non-technical, and research and development groups. Each of these training groups performs its own course development work. The research and development group supports course development and performs training evaluation. The administrative group performs personnel, financial, registration, and property management. This group also manages hostel administration and servicing, and maintenance of the library. Another group cares for the equipment and building facility maintenance and janitorial services.

The total annual expense for this facility is approximately US$ 240,000.

The curriculum consists of 33 courses ranging from four days to ten weeks. The technical courses cover computers, power plant, outside plant, digital switching and transmission, radio relay systems, telegraph, and telex systems. The non-technical courses cover personnel, system management and team building.

For the past three years, an average of 1,310 students per year have completed courses at TTI. Most of the students are government employees and only 29 were from the private sector.

3.1.3 Findings and Conclusions

The importance of telecommunications training is recognized by the administrators and instructors at the training centers, as well as by senior management. PLDT has issued directives aimed at improving the quality of training facilities, but it is not known to what extent funds have been committed for this purpose.

Both the TTI and the PLDT training centers are staffed with dedicated personnel who are proud of what they have accomplished.

All those interviewed placed a strong emphasis on management training and a variety of management courses are offered. No marketing or service orientated courses are offered in any of the telecommunications institutions visited. However, the Asia Institute of Management (AIM) has excellent advanced degree graduate courses covering marketing.

The building facilities at both training centers are clean and orderly but need refurbishing and modernization. Course contents are well developed and organized, with course paths clearly defined.

A need for training in the planning of data networks was identified during a visit to National Computer Center at Camp Alguinaldo in Manila. A new national data network is being planned, which requires knowledge of sizing the bit rate and quantity of data lines connecting the various computers.

The Philippines has an abundance of college graduates who are obtaining jobs well below their educational level. This has both bad and good implications. It is good in that the quality of the work force is excellent, and the capability to learn telecommunications skills is high. On the other hand, it is a problem if employees fail to advance in the organization and become disenchanted and leave for other fields where better opportunities can be realized.

The Philippine government has a program underway to utilize the facilities potential at the former U. S. Naval base at Subic Bay. The four schools at Subic Bay, formerly used by the families of military personnel would provide an ideal facility for telecommunications training, should PLDT, TTI, or any of the smaller companies decide to use them. Subic Bay has suitable airport facilities with commercial service to Manila currently in operation. The government plans to construct a modern highway from Subic Bay to Manila. When completed, it would reduce the driving time to one hour.

At TTI, switching and transmission equipment is adequate, but in some respects the facility lacks the most current technology. For example, some of the test instruments are outdated. The only evidence of new testing instruments was in the optical fiber laboratories.

The course content is well developed and simply organized with clearly defined course paths. Vocational and technical training is suitable for the systems that must be maintained and used by operating personnel. Although TTI is primarily a technical training center, it also emphasizes management training, and has seven courses for managers.

3.2   INDONESIA

3.2.1 Introduction

The telecommunications infrastructure of Indonesia consists of two wholly government-owned state enterprises. The largest of these is PT Telekomunikasi (PT TELKOM), formerly known as Perumtel, which provides basic exchange and domestic long distance service. PT TELKOM has a work force of almost 40,000. The other provider is PT INDOSAT which provides international services.

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Private sector participation is permitted to some extent. Cellular, paging, and data services are provided through joint ventures between the private sector and PT TELKOM.

PT TELKOM will have 1.4 million telephone lines in service by the end of 1993, representing a density of less than 0.7 percent. The national plan from 1994 to 1998 (PELITA VI) calls for the installation of an additional capacity of 5.0 million lines. This will require an estimated investment of US$ 7.5 billion, and is designed to increase the penetration to 3 percent.

3.2.2   Existing and Planned Training Facilities

● **General**

Both the World Bank and the Asian Development Bank are assisting the development of Indonesia's telecommunications infrastructure. These institutions have a considerable interest in Indonesia's ability to absorb the new technologies that are being introduced, and loans include provision for specific human resource development and training projects. These include HRD manpower planning, and sending people overseas for degree and specialized short courses.

The telecommunications education center and the headquarters of PT TELKOM are in the city of Bandung. Three different training institutions are located at the spacious and attractive Pusdiklat Center of Human Resources Development. These are the Training Center of Telekomunikasi Indonesia, which offers a wide variety of courses, both technical and non-technical, to all of PT Telkom's employees; the Bandung School of Management (STMB), which offers masters degree programs in business and management; and the Institute of Telecommunications Technology (STTT), which offers a bachelors and advanced degrees in technological subjects. A brief description of organizations interviewed by the Team and their training facilities follows:

Department of Tourism, Posts, and Telecommunications (DTPT)

● **General**

The DTPT is the government body responsible for telecommunications policy making, and setting guidelines for telecommunications development. The DTPT recognizes the value of trained personnel and is beginning to develop plans to attend to this need. These plans include an insistence on the inclusion of training as a part of any procurement package, and a large scale plan to upgrade the employee skills. Funding for these plans is being sought from various international lending agencies.

●   **Facilities**

There are no existing training facilities at DTPT. However, plans to develop an advanced learning center in Jakarta for managerial level personnel are under discussion.

○   **Staffing, Organization, and Training**

The DTPT's staff for Frequency Management and Standards consists of 25 managers and 120 operational technical personnel. The operational personnel are largely located in regional offices. Training plans for these people are now being prepared; training staff have yet to be appointed. A report prepared by Booze, Allen, and Hamilton has identified their needs, and is under evaluation.

The DTPT stated that they have specific training needs. These include regulation, technical standards, and frequency management.

The PT TELKOM Training Center

○   **General**

This training facility is the focus of all technical and non-technical training for PT TELKOM personnel. It is a fully equipped facility, with switching and transmission systems installed on site similar to those in use in the national network. It is an impressive facility of which the administrators and instructors are very proud.

●   **Facilities**

All training is conducted in a campus environment in a multi-building complex which includes administrative offices, classrooms, laboratories, and dormitories. The laboratories are fully equipped with state-of-the-art switching and transmission equipment. The library contains adequate textbooks and publications which enable the students to do research when required. All classrooms are comfortable, air conditioned, and conducive to a good learning environment.

●   **Staffing, Organization, and Training**

The staff includes 18 administrators, 18 secretaries, 80 supporting staff, 50 course developers, and 56 instructors. The curriculum consists of 168 courses of which 56 are non-technical. All courses are developed on site.

Training courses covering the entire spectrum of the telephone plant are offered, including; outside plant for both optical fiber and copper paired cable, switching and transmission systems, building and power plant maintenance, and network management. These courses are implemented along specific prerequisite course paths.

The non-technical curriculum covers a wide range of supervisory skills and management courses. Some management courses focus on program management including; planning, information management, standards, systems management, evaluation, needs assessments, and organization.

The financial aspects of training are under examination and a move is underway to decentralize training activities which do not require extensive laboratory equipment. This revision is due to the high cost of travel and living expenses in such a large and widely scattered country as Indonesia. In 1991, approximately 55% of all courses were held in Bandung, and it is intended to reduce this to 12.5% by 1996. To achieve this objective, use will be made of alternative training methods, such as television, videotape, self-instructional materials, and job aids.

By 1996 the work force will increase to approximately 60,000 employees and it is planned to train 6,000 students per year in the classroom environment and 1,200 using non-classroom techniques.

The Bandung School of Management (STMB)

● General

The mission of STMB is to prepare Indonesians to participate in the national and international business community, to prepare managers for the information age, and to develop Indonesian capacity in the fields of business administration and management theory. Students from other nations attend.

● Facilities

All training is conducted on the same campus as PT TELKOM. Two lecture amphitheaters, a library, administrative offices, and break-out rooms complement this facility.

● Staffing, Organization, and Training

The facility, which has a capacity for 50 students, has had 91 graduates to date, of which 44 were from PT TELKOM. The cost for tuition is US$ 9,000 US for the one year MBA degree. The MBA program is taught in English and students must converse with other students in English. They must also prepare their theses in English. The prerequisites are two years of management and a university undergraduate degree.

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Two Master of Management courses are also offered, both taught in Indonesian. One course is divided into six modules; financial management and control, operations and quantitative methods, marketing systems and strategies, organizational behavior and development, corporate strategy, and enterprise development.

The other course, scheduled to commence in September, 1993, is a Master of Management course for Executives, and covers all of the above plus operations research, statistics for business, environmental analysis, human resource management, computer simulation, industrial analysis, and entrepreneurship.

The school also conducts short courses in a number of subjects which include maintenance management, project management, service management, human resource management, financial management, marketing, and the training the trainers.

STMB plans to expand by obtaining more classrooms and break-out rooms, enriching its course material, and adding more staff to the faculty. Currently, the school receives a 20% cash subsidy from the government, but plans to be self-sustaining by 1995.

Once a year faculty from the University of Southern California deliver one week lectures on state-of-the-art management. These lectures are sponsored by a grant from AID's APEC Partnership for Education Project.

The Institute of Telecommunications Technology (STT TELKOM)

● **General**

STT TELKOM (STTT) offers engineering training to the Polytechnic level plus a variety of courses leading to the bachelor's degree and more advanced engineering degrees. Students from other nations are invited to attend. It is an objective of this center to become a center of excellence in telecommunications. At the time of the Team's visit in July, 1993, approximately 2,000 students at different levels were undergoing training.

● **Facilities**

As with the PT TELKOM Training Center, all training is conducted in a multi-building complex which includes administrative offices, classrooms, laboratories, and dormitories. The laboratories are complete and fully equipped. Classrooms are comfortable, air conditioned, and conducive to a good learning environment.

STTT plans to move to a new campus in September, 1993. The buildings vacated will be utilized by STMB and the PT TELKOM Training Center.

- **Staffing, Organization, and Training**

STTT offers three basic courses of study which lead to degrees in industrial engineering, electronics and telecommunications, and information technology. The vocational training offered is equivalent to senior high school plus three years of technical vocational training. Each year 1,000 new students enter STTT.

This institution cooperates with overseas academic institutions including Northeastern University, MIT, Tokai University in Japan, British Telecom, and France Telecom.

PT INDOSAT

- **General**

PT INDOSAT is the state-owned limited-liability company that is the monopoly provider of all international services in Indonesia.

PT INDOSAT facilities consist of three satellite earth stations and a Siemens international gateway switching machine located in Jakarta at the Headquarters building. Transmission systems from Jakarta to the earth stations and trunks to the domestic exchange switching network are provided by PT TELKOM. An operations support testing system provides a modern approach to testing the bearer services carried on INDOSAT's facilities. INDOSAT has a work force of 1,600 with 308 technicians located at the satellite earth stations.

- **Facilities**

INDOSAT's training center is located at the Jatiluhir satellite earth station with seminars held at their headquarters building in Jakarta.

- **Staffing, Organization, and Training**

Training is conducted at the satellite earth station sites at Jatiluhur, Batam, and Medan. The technical training at these sites covers earth station operations and transmission facilities. Additional training for the Siemens switching machine is conducted in Jakarta by Siemens.

Each management employee is required to receive 11 training days per year. Most of the technicians are partially trained and require more training to reach full potential. There are a few technicians who are fully trained in all aspects of operation of the physical plant. In order to bring in new business, 40 personnel recently received marketing training to actively pursue a new international service offering to hotels.

The training department is planning to introduce its employees to an education program to cover new technologies. This program will include ISDN, SONET, Synchronous Data services, and interoperabilty.

3.2.3   Findings and Conclusions

Telecommunications training is receiving considerable attention in Indonesia, and is taken seriously by the administrators and instructors at all training centers, as well as by senior management. Its importance is recognized by D_ C, and is evidenced by the ready acceptance of the inclusion of HRD and training projects in the telecommunications development program. The new STT TELKOM campus in Bandung is a good example of the direction that is being taken.

The Team found that all training institutes visited are staffed with dedicated personnel who consider their work to be of importance, and are proud of their accomplishments.

PT TELKOM has a no lay-off policy for its work-force. This becomes a problem as the modernization program progresses, particularly as the introduction of digital switching machines increases. An example was given of the case in Cepu, where the 600 line manual switchboard has been replaced by a 1,000 line switching machine, thus displacing 40 employees. Considering that 200 manual switchboards are still in service, and will be replaced, the problem is of significant proportions. In discussions, it was apparent that HRD managers were aware of the problem, but the Team was uncertain if planning was taking place to alleviate the problem, or to determine its magnitude.

As Indonesia moves towards decentralizing its training activity, distance learning methods could be very helpful. The use of Computer-Based Training (CBT) simulation software packages should also be considered. Indeed, during meetings in Bandung, the Team was told that technical assistance would be welcomed in distance learning technology and methods. Point to multi-point satellite broadcasts with interactive voice through the domestic satellite network could perhaps provide a vehicle for distance learning.

All telecommunications training given by non-vendor instructors, i.e., instructors employed by organizations such as PT Indosat and PT Telecom, is delivered in Indonesian at the training centers. When equipment is purchased from the major vendors, the course material and equipment manuals are in English. Courses presented by vendors' instructors are given in English. However, if the students do not fully understand what they are taught because of the instructor's accent or dialect, they hesitate to reveal this. Since the manuals are in English, an attempt is then made to resolve the misunderstanding by researching the manuals. This usually proves futile since the manuals are very technical and not designed for training. It would also be very useful to require the vendors to supply training documentation and equipment manuals in the local languages.

3.3 THAILAND

3.3.1 Introduction

Major changes have taken place within Thailand's telecommunications infrastructure over the pas three years. The Government of Thailand recognized that weaknesses in the telephone sector, principally the inability to provide sufficient lines to meet the demand, was having a seriou! impact on economic and social development. Telecommunications and transportation wert frequently reported as the most significant barriers to new foreign investment and national growth.

The most significant barrier to telephone sector development was the limits set on foreign borrowing, and the inability of the state-owned Telephone Organization of Thailand (TOT) tc fund large scale capital expansion programs. This resulted in an annual increase in demand which exceeded the number of new lines installed, thus creating an ever-increasing gap betweer supply and demand.

To overcome the problem, the government decided to increase the role of the private sector in telecommunications development, and awarded two "Build, Transfer, and Operate" (BTO) concessions to the private sector. Under the terms of the BTO, the concession holders will hand over all newly built facilities to TOT prior to placing them in service. The assets will, therefore, continue to be owned by the TOT monopoly as required by TOT legislation, but the network will be managed and operated by the BTO operators under a 25 year revenue sharing concession agreement. One concession was awarded to TelecomAsia Corporation Ltd. (TA), to provide two million lines in a five year period in Bangkok. The other concession was awarded to the Thai Telephone and Telecommunication Co., Ltd. (TT&T) consortia, to provide one million lines in the provincial areas, also over a five year period. Both of these groups acquired strategic partners with considerable experience and expertise in the telecommunications industry. TA selected the U.S. Regional Holding Company, NYNEX; and TT&T the Nippon Telephone and Telegraph Company (NTT).

This rapid development over the next several years will require major human resource development and training activity in both technical and non-technical areas if the infrastructure is to be managed and operated successfully.

The following sections address training issues for each service provider. Also discussed is the Post and Telegraph Department (PTD), who have national and international telecommunications responsibilities.

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3.3.2 Existing and Planned Training Activities

● **General**

The original provider of telecommunications services in Thailand was the Post and Telegraph Department (PTD), which was established in 1883. The telephone division of PTD was separated in 1954 when the Telephone Organization of Thailand was created. This was followed in 1976 by the formation of the Communications Authority of Thailand, which was given responsibility for international telephone service and postal services. PTD is currently responsible for international and regional cooperation and coordination in the field of postal and telecommunications activities. PTD is also responsible for all aspects of radio frequency management and monitoring.

There are, therefore, two monopoly providers of telecommunications services in Thailand, one for basic domestic services (TOT), and the other for international service (CAT). Both of these have a significant interest in training and possess extensive existing training facilities.

● **The Telephone Organization of Thailand (TOT).** TOT has responsibility for the provision of basic telephone and value-added services within Thailand, as well neighboring countries with whom Thailand has a common border. TOT is a wholly-owned state enterprise with approximately 19,000 employees, of whom 700 are engineers.

● **The Communications Authority of Thailand (CAT).** CAT has responsibility for international services, with the exception trans-border services to Laos, Malaysia, Cambodia, and Burma, these countries being served by TOT. In addition, CAT has responsibility for all postal services in Thailand. CAT is a wholly-owned state enterprise with approximately 25,000 employees, of whom some 8,000 are employed in the telecommunications sector, and the remainder in the postal service.

In addition to TOT and CAT, there are the two BTO providers referred to earlier. Both of these have significant training requirements. They are:

● **TelecomAsia Corporation Ltd. (TA)** has the responsibility to install, manage, and operate two million lines in Bangkok. TA will retain 84% of the revenues under the BTO agreement, and TOT 16%. TA has already completed the installation of 105,000 lines of which 15,000 are connected. By May 1994, TA plans to have an installed capacity of 600,000. In July 1993, TA had 1,300 employees. Upon completion of the two million lines they plan for a workforce of 2,500.

● **Thai Telephone and Telecommunication Co., Ltd. (TT&T)** has the responsibility for the provision of one million lines in the provincial areas under

a BTO agreement with TOT. TT&T will retain 57% of revenues, and TOT 43%. The one million lines are to be installed by July 1997, with 200,000 lines installed in the first two years of operation. TT&T is currently developing their staffing requirements, but plans for less than 2,000 employees to operate the system when completed.

Brief descriptions of the above organizations are as follows:

The Telephone Organization of Thailand (TOT)

● **General**

TOT was established as a state enterprise under the Ministry of Transport and Communications in 1954, and consequently has a long history of human resource development and training. The enterprise has approximately 1.8 million lines in service and is in the process of providing an additional 600,000 lines under its existing capital expansion program. When this work has been completed, there are no plans for TOT to carry out further installations, and expansion will be left to the private sector under BTO programs. The BTO programs provide for implementation, operations and maintenance, but TOT will continue to function as the customer interface. As one TOT staff member put it, "In Bangkok, TA is the chef in the kitchen, but TOT serves the customers". TOT has also announced that it will privatize, and a short list of firms, one of whom will be selected to assist them in this process, has been announced.

● **Facilities**

TOT has a well established 25 acre training center comprised of 12 buildings. It is located in Nonthaburi on the outskirts of Bangkok. The complex includes 67 classrooms for 500 students, instructors, other personnel, living quarters, laboratories, and a cafeteria. The training center is well maintained and is operated to a high standard.

The center is equipped with both NEC and Ericsson digital switching machines for training purposes, and is in the process of acquiring a Siemens digital switch.

● **Staffing, Organization, and Training**

The training center has is a total staff of 258 of whom 87 are instructors. The center offers over 120 courses, varying in length from two days to one month and with an average duration of five days. It is planned to train approximately 6,000 students in 1993.

The Communications Authority of Thailand (CAT)

● **General**

CAT was established as a state enterprise under the Ministry of Transport and Communications in 1976. In addition to international voice and data services, CAT provides telex service, cellular service, and packet switching. As the dominant provider of services crucial to Thailand's development, CAT has remained in the forefront by introducing new technology, providing advanced services, and recognizing the importance of training in technology absorption.

● **Facilities**

CAT has its own well organized training center established 20 years ago and co-located with the CAT headquarters building. The center covers about 20 acres, and has a collection of buildings including classrooms, two auditoriums, computer and language laboratories, and dormitories.

● **Staffing, Organization, and Training**

The CAT Training Center has 10 full time telecommunications instructors who are teaching computer science subjects. Instructors in other telecommunications subjects are brought in from the field as required. The center conducts training courses in technical and non-technical areas for both telecommunications and postal workers. Subject specific training is routinely provided by vendors in conjunction with equipment procurement.

The center offers approximately 50 courses annually and in 1992 telecommunications courses were completed by 1,235 persons.

Training is also provided in specialized high technology subjects in cooperation with the Asia-Pacific Telecommunity (APT) and the International Telecommunications Union (ITU). A typical example is training in frequency management. For these programs APT/ITU arranges for the provision of instructors in various fields of expertise and for the use of existing facilities of member countries. Countries in which CAT employees have attended courses include Japan, India, Korea, and Australia.

In some cases the ITU arranges for various training audiences to be carried out in Thailand using TOT facilities. A small number of exchange programs are in operation with international services correspondents including KDD, MCI, NTT, and Italcable. Japan offers fellowships through the King Mongkut Institute of Technology (KMIT) and also sponsors seminars through APT.

TelecomAsia Corporation Ltd. (TA)

- **General**

TA has recognized the importance of training in the development of their employees by establishing of an Executive Training Advisory Council and issuing a training policy statement. The policy document states that training is a shared responsibility of the company and its employees. It also states that each employee will be given the opportunity to learn and to grow in his/her assignments, and encourages each individual to take advantage of the training opportunities.

- **Facilities**

TA has leased space which will contain initially five Computer Based Training (CBT) classrooms and four management training classrooms. TA is also currently examining several potential locations for outside plant training. It is also likely that a long association between Germany and the prestigious King Mongkut Institute of Technology (KMIT) will result in a Siemens training switch being located at KMIT. In this case, the machine will be jointly used by KMIT and TA.

Similar discussions are taking place between Japan and KMITL (KMIT Lat Krabang) for an NEC switch, and for an AT&T No. 5ESS at Chulalongkorn University.

- **Staffing, Organization, and Training**

One of the first jobs will be to prepare a needs analysis for the managerial skills and technical knowledge required within TA, and to develop a training path for every type of skill. TA is currently in the process of recruiting instructors and support staff for the facility. When fully staffed, the training center will employ about 60 persons.

Priority will be given to the training of personnel in operating the TA Computerized Customer Services Support system which is the basis of the efficient provision of service to new customers.

Because TOT provides the customer interface, TA must also provide training for TOT staff on the use of the customer interface system, and plans to train 700 TOT employees. The training takes one week.

Training by vendors is normally included with equipment procurement, and is carried out both in Thailand and at the vendor's location. TA has selected three digital switching vendors: Siemens, AT&T, and NEC. An NEC NEAX 61 training switch at TOT is used by TA personnel for training purposes.

TA has established networks with the Department of Education, KMIT, and other educational institutions to coordinate entry requirements and to offer apprenticeship.

There is a perception in Thailand that the job of an instructor is boring and lack the opportunity to learn new technologies. To overcome the resistance to instructor assignments, TA has introduced a process whereby promotion is conditional on an assignment in the training department. Instructors are also offered overseas training and are given priority for career advancement.

Thai Telephone and Telecommunications Co., Ltd. (TT&T)

● General

TT&T is in the early stages of development of its one million line program, and all of the four persons involved in training interviewed by the Team had joined TT&T in the early months of 1993, two as recently as April.

As of June 30, 1993 TT&T had 437 employees. They plan to increase their employee count to approximately 2,000 by 1997 at the time of the completion of the one million line installation program. As with TA, TT&T's needs will be heavily biased towards the technical aspects of telephone operations because of their responsibility for network implementation and operations, while customer services remain with TOT. Initially, most of the burden will fall on personnel brought in from NTT to join NTT International (NTTI), the strategic partner of TT&T.

● Facilities

A temporary training center has been established on Sri Ayutthaya Road in Bangkok and provides space for classrooms and training equipment. An Ericsson training switch has been installed, and Alcatel transmission equipment will be installed for training purposes within the next two to three months. Ericsson and Alcatel are the vendors selected for the one million line project.

● Staffing, Organization, and Training

TT&T has placed emphasis in their planned training activities in three areas:

- Practical aspects of equipment installation

- Preparation for a start up of organization and management activities

- On the job training

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A training division has been established which will be the responsibility of the Vice President of Administration. There are currently nine persons in this division, four of whom are non-Thai.

The most critical area during the implementation period from 1993 to 1996 is the training of engineers and technicians. Functional training for these groups will be given high priority. Non-technical training will be based on a needs analysis and requirements from each division.

TT&T plans to make use of external sources for training and is exploring the establishment of relationships with:

- The King Mongkut Institute of Technology

- The Telephone Organization of Thailand

- The Thailand Management Association

- The Personnel Management Association of Thailand

- The National Electronics and Computer Technology Center

- The Nippon Telegraph and Telephone Corporation

- The Asian Institute of Technology

- The Technology Promotion Association (Thai-Japan)

3.3.3 Conclusions

- **The Telephone Organization of Thailand (TOT)**

TOT has a well established and equipped training establishment and offers a well-balanced program of courses to meet needs of almost all skill categories within the organization.

The most serious problem confronting TOT is the loss of trained engineers to the private sector. As a state enterprise, TOT is restricted to the same government salary scales as all state enterprises. This means that they are unable to compete with TA and TT&T who are allegedly paying salaries considerably in excess of those of TOT. This attrition includes engineering instructors, one of whom recently left for the private sector at an alleged three times pay increase.

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Other findings include that:

(1)   there is no coordinated planning to determine who will attend training courses; it depends on the discretion of local managers.

(2)   there is an absence of career paths for instructors.

(3)   instruction is confined largely to lectures. There is little use made of advanced teaching techniques.

(4)   a language problem exists because most technical manuals are written in English. No tests are carried out for English comprehension.

(5)   no entry or exit level testing is undertaken, thus it is difficult to measure what has been learned.

(6)   instructors do not rotate in line positions.

●   **The Communications Authority of Thailand (CAT)**

As with TOT, a major problem confronting CAT is the loss of trained engineers to other parts of the telecommunications sector in Thailand. In the past two years they have lost more than 100 engineers, many with advanced degrees, to the private sector, especially TA and TT&T, because of the more attractive salaries offered by these firms.

The loss of key personnel is not only damaging because of the loss of needed skills, but it is also costly. CAT pays for scholarships overseas (six were sent to the U.S. in 1992), and at the Asian Institute of Technology, only to lose these people shortly after they complete their studies.

The Team was told that when middle management staff leave CAT for the private sector, there is a generation gap between the senior staff who are still at CAT and the younger newcomers. This has an impact on the ability of the senior staff to transfer valuable knowledge and experience.

●   **TelecomAsia (TA) Corporation**

TA values its image as a world class telecommunications company with an excellent training center. This emerged during discussions concerning their intention to carry out their own fiber optic training rather than having the work done by contractors. This concern serves to illustrate their dedication to training.

TA has clearly recognized the importance of training at all levels. It is correctly placing emphasis on technical training on the new systems being introduced, customer relations skills, maintenance and repair, marketing, and management and supervisory skills. With the support and backing of NYNEX, TA is rapidly developing a well-trained and motivated work force.

TA also suffers from the attrition taking place among trained personnel in Thailand's telecommunications sector. It is losing people to TT&T because TT&T are paying approximately one third more in direct compensation than TA. Another reason appears to be cultural, in that following the departure of the manager to whom there is allegiance, the group that the manager supervised tends to leave.

TA requires a college degree for every job above clerk or technician.

● **Thai Telephone & Telecommunications (TT&T)**

Because TT&T has not yet developed experience as a telecommunications service provider in Thailand, it is unable to clearly identify any regional or specialist courses which would benefit its activities. Its present policy is to cope with the demand for training by using local and Japanese resources.

TT&T claims that because of the high demand for telephone service, due to economic and industrial growth, there was a shortage of trained technical personnel, especially in the telecommunications field. Because of this, they are having difficulty recruiting sufficient people.

TT&T currently receives vendor training, but is very concerned over the training of staff on when vendor training ends. It is grappling with how to address this concern and the related issue of translating instruction and manuals to the Thai language. New students with varying educational levels are joining TT&T, and there are few entrants who can read English text.

NTTI manuals are printed in Japanese, and will have to be translated into Thai.

Also of concern, in common with the other providers, is the possibility of personnel losses to other companies following the completion of training courses. TT&T was particularly concerned that high-cost overseas training could be a wasted investment because of subsequent resignations. Twenty-six persons have already been sent to Japan for training in Network Planning and Outside Plant Design and construction.

TT&T has organized its operations into nine business regions which have the same geographic boundaries as the TOT provincial areas. This means that the TT&T activities are all in the provinces and consequently the work-force is widely scattered. This creates a difficulty because the removal of one employee for training from a small group has a marked effect on the group's productivity.

SECTION 4

FINDINGS AND RECOMMENDATIONS

4.1 General

Each of the three countries visited by the Study Team has its own specific telecommunications training needs, and each is following a different path related to future growth in the telecommunications industry. However, this study has identified 27 specific subject areas (see Appendix I) which are not being adequately addressed by existing or planned training activities within the member nations studied. While training in these subject areas may be available from various universities, private corporate training centers, and private vendors, the countries, for various reasons, are not utilizing them. These subject areas are grouped together in twelve broad categories as follows:

- General Understanding of The Telecommunications Industry

- English Language Instruction

- Strategic Planning

- Human Resource Development

- Marketing and Sales

- Management and Supervisory Skills

- Technical Standards

- Frequency Management

- "Spirit of Service" (customer relations)

- Training (for trainers and training development personnel)

- Project Management

- Telecommunications Industry Trends

The 12 categories listed were identified in all three countries as those for which training is needed. They are listed in order of priority based on the frequency with which they were mentioned during the Study Team's interviews, and upon the collective judgement of the Study

Team members. It should be noted that while English language training ranks second on the list, the Study Team made no attempt to address this need. The Team feels that English language training for telecommunications is beyond APEC's immediate ability to address and the subject more rightly is an issue to be dealt with by the educational and institutional planners of each country.

While the Team feels confident of the priority listing, given more time, a survey analysis of a larger audience and various analytical sorting techniques should be undertaken to provide verification of the ranking.

Three recommendations are offered:

- Develop and deliver an APEC Telecommunication Training Course called the "APEC Telecom Century Course (ATC)," which will provide a comprehensive overview of the telecommunications industry.

- Implement a Regional Plan to insure effective introduction and administration of the overview course.

- Appoint an APEC Training Administrator to serve as a focal point for APEC training matters and carry forward the recommendations in this report.

4.2   Detailed Recommendations

- **APEC Century (ATC) Course**

The single most often-mentioned request during the discussions in the Philippines, Indonesia, and Thailand was for a course that would provide a general understanding of the telephone industry for as many people in the industry as possible. The request is particularly understandable in view of the rapid industrial growth experienced by each of the three countries studied. These three countries have not had the opportunity to grow accustomed gradually to developing telecommunication technology. To address the needs of these nations, a comprehensive overview course, which will include most of the various functions that are performed within the industry should be developed. It should be modeled on a program currently offered by the NYNEX corporation called PT-2001. An estimated 10,000 executives and managers in the Philippines, Indonesia and Thailand, plus an additional undetermined number from other APEC members, will comprise the pool of potential students for this course.

The NYNEX program is an intensive four week course designed to familiarize managers with virtually every aspect of a telephone company's business. It employs hands-on activities and widely accepted accelerated learning techniques. Many of the subject categories mentioned above would be incorporated into the program, including marketing and sales, service, standards,

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industry trends, and general management and supervisory skills. The recommended program will be referred to in this report as the "APEC TELECOM CENTURY" (ATC) course. The basic outline for ATC is shown in Exhibit 4-1, with a suggested classroom configuration and outdoor installation lab shown in Appendix G.

It is likely that NYNEX would be receptive to assisting in an effort to adapt their program to the needs of the APEC members. If NYNEX is not receptive, development should proceed using an independent training development consultant.

When a final format for the course has been determined, an instructor trained in accelerated learning techniques, should be selected to administer an initial session. At that session, a designated prospective in-country instructor should be trained and certified to teach subsequent sessions.

Each of the countries visited has existing facilities which would require only minimal retrofitting to prepare them for teaching the ATC course. Course development using computer based training (CBT) may be necessary to create computer simulated replications of typical CRT screens which are used in service order, circuit provisioning, circuit testing, component inventory, billing, and personnel systems. The simulations would allow students to experience the process of calling up various CRT screens to enter, retrieve, and change data, and solve typical customer problems. Such CBT training may already exist and be readily available from companies in the developed nations. Much of the other subject matter that would be included in the course may be available from NYNEX and would have direct applicability to the needs expressed to the Team.

An issue which may affect participation in the recommended ATC course relates to the reluctance of some managers to participate in activities which they deem inappropriate given their current positions. A limited part of the ATC course will require students to participate in "craft" activity. The Study Team believes that for those managers who have not had the opportunity to participate in lower level jobs, some brief exposure to work done by their subordinates can be a valuable aid in helping them to understand some of the problems encountered in the telecommunications industry. It is for this reason that the Study Team has recommended executive level participation in the ATC course. Attendance arranged by peer-level should lessen any discomfort on the part of senior personnel. Classes composed of peer level managers, including executives from various other member nations, would provide a valuable exchange of ideas among top decision makers.

APEC TELECOM CENTURY COURSE (ATC)

EXHIBIT 4-1

Week	Monday	Tuesday	Wednesday	Thursday	Friday
Week #1	Opening Industry History APEC / ASEAN Issues Developed Nations versus Developing Nations	Industry Trends Managing a Competitive Business • Mission • Vision • Tools (MBO, etc.)	Operational Safety • Outside Plant • Inside Plant	Financial Considerations • Profit and Loss • Balance Sheet • Capital Acquisition	Basic Telephony The Local Loop • Copper Pairs • Wireless
Week #2	Business Products & Services Available	Customer Focus • Communications • Satisfaction • Problem Resolution	Budgets • Planning • Administration Project Management	Service Provisioning • Business Functions	Service Provisioning • Engineering Functions • Plant Functions
Week #3	Service Provisioning • Customer Site Functions • Installation - Grounding - Jacks & Wiring	Service Provisioning • Outdoor Installation • Line Testing • Service to Customer	Line Repair Functions • Trouble Flow System • Line Testing • Fault Identification • Test Equipment Use • Repair Fault	Switching Systems • Digital • Cellular	Transmission Systems • Multiplex • Pair Gain • Fiber Optics • Digital Radio Relay • Satellite
Week #4	Transmission Systems • Fiber Splicing Central Office Visit	Competition & Regulation Interaction with Executive	Service Measurements Network Operations Center Tour	Marketing • Product Definition • Advertising Sales • Techniques	Human Resource Development • Manpower Planning • Training • Culture Vision

• Regional Plan

A regional plan to address the development and implementation of the ATC course is imperative. In this regard, the Study Team proposes the following:

- Approach NYNEX for a commitment of resources, especially a course developer, to help modify the existing PT-2001 course to APEC conditions. In the absence of NYNEX support, select an independent course development vendor to work on the project.

- Phase-in course offerings in three countries over a three year period. Initiate a pilot ATC course in Thailand, eight times during the first year. Offer a second identical version in Indonesia in year 2. In year 3, offer another identical version in the Philippines. Exhibit 4-2 presents a time line for the implementation sequence. Additional offerings in other countries could be considered depending on future demand.

- The TOT Telecommunications Training Center in Bangkok, Thailand should be considered as a start-up location for ATC. The center is in excellent condition and its location close to the Don Muang airport will be convenient for students. While locations in the Philippines and Indonesia could be selected, their stage of readiness is doubtful. Subic Bay in the Philippines has excellent potential, as does the new STT campus under development outside of Bandung, Indonesia. Both of these locations should be utilized as the course is introduced.

- Limit classes to 16 students in order to maximize student/instructor and group interaction and gain the maximum benefit from accelerated learning techniques.

- Allocate four tuition-free seats to the host country at each session. The other 12 seats should be tuition based and open to students from any APEC member.

- Encourage senior level executives and managers to attend the course first. Consider arranging class participation by management level.

• Training Administrator

It is recommended that the Working Group on Telecommunications of APEC appoint, on a rotating two year basis, a Training Administrator from one of the member nations. The administrator would have the responsibility to research and evaluate existing training courses for use by APEC, to establish a training course data bank, and to oversee the delivery of ATC courses in the region. An Administrator charged with these responsibilities would insure consistency of training, spread the cost of administration among the member nations, provide a training ground for talented potential future leaders, provide a consistent message and philosophy

of training to each country, and help insure the maximum use of available facilities and instructors.

The APEC Secretariat location in Singapore should be considered as a base for the Administrator since APEC business is already being conducted from that location. The extent to which the APEC Secretariat could assume temporarily the duties of the Training Administrator, especially in the start up period, should be explored as a way of minimizing overall project costs.

The Administrator should have a strong background in course development, delivery and evaluation. The person should be instrumental in selecting qualified instructors who are fluent in both English and the language of the country in which they will teach. A proposed job description for the Training Administrator would include the following:

- Serve as registrar for students attending the ATC Course.

- Monitor and evaluate the progress of the ATC Course.

- Assist and advise APEC members during the three year phase-in period of the ATC Course.

- Supplement the APEC Training Needs Assessment Team's list of identified needs by using appropriate survey analysis.

- Develop criteria to evaluate "off the shelf" programs for use by APEC members.

- Research "off the shelf" courses for applicability to APEC needs.

- Develop and maintain a library of acceptable courses.

- Develop and distribute relevant course information to members of the APEC Working Group on Telecommunications.

- Attend all meetings and liaise with members of the APEC Working Group on Telecommunications.

- Provide assistance to members making arrangements for students attending courses (out of their own countries) within APEC.

Most of the training needs identified in the study are common to all three members visited by the Team. If each member attempts to address its own needs, a significant amount of duplicative training development will result. Funds are always limited, and each nation will be hard pressed to fully meet its own requirements. The appointment of an APEC Training Administrator will maximize the use of available funds.

One of the most important functions of the Training Administrator would be to identify and communicate information to members on an on-going basis about exceptional or superior courses already offered within the APEC membership. Currently, APEC has no way to effectively evaluate and recommend courses offered by members. With information provided by the Training Administrator, members would be able to attend courses in various countries or purchase the rights to offer those courses themselves, thereby meeting the remaining training needs identified in this report. Using existing courses would have the benefit of providing immediate training and would be lower cost than having each country develop courses for all of their training needs. Because these training needs vary among members, this report does not include those different costs.

Although this sharing of information through the Training Administrator is recommended for both large and small group courses, it is especially important for specialized audiences. Many of the training needs identified -- such as frequency management, train the trainer, and telemarketing techniques -- can be met by existing courses currently available from within the APEC membership. An additional benefit from this approach is the likely increase in attendance in these courses which would lead to economies of scale for the providers.

In the instance where future training needs are identified and for which there are no course offerings by APEC members, this report recommends that the Training Administrator, with the assistance of the APEC Working Group, determine the appropriate action. The costs of such future courses are not included in this report, but might be offset by the surplus funds generated after year 3 from the ATC course.

IMPLEMENTATION SCHEDULE

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5

GETTING STARTED

APEC TELECOMMUNICATIONS SUPPORT CENTER OFFICE IN SINGAPORE

GETTING STARTED

ATC ENVIRONMENT IN   THAILAND

GETTING STARTED

ATC ENVIRONMENT IN INDONESIA

GETTING STARTED

ATC ENVIRONMENT IN THE PHILIPPINES
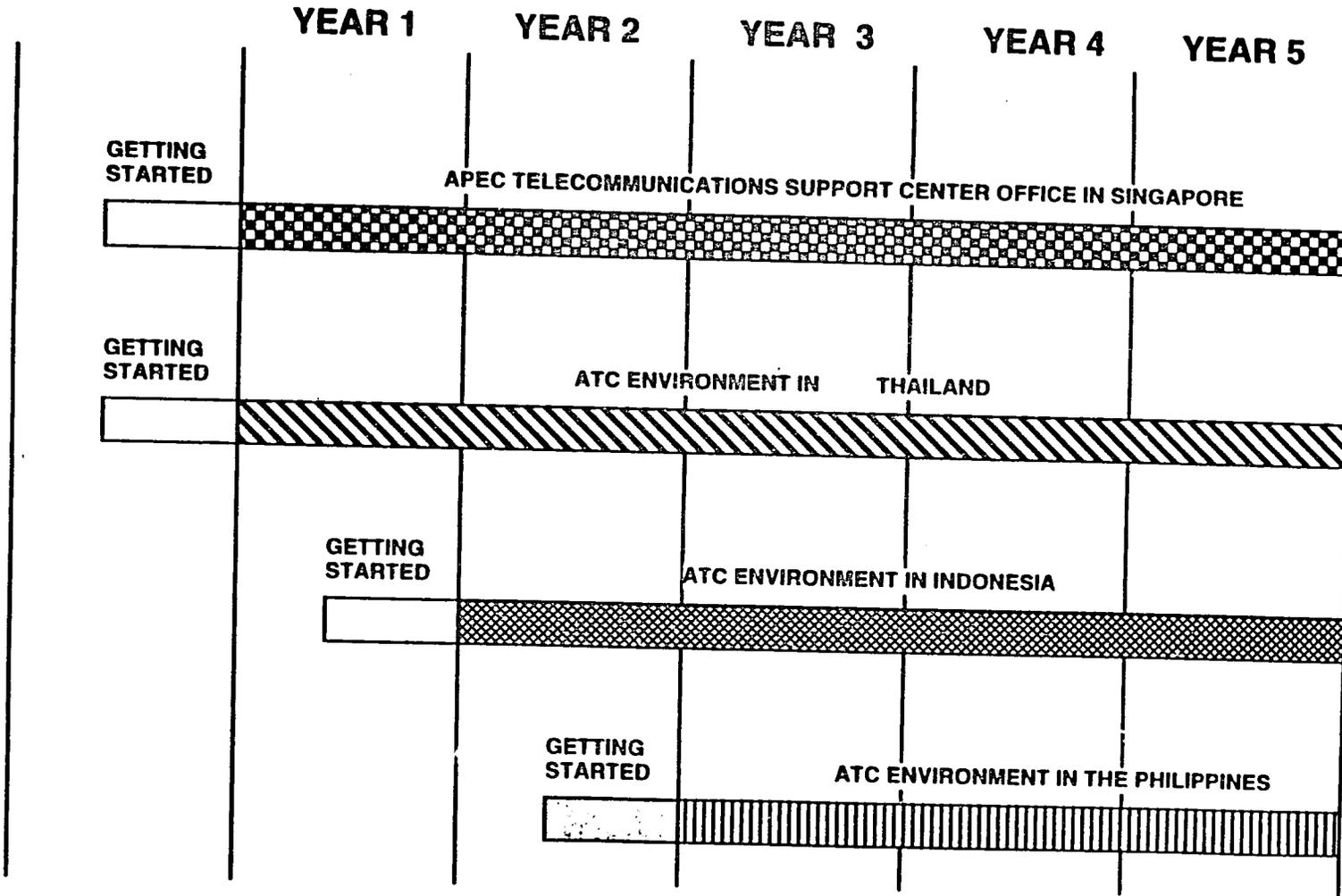
EXHIBIT 4-2

4.3 Summary

The Study Team found adequate facilities to accommodate the ATC in the countries visited. By making maximum use of the existing and projected training facilities within APEC, each member should be able to realize substantial savings. Following the recommended actions outlined in this report will lay the groundwork for establishing a pool of applicable courses for the region and provide for the development of well-trained instructors to deliver them.

There will be considerable flexibility within the region in terms of availability of courses, including the ATC course described earlier and the more focused courses, available within APEC. When a need arises for training, students need not necessarily wait until courses are conducted in their area or attend an expensive course in a distant location; a choice of courses should be available in their immediate region.

Appropriate time lines and cost data relative to the implementation of these recommendations, including facility development costs needed to bring the program to fruition, are included in section 5.

In summary, the ATC program will contribute to building a fundamental understanding of the telecommunications industry throughout all levels of management. Using the proposed APEC telecommunications Training Administrator as a focal point to channel students to appropriate courses will be a cost effective means of addressing the ever-increasing expense of needed training.

SECTION 5

COST SUMMARY

5.1   General

The proposed training program must be self-sustaining. The team has prepared financial spreadsheets that demonstrate, subject to certain assumptions, that the APEC Telecom Century (ATC) Course can become self-sustaining at some point during the second and third years of operation. This financial analysis also includes the costs associated with the APEC Training Administrator.

The team has based its projections on several assumptions which, because of a lack of time, have not been validated. The most important assumptions are (1) that the tuition fee per student for the four week course would be US$ 1,275; (2) the ATC course can be developed with the start-up costs allocated; (3) host organizations will provide facilities free of charge in return for as many as four tuition-free seats in each course and; (4) eight sessions of the ATC course will be held each year, and attendance at each will be limited to 16 students. A full list of assumptions is given at 5.3 in this Section.

Should some of these assumptions prove not to be accurate, the point at which the project would become self-sustaining would be earlier or later. For example, should the host country require payment for the use of its facilities, then the point at which the project becomes self-sustaining would be later. However, should training supplies (an anticipated expense) de donated, then the break-even point would be earlier.

5.2 Financial Projection Models

The team has presented two models for projecting the costs associated with the ATC Course and the Training Administrator. Both models compare expenses versus revenues in two ways. One set of calculations for each Model is based on "Actual" expenses and revenues (adjusted for inflation) for each year; this set of calculations is most appropriate for budgeting purposes. The second set of calculations for each Model is based on "Present Worth" -- the expenses and revenues for each year are adjusted to account for both projected inflation and interest rates. This method is most appropriate for calculating the break-even point, the time when revenues exceed expenses and the course becomes self sustaining.

In addition, the costs in both Models are divided into two categories: start-up and operational. The principal start-up costs include course development, facilities and equipment. The operational costs are the recurring expenses to support the ATC Course and the Training Administrator.

The following two models differ, however, in the way that some of the start-up costs are calculated. In Model 1, all the start-up costs are budgeted in the year in which they occur; that is, none of the costs are amortized. This would be the most appropriate model for developing a project budget. In Model 2, some of the start-up costs are amortized over the life of the project.

Note that the budgets include a start-up period plus additional years. The start-up period in each country would take about three months. In Singapore and Thailand, the start-up period would begin prior to Year 1 of the project. In Indonesia, the start-up period takes place during the project Year 1, and in the Philippines in project Year 2.

The economic indicators for calculating inflation and interest rates are based on World Bank records from 1987 to 1992, plus data gathered during interviews in the Philippines, Indonesia, and Thailand where actual economic indicators were obtained for 1993. Extrapolations were then made to 1998.

5.2.1 Model 1, Non-Amortized Costs

This model assumes that start-up costs would not be amortized, but would be paid at the time they were incurred (APEC's method of allocating funds in its budget process). The total "Actual" expenses and revenue for five years (plus start-up) are summarized below:

EXPENSES

Operating Expenses	US $	806,823
Start-Up Expenses		
Singapore		113,385
Thailand		58,736
Indonesia		65,542
Philippines		76,546
TOTAL EXPENSES		1,121,032

REVENUES

Tuition	2,027,494

These costs are broken out in Exhibit 5-2 on a year-by-year basis. Note that there are no revenues during the initial start-up period and that the revenues climb dramatically in Year 3. By Year 5 the projected revenues far exceed the projected expenses. Also note that the expenses remain fairly constant over the five years, with a modest peak in Year 3.

A breakdown of all "Actual" expenses and revenues by country for each year is presented in Appendix E.

For a detailed cost breakout of all costs for Model 1, see the summaries in Appendix E. For each country, budget detail is presented using two methods: (1) "Actual Expenses and Revenue" and (2) "Present Worth of Expenses and Revenues." As explained earlier, the "Actual" costs should be used for budgeting purposes; the "Present Worth" costs should be used to predict the break-even point when the ATC Course becomes self-sustaining.

Chart 5-3 shows the projected break-even point for this Model is in Year 3. Over the life of the project, the accumulated revenues far exceed expenditures as shown below (calculation in "Present Worth"):

Revenues (PW)	$1,355,663
Expenses (PW)	$ 998,707
Positive Balance (PW)	$ 356,956

The positive earnings could be used to support additional APEC telecommunications training activities as recommended by the APEC Training Administrator and Working Groups.

APEC TELECOMMUNICATIONS TRAINING COST STUDY

EXHIBIT 5-1

49
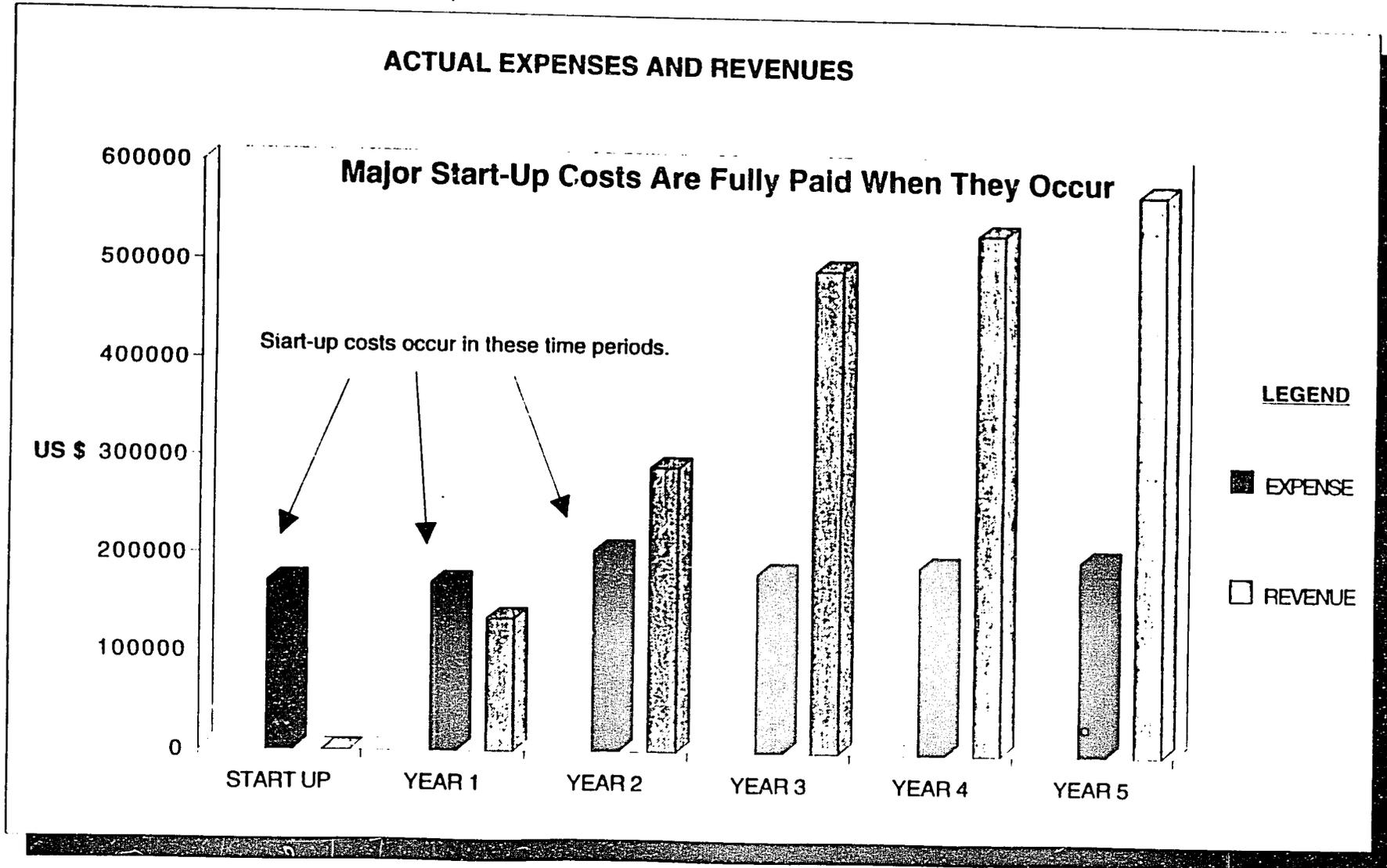
ACTUAL EXPENSES AND REVENUES

Major Start-Up Costs Are Fully Paid When They Occur

Start-up costs occur in these time periods.

US $

LEGEND

EXPENSE

REVENUE

START UP YEAR 1 YEAR 2 YEAR 3 YEAR 4 YEAR 5

APEC TELECOMMUNICATION TRAINING COST STUDY

SUMMARY OF ANNUAL BUDGETS
SINGAPORE

	START UP PERIOD	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	TOTAL
EXPENSE	$113,385	$81,229	$84,843	$117,719	$121,327	$124,715	$643,220
REVENUE	$0	$0	$0	$0	$0	$0	$0

SUMMARY OF ANNUAL BUDGETS
THAILAND

	START UP PERIOD	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	TOTAL
EXPENSE	$58,736	$24,326	$25,463	$26,592	$27,835	$29,136	$192,088
REVENUE	$0	$134,109	$140,377	$146,938	$153,605	$160,994	$736,222

SUMMARY OF ANNUAL BUDGETS
INDONESIA

	START UP PERIOD	YEAR 2	YEAR 3	YEAR 4	YEAR 5	TOTAL
EXPENSE	$65,542	$17,969	$19,142	$20,496	$21,946	$145,096
REVENUE	$0	$150,254	$160,881	$172,261	$184,445	$667,841

SUMMARY OF ANNUAL BUDGETS
PHILIPPINES

	START UP PERIOD	YEAR 3	YEAR 4	YEAR 5	TOTAL
EXPENSE	$76,546	$19,159	$21,282	$23,642	$140,629
REVENUE	$0	$186,385	$207,047	$229,999	$623,430

SUMMARY OF ANNUAL BUDGETS
APEC

	START UP	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	TOTAL
EXPENSE	$172,121	$171,098	$204,821	$182,612	$190,941	$199,439	$1,121,032
REVENUE	$0	$134,109	$290,630	$494,204	$533,113	$575,438	$2,027,494

EXHIBIT 5-2

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APEC TELECOMMUNICATION TRAINING COST STUDY

51

ACCUMULATED PW EXPENSE VERSUS PW REVENUE

Major Start-Up Costs Are Fully Paid When They Occur

Break Even Point

Revenue

Accumulated present worth of expenses
and revenues are today's money requirements
for the entire project as planned.

Expense

US $

1400000

1200000

1000000

800000

600000

400000

200000

0

START UP   YEAR 1   YEAR 2   YEAR 3   YEAR 4   YEAR 5
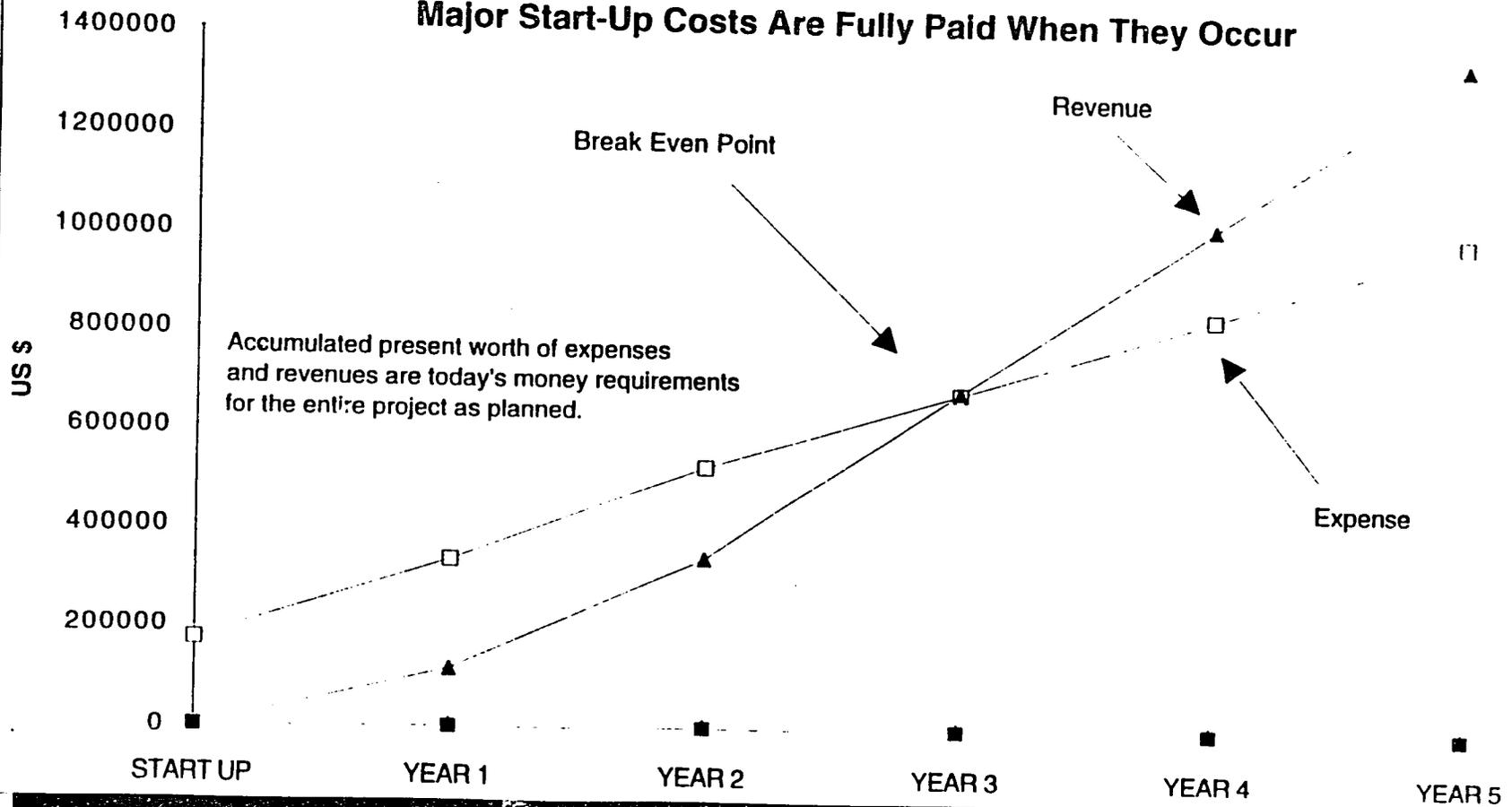
5.2.2 Model 2 - Amortized Costs

Given that APEC may seek a loan to support this training project, there is need to present a second financial analysis based on costs being amortized over the five year period. The start-up costs that would be amortized include course development, facilities and equipment. Model 2 assumes that the major start-up costs would be amortized as a paid incremental expense over the life of the project.

Exhibit 5-6 shows the actual expenses and revenues by year. Note, in contrast to Exhibit 5-3, that the expenses increase each year, although the increases per year starting in Year 3 are very modest.

For a detailed presentation of the "Actual" expenses and revenues by country for each year, see the table on Exhibit 5-5. For details on the "Present Worth" of expenses and revenues, as well as the "Actual" expenses and revenues, see Appendix F.

The line graph on Exhibit 5-3 shows "Present Worth" of expenses and revenues of the project for each year. Note that the break-even point occurs during Year 2. Over the life of the project, the accumulated revenues far exceed expenditures as shown below (calculation in "Present Worth"):

Revenues (PW)	$1,355,663
Expenses (PW)	$ 962,235
Positive Balance (PW)	$ 393,428

APEC TELECOMMUNICATIONS TRAINING COST STUDY

EXHIBIT 5-4

53
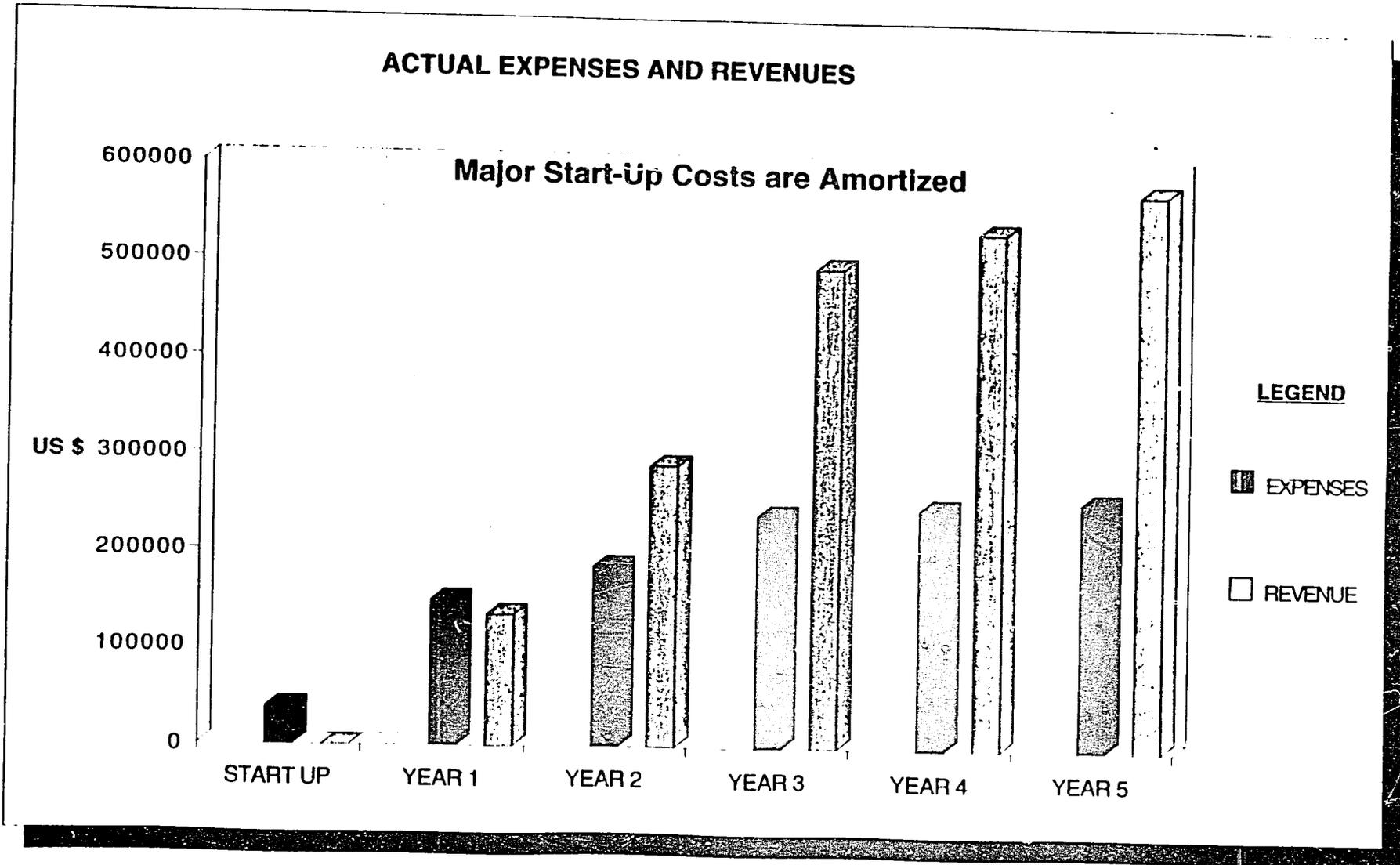
ACTUAL EXPENSES AND REVENUES

Major Start-Up Costs are Amortized

LEGEND

▦ EXPENSES

☐ REVENUE

APEC TELECOMMUNICATION TRAINING COST STUDY

SUMMARY OF ANNUAL BUDGETS WITH MAJOR START-UP COSTS AMORTIZED
SINGAPORE

	START UP PERIOD	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	TOTALS
EXPENSES	$24,856	$98,882	$102,496	$135,372	$138,980	$142,368	$642,953
REVENUE	$0	$0	$0	$0	$0	$0	$0

SUMMARY OF ANNUAL BUDGETS WITH MAJOR START-UP COSTS AMORTIZED
THAILAND

	START UP PERIOD	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	
EXPENSES	$13,753	$36,524	$37,661	$38,790	$40,032	$41,333	$208,093
REVENUE	$0	$134,109	$140,377	$146,938	$153,805	$160,994	$736,222

SUMMARY OF ANNUAL BUDGETS WITH MAJOR START-UP COSTS AMORTIZED
INDONESIA

	START UP PERIOD	YEAR 2	YEAR 3	YEAR 4	YEAR 5	
EXPENSES	$13,877	$30,838	$32,012	$33,366	$34,816	$144,910
REVENUE	$0	$150,254	$160,881	$172,261	$184,445	$667,841

SUMMARY OF ANNUAL BUDGETS WITH MAJOR START-UP COSTS AMORTIZED
PHILIPPINES

	START UP PERIOD	YEAR 3	YEAR 4	YEAR 5	
EXPENSES	$14,707	$33,772	$35,896	$38,255	$122,629
REVENUE	$0	$186,385	$207,047	$229,999	$623,430

SUMMARY OF ANNUAL BUDGETS WITH MAJOR START-UP COSTS AMORTIZED
APEC

	START UP	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	
EXPENSES	$38,609	$149,283	$185,703	$239,945	$248,274	$256,772	$1,118,585
REVENUE	$0	$134,109	$290,630	$494,204	$533,113	$575,438	$2,027,494

EXHIBIT 5-5

APEC TELECOMMUNICATION TRAINING COST STUDY

ACCUMULATED PW EXPENSE VERSUS PW REVENUE

Major Start-Up Costs Are Amortized

Accumulated present worth of expenses and revenues
are today's money requirements for the entire project as planned.

Revenue

Break Even Point

Expense

US $$

| 1400000 | 1200000 | 1000000 | 800000 | 600000 | 400000 | 200000 | 0 |

START UP YEAR 1 YEAR 2 YEAR 3 YEAR 4 YEAR 5
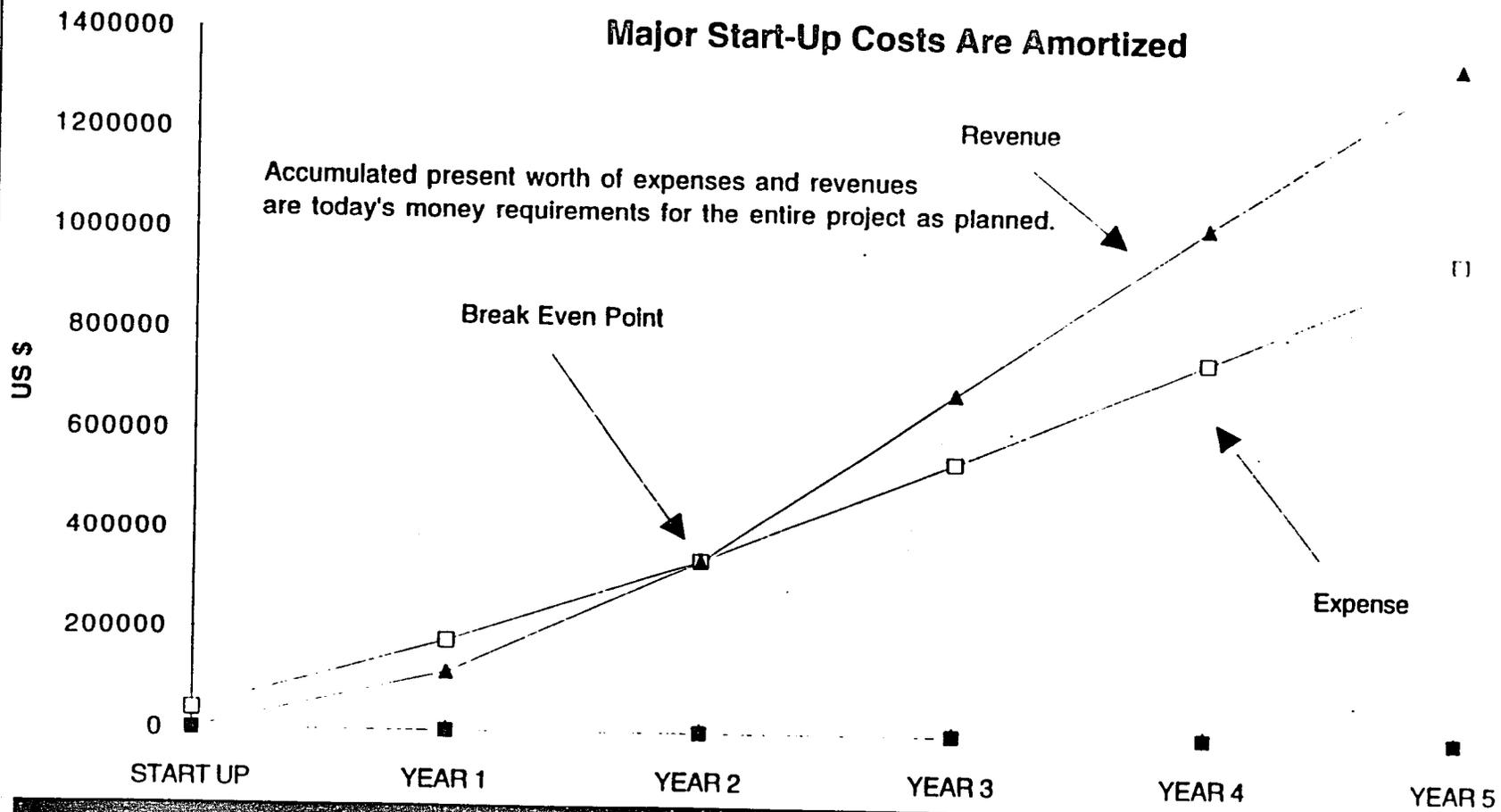
5.2.3 Comparison Between Models 1 and 2

The only fundamental difference between Models 1 and 2 is that the major start-up costs in Model 2 are amortized over the life of the project. As stated earlier, Model 2 would be relevant for project planning only if the project funds were to be borrowed.

Since the amortization only applies to expenses, there is no difference between the two Models in the total actual *revenues* over the life of the project. (See Exhibits 5-2 and 5-5). The total revenues for both Models is $2,027,494. There is only a modest difference between the two Models in the total actual *expenses* as shown in the second to last line in the same tables -- $1,121,032 for the non-amortized model and $1,118,585 for the amortized model.

Model 2, however, does show one positive result. As can be seen in Exhibit 5-6, the break-even point is earlier, moving from Year 3 to Year 2.

5.3 Assumptions

The assumptions used in the study are as follows:

(1)   Each country will permit free use of its training facility. In return, the host country will have four free of charge seats in the APEC Telecom Century (ATC) course for each session.

(2)   Eight class sessions of the ATC course will be conducted each year with seats for 16 students.

(3)   The charge for tuition for the four week ATC course will be US $ 1,275.

(4)   All travel and living expenses to attend the course will be paid by students' sponsor organizations, and are not included in the study.

(5)   All training supplies, documentation copying, and related materials will be provided from tuition generated funds.

(6)   Estimated inflation factors and interest rates for the countries were assumed.

(7)   The training program continues for six years beginning in 1993 with year 1 ending in 1994, and year five ending in 1998.

5.4 Notes regarding start-up costs

(1) Under the non-amortized assumption, start-up costs are included as a one time charge in the month in which they occur. In the amortized assumption, they are amortized beginning in the month in which they occur.

(2) The start-up costs for Singapore should only be for staffing. However, since some course development work will be needed to modify the existing PT-2001 format, and since such costs should be spread over the entire project, additional funds are included for this purpose in the Singapore budget.

(3) The start-up costs in Thailand, Indonesia, and the Philippines are for additional PCs, printers, laboratory rearrangement, cable installation, and setting up the recommended classroom and break-out room environment. Refer to Appendix G for a description of this work.

(4) Expenses for training the in-country ATC instructors for Thailand, Indonesia, and The Philippines are included in each of the in-country budgets. It is assumed that the instructors would attend the PT-2001 course at NYNEX's Marlboro Learning Center, near Boston, Massachusetts.

APPENDICES

APPENDIX A

U.S. COMPANIES - SUGGESTED TOPICS FOR DISCUSSIONS

APPENDIX A

U.S. Companies - Suggested Topics for Discussion

(1) Business Mission

What is your company's principal business objective in SE Asia?

(2) Regional Presence

Do you have an permanent presence in the region?

If so, where is it located and what activity is being undertaken?

Who is the contact person, and do you mind if they are contacted? If not, what is their telephone/FAX number, and address?

(3) Benefits

How do you view the telecommunications needs assessment study as being of benefit to your organization?

For example, we see the following as possible advantages:

Company profile enhanced by participation in an APEC initiative.

HRD and training could assist your efforts to staff up with suitable personnel to engineer, install, and maintain your products.

Company interest in regional HRD and training as an enhancement to winning contract awards.

What negatives do you perceive from this initiative?

(4) Relationships

Do you have any business relationships with telecommunications organizations in the countries to be visited (TOT, PLTD, PT TELKOM, Etc.)?

Do you feel that when these organizations are visited, reference to your company's interest and participation in this initiative will be helpful to you?

(5) Extent of Need

From your experience, what do you see as the greatest need in both HRD and training in the respective countries?

Do you have any views on how to best meet the needs of the telecommunications sector for a well trained and motivated work-force?

There are many existing vocational, management, and engineering training programs, available to telecommunications providers. If a single training course was developed through this initiative and made available to Thailand, Indonesia, and the Philippines, what do you consider to be the most appropriate and beneficial course syllabus?

(6) Conflicts

Do you see any opposition to this program from other APEC members?

(7) Existing Programs

Does your company have any programs planned or in existence to train personnel in SE Asia which will assist you in operating your own systems in those countries?

If so, does this training involve nationals of those countries to a U.S. based training facility, by carrying out the training in-country, or by a mixture of both?

Also, if you do operate programs for foreign students either in the U.S. or overseas, what specific problems do you encounter, and what is your method of handling these? Is language a particular problem?

(8) U.S. Facilities

Could you please describe your existing training programs and facilities in the U.S. and provide copies of course syllabi plus any other available information.

It will be necessary to develop line item budgets for any proposed course. Can you provide any guidance on the line items to be included and their estimated costs. Are there any rough rule of thumb figures available based on units, such as total cost per student day?

Would you be able to provide course instructors for overseas assignments? If so, what would be your requirements?

(9) Course Rotation

It has been suggested that a course be developed that will rotate among ASEAN cities. Do you have any views on this approach?

APPENDIX B

ORGANIZATIONS INTERVIEWED IN THE U.S.

APPENDIX 3

Organizations Interviewed in the U.S.

Name of Organization	Contact
Pacific Economic Cooperation Council	Janet Pearce
American Telephone and Telegraph Company	Rhonda Crane Joe Murray Ken Radzwinokowski Judy Cuco
Motorola	Terry O'Conner Jerry Kline James Oehlerking Paul Scott
Hewlett Packard	Allen Bikell Claudia Davis
Bell Atlantic	David Frost Dick Ramlall Michael Courts
Hughes Network Systems	Dr. Coehler Keary Cannon
NYNEX	Steve Dutton Janet Keany David Kirwin
Tellabs	Chris Cooney
Bellcore	Richard Peterson Frank Sianez Roger Place W. Sheilds Terry Nelson
GE Information Services	Warner Sinback

APPENDIX C

ORGANIZATIONS AND COMPANIES VISITED IN APEC BY THE STUDY TEAM

APPENDIX C

Organizations and Companies Visited in APEC by the Study Team

Organization visited:	Representatives from:
Indonesia	
• PT INDOSAT	Human Resource and Training
• POST & TELEGRAPH DEPT.	Education and Training
• DEPARTMENT OF TOURISM POST AND TELECOMMUNICATION	Deputy's Office
• PT TELKOM TRAINING CENTER	Training
• TELKOM DIRECTORATE	Human Resource Planning
• USAID/Indonesia Mission	Human and Institutional Resource Development
• US Embassy	U.S. and Foreign Commercial Service
• PT. TELKOM	Human resource and training, technology development, administration and finance, marketing, public relations, and student affairs
• BAPPENAS	National Planning
• I.T.U.	Area Office
Philippines:	
• SBMA (Subic Bay)	Officials of SBMA, Training and Education
• USAID/Manila	Training, Planning and Economics, Special Projects
• DEPT. OF FOREIGN AFFAIRS	Officials from the department

- EASTERN TELECOMS — Executive & Training

- AIM — Executive and Administration

- ADVANCED SCIENCE AND TECHNOLOGY INSTITUTE — Engineering Training and Education

- PHILIPPINE LONG DISTANCE TELEPHONE COMPANY — Executive, Human Resources, Employee Development, Training

- NEDA — Economics and Development

- PT&T CORPORATION — Executive Levels

- CAPITAL WIRELESS CORPORATION — Executive and Marketing

- NATIONAL COMPUTER CENTER — Executive

- DIGITEL TELECOMMUNICATIONS, PHILS., INC. — Personnel and Administration

- DEPARTMENT OF TRANSPORT AND COMMUNICATION — Telecom Training Institute

- DEPARTMENT OF SCIENCE AND TECHNOLOGY — Project Implementation

- PHILIPINO TELEPHONE COMPANY

- PTTC

Thailand:

- USAID/Thailand — Technical Resources

- U.S. EMBASSY — Economic Section

- MINISTRY OF TRANSPORT AND COMMUNICATION — International Affairs

- T.O.T. — Executive, HRD, Training,Performance Appraisal.

- THAI TELEPHONE AND
  TELECOMMUNICATION   Executive, Administration,

- COMMUNICATIONS AUTHORITY OF
  THAILAND   Advisor staff

- POST AND TELEGRAPH
  DEPARTMENT   Executive, Frequency management,
                                       Planning, Services

- TELECOM ASIA   Executive, Training

- NYNEX   Network Systems

APPENDIX D

TOPICS FOR DISCUSSION DURING OVERSEAS FIELD VISIT!

APPENDIX D

TOPICS FOR DISCUSSION DURING OVERSEAS FIELD VISITS

TELECOMMUNICATIONS TRAINING NEEDS ASSESSMENT

- How important is human resource development and training within your organization? How are these activities structured within the organization?

- Are you able to provide any information on what percentage of your total budget is devoted to training?

- What is the "training rate" in your organization? This is the percent of employees in a workforce in training on a typical day?

- It has been said that a key problem is a lack of management and "soft: training. Do you believe this to be true of your organization? Soft training includes economic issues, language skills, corporate management, customer orientation, and systems.

- Could you please describe your existing training facilities, including:

    Types and duration of courses

    Number of students per course

    Backlog of students requiring training

    Audio visual aids used

- Please describe any plans to expand existing training capability.

- To what extent, if any, are local universities, technical colleges, vocational institutions, etc., used for improving the skills of your employees. Could you please name these institutions.

- Could you explain any constraints, such as salary levels, benefits, and other factors, which prevent you from attracting either sufficient, or the right caliber, of new employees.

- Do you consider that the number of engineers graduating each year from college and universities is insufficient to meet your needs? Is this particularly because c the requirements of competing enterprises and the accelerated development of th telecommunications sector?

- What is the educational level of your workforce in terms of those with bachelor and higher degrees, high school, and below high school?

- How many vacancies do you have for different work categories and how lon have these been unfilled?

- Are you losing skilled personnel to the other sectors of the economy or to othe countries? If so, what are the reasons for this?

- Is the lack of a highly educated and skilled workforce causing bottlenecks in the absorption of the increasing number of new technologies that are being introduced into telecommunications?

- Are personnel routinely sent on overseas training programs? Are these programs successful and beneficial?

- What are the input sources of new employees? How does this process work. In general, what are you recruitment problems?

- How are your requirements for different skill categories determined - is there a manpower planning unit in your organization?

- What programs are in place to train personnel for management positions and how are management personnel trained?

- To what extent, if any, are you relying on foreign personnel to perform technical or other activities, because local trained staff are not yet available?

- If foreign personnel are used, is there any program in place to replace them?

- To what extent, if any, is the lack of sufficiently trained personnel hampering your efforts to expand and improve the telecommunications services?

- Do you have a set of job descriptions for the various positions in your workforce?

- If a training program was developed under the auspices of APEC, what would you consider the most beneficial course(s) subjects to be taught?

APPENDIX E

SPREADSHEETS

MODEL 1, NON-AMORTIZED COSTS

APEC TELECOMMUNICATION TRAINING COST STUDY

SUMMARY OF ANNUAL BUDGETS

APEC   CHART 5-3

	START UP PERIOD	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
EXPENSES	$172,121	$171,098	$204,821	$182,612	$190,941	$199,439
REVENUE	$0	$134,109	$290,630	$494,204	$533,113	$575,438

	START UP	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
ACCUMULATED EXPENSES	$172,121	$343,219	$548,040	$730,652	$921,593	$1,121,032
ACCUMULATED REVENUE	$0	$134,109	$424,739	$918,943	$1,452,056	$2,027,494

	START UP PERIOD	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
PRESENT WORTH OF EXPENSES	$172,121	$163,244	$189,827	$155,874	$157,774	$159,868
PRESENT WORTH OF REVENUE	$0	$114,798	$226,260	$342,855	$337,165	$334,585

CHART 5-1

	START UP	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
ACCUMULATED PRESENT WORTH OF EXPENSES	$172,121	$335,365	$525,191	$681,066	$838,839	$998,707
ACCUMULATED PRESENT WORTH OF REVENUE	$0	$114,798	$341,057	$683,913	$1,021,078	$1,355,663

APEC TELECOMMUNICATION TRAINING COST STUDY

SUMMARY OF ANNUAL BUDGETS
SINGAPORE

	START UP PERIOD	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
EXPENSES	$113,385	$81,229	$84,843	$117,719	$121,327	$124,715
REVENUE	$0	$0	$0	$0	$0	$0

	START UP PERIOD	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
PRESENT WORTH OF EXPENSES	$113,385	$76,878	$75,997	$99,797	$97,346	$94,704
PRESENT WORTH OF REVENUE	$0	$0	$0	$0	$0	$0

	START UP	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
ACCUMULATED PRESENT WORTH OF EXPENSES	$113,385	$190,263	$266,260	$366,057	$463,402	$558,106
ACCUMULATED PRESENT WORTH OF REVENUE	$0	$0	$0	$0	$0	$0

SUMMARY OF ANNUAL BUDGETS
THAILAND

	START UP PERIOD	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
EXPENSES	$58,736	$24,326	$25,463	$26,592	$27,835	$29,136
REVENUE	$0	$134,109	$140,377	$146,938	$153,805	$160,994

	START UP PERIOD	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
PRESENT WORTH OF EXPENSES	$58,736	$20,823	$21,813	$22,797	$23,881	$25,016
PRESENT WORTH OF REVENUE	$0	$114,798	$114,885	$114,973	$115,061	$115,148

	START UP	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
ACCUMULATED PRESENT WORTH OF EXPENSES	$58,736	$79,560	$101,373	$124,170	$148,051	$173,068
ACCUMULATED PRESENT WORTH OF REVENUE	$0	$114,798	$229,683	$229,858	$230,033	$230,209

APEC TELECOMMUNICATION TRAINING COST STUDY

SUMMARY OF ANNUAL BUDGETS
INDONESIA

	START UP PERIOD	YEAR 2	YEAR 3	YEAR 4	YEAR 5
EXPENSES	$65,542	$17,969	$19,142	$20,496	$21,946
REVENUE	$0	$150,254	$160,881	$172,261	$184,445

	START UP PERIOD	YEAR 2	YEAR 3	YEAR 4	YEAR 5
PRESENT WORTH OF EXPENSES	$65,542	$15,470	$16,613	$17,932	$19,357
PRESENT WORTH OF REVENUE	$0	$111,375	$105,164	$100,926	$98,465

	START UP	YEAR 2	YEAR 3	YEAR 4	YEAR 5
ACCUMULATED PRESENT WORTH OF EXPENSES	$65,542	$81,013	$97,626	$115,558	$134,915
ACCUMULATED PRESENT WORTH OF REVENUE	$0	$111,375	$216,538	$317,464	$415,929

SUMMARY OF ANNUAL BUDGETS
PHILIPPINES

YEAR	START UP PERIOD	YEAR 3	YEAR 4	YEAR 5
EXPENSES	$76,546	$19,159	$21,282	$23,642
REVENUE	$0	$186,385	$207,047	$229,999

	START UP PERIOD	YEAR 3	YEAR 4	YEAR 5
PRESENT WORTH OF EXPENSES	$76,546	$16,667	$18,615	$20,791
PRESENT WORTH OF REVENUE	$0	$122,719	$121,179	$120,972

	START UP	YEAR 3	YEAR 4	YEAR 5
ACCUMULATED PRESENT WORTH OF EXPENSES	$76,546	$93,213	$111,828	$132,619
ACCUMULATED PRESENT WORTH OF REVENUE	$0	$122,719	$243,898	$364,870

APEC TELECOMMUNICATIONS TRAINING COST STUDY

Expense Line Items	Start-Up	Year 1	Year 2	Year 3	Year 4	Year 5
Force						
Administrator	1	1	1	1	1	
Assistant Administrator	0	0	0	1	1	1
Clerical Support	1	1	1	1	1	1
Salaries						
Director	$10,440	$42,930	$44,133	$45,369	$46,640	$47,947
Administrate:	$0	$0	$0	$31,758	$32,648	$33,563
Clerical Support	$715	$8,586	$8,827	$9,074	$9,328	$9,589
Contract Items						
Course Development Consultation	$90,000	$0	$0	$0	$0	$0
Office Rent & Logistic Support	$1,229	$5,041	$5,200	$5,443	$5,906	$6,060
Office Equipment	$5,000	$0	$1,321	$0	$0	$0
Travel and Living Expenses	$6,000	$24,672	$25,364	$26,074	$26,805	$27,556
Total:	$113,385	$81,229	$84,843	$117,719	$121,327	$124,715

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APEC TELECOMMUNICATIONS TRAINING COST STUDY

SUMMARY OF ANNUAL REPORT

YEAR	START-UP PERIOD	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
EXPENSES	$113,385	$81,229	$84,843	$117,719	$121,327	$124,715
REVENUE	$0	$0	$0	$0	$0	$0
YEAR	1994	1994	1995	1996	1997	1998
PRESENT WORTH OF EXPENSES	$113,385	$76,878	$75,997	$99,797	$97,346	$94,704
PRESENT WORTH OF REVENUE	$0	$0	$0	$0	$0	$0
YEAR	1994	1994	1995	1996	1997	1998
ACCUMULATED PRESENT WORTH OF EXPENSES	$113,385	$190,263	$266,260	$366,057	$463,402	$558,106
ACCUMULATED PRESENT WORTH OF REVENUE	$0	$0	$0	$0	$0	$0

APEC TELECOMMUNICATIONS TRAINING COST STUDY

Expense Line Items	Start-Up	Year 1	Year 2	Year 3	Year 4	Year 5
Force						
Instructor	1	1	1	1	1	1
Laboratory Technician	1	1	1	1	1	1
Clerical Support	1	1	1	1	1	1
Salary						
Instructor	$3,000	$18,841	$19,722	$20,644	$21,608	$22,618
Instructor Preparation	$9,500	$0	$0	$0	$0	$0
Logistics Support Services	$236	$5,485	$5,741	$5,948	$6,226	$6,517
Classroom and Laboratory Set-Up	$46,000	$0	$0	$0	$0	$0
Total:	$58,736	$24,326	$25,463	$26,592	$27,835	$29,136

Revenue Line Items	Start-Up	Year 1	Year 2	Year 3	Year 4	Year 5
Number of students	0	128	128	128	128	128
Free Tuition For 4 In-Country Student	$0	($44,703)	($46,792)	($48,979)	($51,268)	($53,665)
Income From Tuition	$0	$178,812	$178,812	$195,917	$205,074	$214,658
Total:	$0	$134,109	$132,019	$146,938	$153,805	$160,994

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APEC TELECOMMUNICATIONS TRAINING COST STUDY

SUMMARY OF ANNUAL BUDGETS
THAILAND

	START UP PERIOD	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
EXPENSES	$58,736	$24,326	$25,463	$26,592	$27,835	$29,136
REVENUE	$0	$134,109	$140,377	$146,938	$153,805	$160,994

	START UP PERIOD	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
PRESENT WORTH OF EXPENSES	$58,736	$20,823	$21,813	$22,797	$23,881	$25,016
PRESENT WORTH OF REVENUE	$0	$114,798	$114,885	$114,973	$115,061	$115,148

	START UP	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
ACCUMULATED PRESENT WORTH OF EXPENSES	$58,736	$79,560	$101,373	$124,170	$148,051	$173,068
ACCUMULATED PRESENT WORTH OF REVENUE	$0	$114,798	$229,683	$344,655	$459,716	$574,864

APEC TELECOMMUNICATIONS TRAINING COST STUDY

Expense Line Items	Start-Up	Year 2	Year 3	Year 4	Year 5
Force					
Instructor	1	1	1	1	1
Laboratory Technician	1	1	1	1	1
Clerical Support	1	1	1	1	1
Salary					
Instructor	$1,650	$9,898	$10,598	$11,347	$12,150
Instructor Preparation	$10,891	$0	$0	$0	$0
Logistics Support Ser vices	$264	$8,071	$8,545	$9,149	$9,796
Classroom and Laboratory Set-Up	$52,738	$0	$0	$0	$0
Total:	$65,542	$17,969	$19,142	$20,496	$21,946

Revenue Line Items					
Number of students	1	128	128	128	128
Free Tuition For 4 In-Country Student	$0	($50,085)	($53,627)	($57,420)	($61,482)
Income From Tuition	$1	$200,338	$214,508	$229,681	$245,927
Total:	$1	$150,254	$160,881	$172,261	$184,445

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APEC TELECOMMUNICATIONS TRAINING COST STUDY

SUMMARY OF ANNUAL REPORT
INDONESIA

	START UP PERIOD	YEAR 2	YEAR 3	YEAR 4	YEAR 5
EXPENSES	$65,542	$17,969	$19,142	$20,496	$21,946
REVENUE	$0	$150,254	$160,881	$172,261	$184,445

	START UP PERIOD	YEAR 2	YEAR 3	YEAR 4	YEAR 5
PRESENT WORTH OF EXPENSES	$65,542	$15,470	$16,613	$17,932	$19,357
PRESENT WORTH OF REVENUE	$0	$111,375	$105,164	$100,926	$98,465

	START UP	YEAR 2	YEAR 3	YEAR 4	YEAR 5
ACCUMULATED PRESENT WORTH OF EXPENSES	$65,542	$81,013	$97,626	$115,558	$134,915
ACCUMULATED PRESENT WORTH OF REVENUE	$0	$111,375	$216,538	$317,464	$415,929

Expense Line Items	Start-Up	Year 3	Year 4	Year 5
Force				
Instructor	1	1	1	1
Laboratory Technician	1	1	1	1
Clerical Support	1	1	1	1
Salary				
Instructor	$1,451	$9,672	$10,745	$11,936
Instructor Preparation	$11,723	$0	$0	$0
Logistics Support Services	$315	$9,486	$10,538	$11,706
Classroom and Laboratory Set-Up	$63,057	$0	$0	$0
Total:	$76,546	$19,159	$21,282	$23,642

Revenue Line Items				
Number of students	0	128	128	128
Free Tuition For 4 In-Country Students	$0	($62,128)	($69,016)	($76,666)
Income From Tuition	$0	$248,513	$276,062	$306,665
Total:	$0	$186,385	$207,047	$229,999

APEC TELECOMMUNICATIONS TRAINING COST STUDY

SUMMARY OF ANNUAL REPORT
PHILIPPINES

	START UP PERIOD	YEAR 3	YEAR 4	YEAR 5
EXPENSES	$76,546	$19,159	$21,282	$23,642
REVENUE	$0	$186,385	$207,047	$229,999

	START UP PERIOD	YEAR 3	YEAR 4	YEAR 5
PRESENT WORTH OF EXPENSES	$76,546	$16,667	$18,615	$20,791
PRESENT WORTH OF REVENUE	$0	$122,719	$121,179	$120,972

	START UP	YEAR 3	YEAR 4	YEAR 5
ACCUMULATED PRESENT WORTH OF EXPENSES	$76,546	$93,213	$111,828	$132,619
ACCUMULATED PRESENT WORTH OF REVENUE	$0	$122,719	$243,898	$364,870

APPENDIX F

SPREADSHEETS

MODEL 2, AMORTIZED COSTS

APEC TELECOMMUNICATION TRAINING COST STUDY - MAJOR COSTS AMORTIZE

APEC CHART 5-4

	START UP PERIOD	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
EXPENSES	$38,609	$149,283	$185,703	$239,945	$248,274	$256,772
REVENUE	$0	$134,109	$290,630	$494,204	$533,113	$575,438

	START UP	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
ACCUMULATED EXPENSES	$38,609	$187,892	$373,594	$613,539	$861,813	$1,118,585
ACCUMULATED REVENUE	$0	$134,109	$424,739	$918,943	$1,452,056	$2,027,494

	START UP PERIOD	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
PRESENT WORTH OF EXPENSES	$38,609	$138,727	$165,329	$205,178	$206,443	$207,948
PRESENT WORTH OF REVENUE	$0	$114,798	$226,260	$342,855	$337,165	$334,585

CHART 5-2

	START UP	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
ACCUMULATED PRESENT WORTH OF EXPENSES	$38,609	$177,336	$342,665	$547,843	$754,287	$962,235
ACCUMULATED PRESENT WORTH OF REVENUE	$0	$114,798	$341,057	$683,913	$1,021,078	$1,355,663

APEC TELECOMMUNICATION TRAINING COST STUDY - MAJOR COSTS AMORTIZED

SUMMARY OF ANNUAL BUDGETS
SINGAPORE

	START UP PERIOD	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
EXPENSES	$24,856	$98,882	$102,496	$135,372	$138,980	$142,368
REVENUE	$0	$0	$0	$0	$0	$0

	START UP PERIOD	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
PRESENT WORTH OF EXPENSES	$24,856	$93,585	$91,809	$114,761	$111,509	$108,108
PRESENT WORTH OF REVENUE	$0	$0	$0	$0	$0	$0

	START UP	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
ACCUMULATED PRESENT WORTH OF EXPENSES	$24,856	$118,441	$210,250	$325,011	$436,520	$544,629
ACCUMULATED PRESENT WORTH OF REVENUE	$0	$0	$0	$0	$0	$0

SUMMARY OF ANNUAL BUDGETS
THAILAND

	START UP PERIOD	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
EXPENSES	$13,753	$36,524	$37,661	$38,790	$40,032	$41,333
REVENUE	$0	$134,109	$140,377	$146,938	$153,805	$160,994

	START UP PERIOD	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
PRESENT WORTH OF EXPENSES	$13,753	$31,265	$32,262	$33,255	$34,346	$35,490
PRESENT WORTH OF REVENUE	$0	$114,798	$114,885	$114,973	$115,061	$115,148

	START UP	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
ACCUMULATED PRESENT WORTH OF EXPENSES	$13,753	$45,017	$77,280	$110,534	$144,881	$180,370
ACCUMULATED PRESENT WORTH OF REVENUE	$0	$114,798	$229,683	$229,858	$230,033	$230,209

APEC TELECOMMUNICATION TRAINING COST STUDY - MAJOR COSTS AMORTI

SUMMARY OF ANNUAL BUDGETS
INDONESIA

	START UP PERIOD	YEAR 2	YEAR 3	YEAR 4	YEAR 5
EXPENSES	$13,877	$30,838	$32,012	$33,366	$34,816
REVENUE	$0	$150,254	$160,881	$172,261	$184,445

	START UP PERIOD	YEAR 2	YEAR 3	YEAR 4	YEAR 5
PRESENT WORTH OF EXPENSES	$13,877	$26,551	$27,782	$29,192	$30,709
PRESENT WORTH OF REVENUE	$0	$111,375	$105,164	$100,926	$98,465

	START UP	YEAR 2	YEAR 3	YEAR 4	YEAR 5
ACCUMULATED PRESENT WORTH OF EXPENSES	$13,877	$40,428	$68,210	$97,402	$128,110
ACCUMULATED PRESENT WORTH OF REVENUE	$0	$111,375	$216,538	$317,464	$415,929

SUMMARY OF ANNUAL BUDGETS
PHILIPPINES

YEAR	START UP PERIOD	YEAR 3	YEAR 4	YEAR 5
EXPENSES	$14,707	$33,772	$35,896	$38,255
REVENUE	$0	$186,385	$207,047	$229,999

	START UP PERIOD	YEAR 3	YEAR 4	YEAR 5
PRESENT WORTH OF EXPENSES	$14,707	$29,380	$31,396	$33,642
PRESENT WORTH OF REVENUE	$0	$122,719	$121,179	$120,972

	START UP	YEAR 3	YEAR 4	YEAR 5
ACCUMULATED PRESENT WORTH OF EXPENSES	$14,707	$44,087	$75,484	$109,126
ACCUMULATED PRESENT WORTH OF REVENUE	$0	$122,719	$243,898	$364,870

Expense Line Items	Start-Up	Year 1	Year 2	Year 3	Year 4	Year 5
Force						
Administrator	1	1	1	1	1	1
Assistant Administrator	0	0	0	1	1	1
Clerical Support	1	1	1	1	1	1
Salaries						
Director	$10,440	$42,930	$44,133	$45,369	$46,640	$47,947
Administrator	$0	$0	$0	$31,758	$32,648	$33,563
Clerical Support	$715	$8,586	$8,827	$9,074	$9,328	$9,589
Contract Items						
Repayment of Capital	$1,471	$17,652	$17,652	$17,652	$17,652	$17,652
Office Rent & Logistic Support	$1,229	$5,041	$5,200	$5,443	$5,906	$6,060
Office Equipment	$5,000	$0	$1,321	$0	$0	$0
Travel and Living Expenses	$6,000	$24,672	$25,364	$26,074	$26,805	$27,556
Total:	**$24,856**	**$98,882**	**$102,496**	**$135,372**	**$138,980**	**$142,368**

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APEC TELECOMMUNICATIONS TRAINING COST STUDY - MAJOR COSTS AMORTIZED

SUMMARY OF ANNUAL REPORT

YEAR	START-UP PERIOD	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
EXPENSES	$24,856	$98,882	$102,496	$135,372	$138,980	$142,368
REVENUE	$0	$0	$0	$0	$0	$0

YEAR	1994	1994	1995	1996	1997	1998
PRESENT WORTH OF EXPENSES	$24,856	$93,585	$91,809	$i14,761	$111,509	$108,108
PRESENT WORTH OF REVENUE	$0	$0	$0	$0	$0	$0

YEAR	1994	1994	1995	1996	1997	1998
ACCUMULATED PRESENT WORTH OF EXPENSES	$24,856	$118,441	$210,250	$325,011	$436,520	$544,629
ACCUMULATED PRESENT WORTH OF REVENUE	$0	$0	$0	$0	$0	$0

Expense Line Items	Start-Up	Year 1	Year 2	Year 3	Year 4	Year 5
Force						
Instructor	1	1	1	1	1	1
Laboratory Technician	1	1	1	1	1	1
Clerical Support	1	1	1	1	1	1
Salary						
Instructor	$3,000	$18,841	$19,722	$20,644	$21,608	$22,618
Instructor Preparation	$9,500	$0	$0	$0	$0	$0
Logistics Support Ser vices	$236	$5,485	$5,741	$5,948	$6,226	$6,517
Repayment of Capital	$1,016	$12,198	$12,198	$12,198	$12,198	$12,198
Total:	$13,753	$36,524	$37,661	$38,790	$40,032	$41,333

Revenue Line Items						
Number of students	0	128	128	128	128	128
Free Tuition For 4 In-Country Student	$0	($44,703)	($46,792)	($48,979)	($51,268)	($53,665)
Income From Tuition	$0	$178,812	$178,812	$195,917	$205,074	$214,658
Total:	$0	$134,109	$132,019	$146,938	$153,805	$160,994

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APEC TELECOMMUNICATIONS TRAINING COST STUDY - MAJOR COSTS AMORTIZED

SUMMARY OF ANNUAL BUDGETS
THAILAND

	START UP PERIOD	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
EXPENSES	$13,753	$36,524	$37,661	$38,790	$40,032	$41,333
REVENUE	$0	$134,109	$140,377	$146,938	$153,805	$160,994

	START UP PERIOD	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
PRESENT WORTH OF EXPENSES	$13,753	$31,265	$32,262	$33,255	$34,346	$35,490
PRESENT WORTH OF REVENUE	$0	$11_.798	$114,885	$114,973	$115,061	$115,148

	START UP	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
ACCUMULATED PRESENT WORTH OF EXPENSES	$13,753	$45,017	$77,280	$110,534	$144,881	$180,370
ACCUMULATED PRESENT WORTH OF REVENUE	$0	$114,798	$229,683	$344,655	$459,716	$574,86_

Expense Line Items	Start-Up	Year 2	Year 3	Year 4	Year 5
Force					
Instructor	1	1	1	1	1
Laboratory Technician	1	1	1	1	1
Clerical Support	1	1	1	1	1
Salary					
Instructor	$1,650	$9,898	$10,598	$11,347	$12,150
Instructor Preparation	$10,891	$0	$0	$0	$0
Logistics Support Services	$264	$8,071	$8,545	$9,149	$9,796
Repayment of Capital	$1,072	$12,870	$12,870	$12,870	$12,870
Total:	$13,877	$30,838	$32,012	$33,366	$34,816

Revenue Line Items	Start-Up	Year 2	Year 3	Year 4	Year 5
Number of students	1	128	128	128	128
Free Tuition For 4 In-Country Student	$0	($50,085)	($53,627)	($57,420)	($61,482)
Income From Tuition	$1	$200,338	$214,508	$229,681	$245,927
Total:	$1	$150,254	$160,881	$172,261	$184,445

APEC TELECOMMUNICATIONS TRAINING COST STUDY - MAJOR COSTS AMORTIZED

SUMMARY OF ANNUAL REPORT
INDONESIA

	START UP PERIOD	YEAR 2	YEAR 3	YEAR 4	YEAR 5
EXPENSES	$13,877	$30,838	$32,012	$33,36ɔ	$34,816
REVENUE	$0	$150,254	$160,881	$172,261	$184,445

	START UP PERIOD	YEAR 2	YEAR 3	YEAR 4	YEAR 5
PRESENT WORTH OF EXPENSES	$13,877	$26,551	$27,782	$29,192	$30,709
PRESENT WORTH OF REVENUE	$0	$111,375	$105,164	$100,926	$98,465

	START UP	YEAR 2	YEAR 3	YEAR 4	YEAR 5
ACCUMULATED PRESENT WORTH OF EXPENSES	$13,877	$40,428	$68,210	$97,402	$128,110
ACCUMULATED PRESENT WORTH OF REVENUE	$0	$111,375	$216,538	$317,464	$415,929

Expense Line Items	Start-Up	Year 3	Year 4	Year 5
Force				
Instructor	1	1	1	1
Laboratory Technician	1	1	1	1
Clerical Support	1	1	1	1
Salary				
Instructor	$1,451	$9,672	$10,745	$11,936
Instructor Preparation	$11,723	$0	$0	$0
Logistics Support Ser vices	$315	$9,486	$10,538	$11,706
Reapyment of Capital	$1,218	$14,613	$14,613	$14,613
Total:	$14,707	$33,772	$35,896	$38,255

Revenue Line Items				
Number of students	0	128	128	128
Free Tuition For 4 In-Country Students	$0	($62,128)	($69,016)	($76,666)
Income From Tuition	$C	$248,513	$276,062	$306,665
Total:	$0	$186,385	$207,047	$229,999

APEC TELECOMMUNICATIONS TRAINING COST STUDY - MAJOR COSTS AMORTIZED

SUMMARY OF ANNUAL REPORT
PHILIPPINES

	START UP PERIOD	YEAR 3	YEAR 4	YEAR 5
EXPENSES	$14,707	$33,772	$35,896	$38,255
REVENUE	$0	$186,385	$207,047	$229,999

	START UP PERIOD	YEAR 3	YEAR 4	YEAR 5
PRESENT WORTH OF EXPENSES	$14,707	$29,380	$31,396	$33,642
PRESENT WORTH OF REVENUE	$0	$122,719	$121,179	$120,972

	START UP	YEAR 3	YEAR 4	YEAR 5
ACCUMULATED PRESENT WORTH OF EXPENSES	$14,707	$44,087	$75,484	$109,126
ACCUMULATED PRESENT WORTH OF REVENUE	$0	$122,719	$243,898	$364,870

APPENDIX G

THE CONFIGURATION OF THE APEC COURSE ENVIRONMENT

APPENDIX G

THE CONFIGURATION OF THE APEC COURSE ENVIRONMENT

Classroom

It is planned that the class size will be limited to 16 students which will break up into four work groups of four students each for specific lessons. The classroom will be furnished with eight two person tables, 17 chairs, two large white boards, one instructor's desk, one small utility table on wheels equipped with an overhead projector, a screen for projection, and a second small utility table equipped with a video monitor and VCR, The main classroom should be environmentally sound with better than average lightning. Floor space for this room should be 48 square meters. A floor plan layout is depicted on Exhibit G-1.

Breakout Rooms

Four breakout rooms will be required. Each room will be equipped with two personal computers, one printer, one small white board, one easel, two tables, and four chairs. Floor space for each of these rooms should be nine square meters. A floor plan layout is depicted on Exhibit G-2.

Laboratory

The laboratory should be the same size as the classroom. It will be furnished with a single-sided main distributing frame, two large laboratory work tables equipped with adequate voltages both AC and DC, power receptacles, and test jacks terminated on the single-sided main distributing frame. Also required are two large white boards and two equipment cabinets.

The laboratory experiments will require the following equipment:

Quantity	Description
3	Digital Transmission Test Set
3	Analog Transmission Test Set
3	Loop Simulators (R, L, & C)
3	Loop Test Set
3	Field Telephone Tester (But-Set)
1	Fiber Optic Splicing Set
1	Optical Reflectometer Test Set
1	Spool of Fiber (1 KM in length)
6	Portable Electric Wire-Wrapping Tool
12	Wire Cutter
12	Wire Plier (Flats)
12	Wire Insulation Stripper
12	Standard Screw Driver
12	Phillips Head Screw Driver
6	Electric Solder Iron & Solder
6	Tool Belt
2	Spool of 24 Gauge Paired Frame Wire
1	Lot of Electric Tape, Cord, Misc. Telephone Connectors, etc.
12	DTMF Telephone Set e/w Line Cable & Connector

Outdoor Installation Laboratory

A suitable area must be selected on a wall which houses the APC Telecom Laboratory. Install six utility poles (3 meters above ground). Install six building fixture attachments for the drop wire and six Network Interface Boxes along the outside wall. Use Exhibit G-1 for an isometric view of this arrangement. Install a 60 Pair PVC cable along the poles with a drop splice at each pole and terminate the cable on the Single Sided Main Distributing Frame in the APC Laboratory with appropriate lighting protectors.

General

All dimensions and exact installation details are subject to the building code and standards for the country in which this course will be taught. It is suggested that construction plans be developed by certified personnel once it is determined to implement the course.

All of the equipment items noted above are currently available in the countries visited. All training centers visited expressed an interest in participating with APEC and could make these facilities available with minor modifications.

FACILITY DESIGN OF ATC ENVIRONMENT

FLOOR PLAN
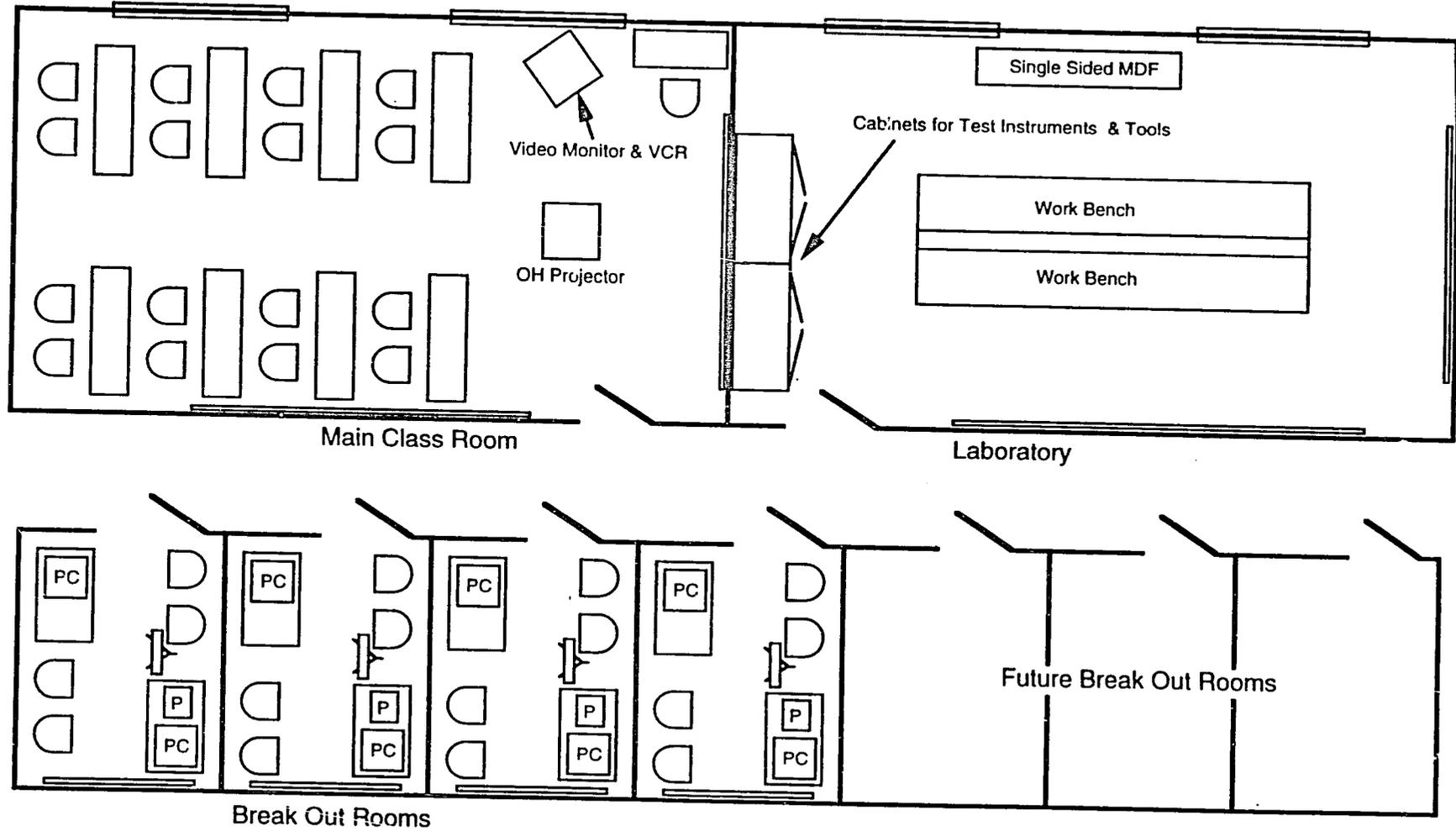
Video Monitor & VCR
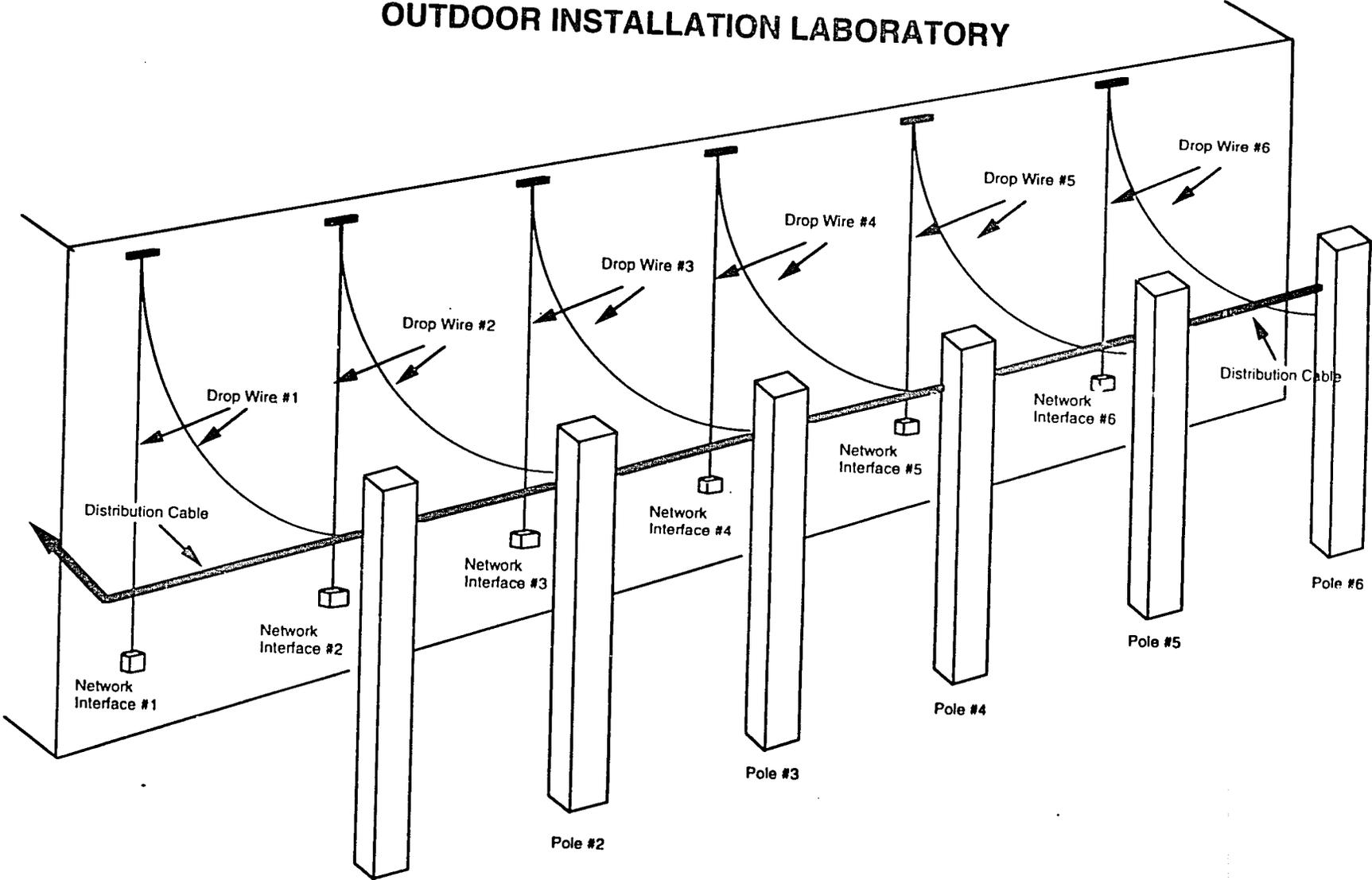
OH Projector

Main Class Room

Single Sided MDF

Cabinets for Test Instruments & Tools

Work Bench

Work Bench

Laboratory

PC

PC

PC

PC

P

PC

P

PC

P

PC

P

PC

Break Out Rooms

Future Break Out Rooms

FACILITY DESIGN OF ATC ENVIRONMENT
OUTDOOR INSTALLATION LABORATORY

Drop Wire #6

Drop Wire #5

Drop Wire #4

Drop Wire #3

Drop Wire #2

Drop Wire #1

Distribution Cable

To MDF
in Laboratory

Distribution Cable

Network
Interface #6

Network
Interface #5

Network
Interface #4

Network
Interface #3

Network
Interface #2

Network
Interface #1

Pole #6

Pole #5

Pole #4

Pole #3

Pole #2

APPENDIX H

LIST OF UNIVERSITIES AND VOCATIONAL SCHOOLS

APPENDIX H

LIST OF UNIVERSITIES AND VOCATIONAL SCHOOLS

The following schools were mentioned in the context of telecommunications training discussions in the Philippines, Indonesia, and Thailand. They do not represent all the learning institutes in the three countries. Due to the limited amount of time available for interviews, the only campuses visited are noted with an asterisk.

PHILIPPINES

*   Asian Institute of Management

*   University of the Philippines

University of the East

University of Santo Thomas

Don Bosco Technical College

Saint Louis University

Misamis Institute of Technology

Iligan Institute of Technology

Polytechnic University of the Philippines

New Era College

Napia Institute of Technology

Lyceum Of the Philippines

University of Fiati

INDONESIA

*   Sekolah Tinngi Manjemen Bandung (STMB)

*   STT Telkom

Universitas Widya Mataram

THAILAND

Asian Institute of Technology

King Mongkut Institute of Technology (KMIT)

Chulalongkorn University

Thammasat University

Chieng Mai University

Khornkan University

Lardkrabung Technical Institute

Rangsit University

Siam University

APPENDIX I

IDENTIFIED COURSE NEEDS

APPENDIX I

Identified Course Needs

Subject Area	Target Audience
• English language	all levels
• Privatization/control	executive and military
• Future trends in the telecommunications industry	executive and military
• General understanding of the telecommunications industry	management, executive, and military
• Strategic planning	management and executive
• Marketing	management and executive
• Sales	management and executive
• Finance	management and executive
• Consumer orientation and focus	all levels
• Service concepts	all levels
• Train the trainer	trainers
• Consulting skills	course developers
• Course development skills	course developers
• Use of media in training	course developers
• Standards	executives and management
• Manpower planning	executives and management

- Human resources development   executives and management

- Project planning   executives and management

- Project evaluation   executives and management

- Materials management   management

- Divestiture models for orderly transition to competitive environment   executives

- Basic management/supervisory training   management and supervisors

- Career planning   management and supervisors

- Job evaluation techniques   management and supervisors

- Telemarketing techniques   management and supervisors

- Communication/Negotiation techniques/conflict resolution   management and supervisors

- Transition from analogue to digital technology   management and supervisors