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Appraisal of the First Telecommunications Project (P&T) Burma

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CURRENCY EQUIVALENTS

US$1	=	K 6.24
K 1	=	US$.1603

MEASURES EQUIVALENT

1 kilometer = 0.621 statute mile

FISCAL YEAR

April 1 - March 31

LIST OF ABBREVIATIONS, ACRONYMS AND DEFINITIONS

Carrier	- A system providing a number of telephone circuits over one radio link, coaxial cable or pair of wires.
Channel	- Frequency band of a carrier system carrying telephone, telegraph or data signals.
Concentrator	- A device which enables a few lines to be shared by a number of subscribers.
Crossbar	- An automatic telephone switching system utilizing a connecting matrix with horizontal bars and vertical bridges.
DEL	- Direct exchange line.
Gentex	- Telegraph exchange switching system used by public telegraph service.
HF	- High frequency (3-30 MHz).
ITU	- International Telecommunications Union.
Lincompex	- A device to improve the quality of speech on an HF radiotelephone system.
Magneto	- A manual exchange where the signaling is done by a magneto operated generator.
MHz	- Megahertz.
Microwave	- Radio system working at frequencies above 300 MHz but normally applied to systems working at frequencies above 1,000 MHz.
Multiplex	- The equipment in a carrier system which shifts and stacks the different circuits in the frequency spectrum appropriate to the particular carrier system.
P&T	- Posts and Telecommunications Corporation.
STD	- Subscriber trunk dialing.
Telex	- Teleprinter exchange service for public subscribers.
UNDP	- United Nations Development Program.

BURMA

POSTS AND TELECOMMUNICATIONS CORPORATION

APPRAISAL OF A TELECOMMUNICATIONS PROJECT

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BURMA

POSTS AND TELECOMMUNICATIONS CORPORATION (P&T)

APPRAISAL OF THE FIRST TELECOMMUNICATIONS PROJECT

SUMMARY AND CONCLUSIONS

i. In May 1974 the Government of Burma requested IDA assistance in financing their FYs 1976-79 program of telecommunications development.

ii. The present very inadequate telecommunications service in Burma is one of the bottlenecks to the growth of output of productive sectors. With only one telephone per 1,000 of population, Burma ranks amongst the IDA countries with lowest levels of service. There is a large number of pending applications for new subscriber connections and substantial unsatisfied demand for trunk calls. The Posts and Telecommunications Corporation (P&T), which is responsible for all public telecommunications service in Burma, has drawn up a program for telecommunications development for the FYs 1976-79 which represents the first major effort to improve telecommunication services since the early 1960s when the only significant investment of the post war period was made for the Rangoon telephone system. The estimated cost of this program is K 193 (US$30.9) million with a foreign exchange component of K 131 (US$21.0) million.

iii. The four year project (FYs 1976-79) identified for the first Bank Group telecommunications lending operation in Burma would be this FYs 1976-79 development program of P&T. It would provide for 17,000 lines of local exchange equipment and associated cable facilities to partially meet the demand for new telephone connections, trunk transmission equipment and switching equipment to interconnect major centers and exchange and switching equipment to meet the demand for telex service. An IDA Credit of US$21.0 million is proposed to cover the foreign exchange component of this development program.

iv. All the equipment financed by the proposed Credit would be procured through international competitive bidding except in respect of goods valued at about US$380,000, or less than 2% of the Credit amount, where for reasons of economy and compatibility it is proposed that certain equipment be directly purchased from existing suppliers.

v. The project is the urgent, minimum level of investment that Burma should undertake to lessen the current handicaps to economic development. The project is the least cost method of achieving service objectives and is technically and financially sound. The minimum estimate of internal economic return is about 22%. Sensitivity analysis was conducted and even with an unfavorable combination of main parameters, the rate of return would not be less than 15%.

vi. The Posts and Telecommunications Corporation is a well managed entity which will be able to execute the project. Weaknesses in their training program and accounting system will be remedied during the project with the assistance of consultants.

vii. The borrower would be the Government of Burma which would relend the funds to the beneficiary, the Posts and Telecommunications Corporation (P&T) for a term of 24 years, including a four year grace period, and at an annual interest rate of 8½%.

viii. The project is suitable for an IDA Credit of US$21.0 million.

BURMA

POSTS AND TELECOMMUNICATIONS CORPORATION (P&T)

APPRAISAL OF THE FIRST TELECOMMUNICATIONS PROJECT

1. INTRODUCTION

1.01 In May 1974 the Government of Burma requested IDA assistance in financing the foreign exchange costs of its 1976-79 program of telecommunications development.

1.02 The 4-year project (FYs 1976-79) proposed for Bank Group lending would be the first telecommunications lending operation in Burma and would comprise P&T's development program for that period. The project aims to meet part of the urgent demand for new telephone connections; to improve the service to be offered to existing and new subscribers by replacing worn-out equipment and by expanding the trunk network; and to improve telegraph services by up-grading the public telegram service and by introducing a national telex service. The estimated cost of the project is K 193 (US$30.9) million with a foreign exchange component of K 131 (US$21.0) million. An IDA Credit of US$21.0 million is proposed to cover this foreign exchange component.

1.03 The Government of Burma would be the borrower and relend the proceeds of the Credit to the Posts and Telecommunications Corporation (P&T) at 8½% for a term of 24 years, including a four year grace period. P&T, the beneficiary of the Credit, is responsible for all public telecommunications services within Burma and for international services to other countries.

1.04 The report is based on information provided by P&T and on the findings of G.E. Hams, R.C. Mitchell, M. Yokoi, and T. Miyawaki who visited Burma in November and December 1974.

2. THE ECONOMY AND THE SECTOR

The Economy

2.01 The Union of Burma comprises Burma proper, administered directly by the Central Government and the States of Kachin, Shan, Kayah, and Karen, each with its own State Government. It is bounded by India, Bangladesh and the Bay of Bengal on the north and west; and China, Laos and Thailand on the east. Seventy percent of the population lives in the valleys and plains along the Irrawaddy River, its tributary, the Chindwin, the many river branches in the Irrawaddy delta and the lower Salween River.

2.02 The economy depends primarily on the agricultural and forestry sectors but mineral and oil resources are being exploited and have high potential. Much economic activity is concerned with the trade and movement of primary products. Agricultural produce of the delta and of central Burma is moved for consumption in the cities, towns and less fertile areas of the country and for export via Rangoon and Bassein. Forestry products, minerals and oil are moved from their sources to the Rangoon area for processing, redistribution of refined products or export.

2.03 The Burmese economy is operating below its potential. Improved performance requires not only a higher level of investment with immediate emphasis on quick-yielding projects but also better management at all levels and in all fields. Good telecommunication services are important for improving the operational efficiency of all productive and service sectors. Because of this, and the contribution that it can make in maintenance of national unity, the Burmese Government places high priority on improved telecommunications.

The Telecommunications Sector

2.04 Prior to 1972, telecommunication services were the responsibility of a Department of State, the Posts and Telecommunications Department. In response to a directive issued by the Chairman of the Revolutionary Council, P&T was established in March 1972 as a Government-owned corporation under the policy and direction of the Ministry of Transport and Communications, and a smaller department was retained within the Ministry of Transport and Communications to handle governmental responsibilities (see para. 2.05 below). This organization of the sector is in line with world trends and is satisfactory.

2.05 P&T is responsible for the provision and operation of all local, trunk and international public telecommunications services in Burma. The small Posts and Telecommunications Department of the Government is responsible for giving advice to the Minister on national telecommunications policy; for providing liaison with international bodies such as the ITU; and for exercising licensing functions for home and commercial radio receivers.

2.06 P&T is required to operate in a commercial manner in providing and operating Burma's telecommunications services. Its management has adequate autonomy and Government control of P&T is limited to policy direction from the Minister of Transport and Communication; to the review of P&T's development plans and annual budgetary estimates by the Ministry of Planning and Finance and their approval by Parliament; approval of tariffs by the Minister of Transport and Communications and their tabling for consideration of the Council of Ministers; selection of senior management staff by the Public Services Selection and Training Board; and responsibility for auditing of P&T's accounts.

2.07 P&T's corporate status will be formalized during 1975 with the issuing by the Ministry of Transport and Communications of a notification under "The Law Conferring Powers for the Construction of a Socialist Economic System, 1965". The draft notification made available to the Association adequately preserves P&T's present degree of autonomy.

Existing Telecommunications Facilities

2.08 Burma, with 1 telephone per 1,000 population, ranks very low even amongst the IDA countries with poor levels of service (see Annex 1). As of December 31, 1973, 22,970 direct connections (DELs) were provided on 136 exchanges. Further basic data on the existing services are given in Annex 2 and existing facilities are described in the following paragraphs and in Annex 3. Only in Rangoon are there relatively modern automatic facilities but extension has fallen well short of demand. Elsewhere only manual service is available using obsolete and generally over-age plant. The trunk network is old, unreliable and its capacity inadequate.

Local Telephone Service

2.09 Rangoon is served by a network of five automatic exchanges which use an earlier design crossbar switching system manufactured by L. M. Ericsson of Sweden, the ARF 101 system. The network has not been extended for more than a decade and although it has been well maintained, the central city exchanges are overloaded in the busy periods as usage of the limited available services has risen beyond design levels. Excessive congestion is a recurrent feature causing poor service. As of December 31, 1973 Rangoon had 15,479 connected subscribers (DEL's) and the waiting list stood at 4,940.

2.10 Manual service is provided in 131 other towns and at December 31, 1973 there were 7,491 DELs. The larger of these exchanges and distribution networks, which serve the 12 most important towns, are old and unreliable, the latest of these being 25 years old and 4 date from before World War II. These twelve exchanges provided 3,523 DELs and had a waiting list of 1,002. The remaining 119 towns are served by small magneto exchanges of 100-line capacity or less which vary in vintage from pre-World War II to recent years.

Trunk Telephone Service

2.11 The present trunk network is based principally on old pole lines which generally have been exploited with carrier systems to the limited extent permitted by their design. An old 24-channel vacuum tube type microwave radio system connects Rangoon and Bassein; however the system has served its economic life and procurement of spares is difficult. Akyab is connected to the national network by one HF radio circuit only.

2.12 The capacity of the network is inadequate to meet the calling requirements of the present customers and delays are normal and can often

exceed one day. Transmission quality is poor due to the age of plant and route breakdowns are frequent because of deterioration due to age and also because of theft of copper wire from pole routes -- a present day problem common throughout the developing world. The service is thus poor and unreliable.

International Telephone Service

2.13 International telephone services are operated from the Rangoon manual switchboard which is located in the Maungtaulay exchange building and has four international positions. HF radio schedules are maintained with Hong Kong, Tokyo, Pyongyang, Calcutta, Karachi, Dacca, Singapore and Shanghai. Service is largely restricted to the Rangoon area due to the poor quality of the internal long distance network and the fact that the international circuits are operated by HF radio. The present traffic level is very low indeed, amounting in total to about 10 calls a day. Two circuits to Tokyo and Hong Kong have recently been equipped with Lincompex equipment which improves somewhat the quality of telephone service on HF radio circuits. There is no doubt that Burma would benefit considerably from the improved telephone and telegraph contact with the rest of the world that would result from provision of a satellite earth station. However, the investment of approximately US$5.0 million is at present beyond P&T's limited financial resources. Hence P&T must make do for a time with minor improvements to existing facilities. P&T might advance the provision of an earth station should it become possible for them to arrange suitable financing for this work.

Telegraph and Telex Services

2.14 There are a total of 283 public telegraph offices throughout the country and transmission of messages is largely over land line Morse sounder circuits or through use of HF radio links. There is a total of 10 teleprinter circuits operating between main offices. Overseas telegraph services operate via a main route to Colombo which is kept open through the day and at fixed time schedules to Calcutta, Dacca, Karachi, Bangkok, Hong Kong, Tokyo, Shanghai, Manila, Pyongyang. Automatic error correcting facilities are only available on the Hong Kong link. Mutilations of the text are therefore frequent and quality of service poor.

2.15 Telex service is restricted to international service originating and terminating in the City of Rangoon where a 50-line concentrator with three operating positions is installed. At present there are 30 subscribers; service is available only via Hong Kong to which three outlets with automatic error correcting facilities are available. Service standards appear reasonable.

3. THE PROGRAM AND THE PROJECT

The Program

3.01 The program of expansion in the period FYs 1976-80 recommences

development of the Burmese telecommunications network which, other than for the installation of modern automatic telephone facilities in Rangoon in the period 1958-1964, has remained virtually static since World War II. It is a modest program in view of Burma's present resource limitations and consists of

(a) P&T's ongoing works which continue through FY78 and essentially include provision of about 1,000 line units of manual telephone exchange equipment;

(b) the project consisting of the FY1976-79 development program for the modernization and expansion of the basic telecommunications facilities; and

(c) preliminary works in FY80 for the next development program.

The program for FY1976-80 is estimated to cost K 315 (US$50) million with a foreign exchange component equivalent to K 210 (US$34) million. Annual and total capital expenditures are shown in Annex 4.

The Project

3.02 The proposed project is the P&T's development program covering the period FY1976-79 and includes the following items:

(a) Installation of 17,000 line units of local automatic telephone exchange equipment including replacement of 4,300 line units now in existing manual exchanges in 12 cities thus providing for a net additional capacity of 12,700 line units;

(b) installation of cable and associated distribution network equipment to enable connection of about 12,000 new DELs and for upgrading the lines of the 3,400 existing subscribers connected to manual exchanges which are being converted to automatic working;

(c) provision of subscriber apparatus including 22,750 automatic telephone instruments;

(d) installation of trunk transmission facilities, including microwave radio systems and associated multiplex equipment interconnecting the major centers of Rangoon, Moulmein, Mandalay, Bassein and important centers along the Irrawaddy River; low capacity radio systems for spur routes to the provincial centers of Akyab and Tavoy; and open wire carrier systems for existing pole routes;

(e) installation of automatic trunk switching centers for Rangoon and Mandalay which will provide STD to all centers having automatic service and addition of 13 manual trunk exchanges at key centers in the network to give improved manual services from and to other communities;

(f) installation of 120 telex and gentex exchange lines and 80 telex and subscriber units; and

(g) provision of construction vehicles and assorted machines such as borers for cable crossings of roadways for use in local distribution networks and miscellaneous equipment ancillaries to improve productivity in operation of telephone and telegraph services.

Further details of the project are given in Annex 5.

Cost of the Project

3.03 The estimated cost of the project summarized below is K 193 million including a foreign exchange component of K 131 (US$21.0) million. Details of the project including annual expenditures are given in Annex 4.

	K million			US$ million		
	Local	Foreign	Total	Local	Foreign	Total
Local Telephone Facilities						
Exchange equipment	5.68	24.03	29.71	0.91	3.85	4.76
Distribution networks	10.32	14.96	25.28	1.65	2.40	4.05
Subscriber apparatus	0.52	2.49	3.01	0.08	0.40	0.48
Trunk Line Facilities						
Switching	1.56	12.06	13.62	0.25	1.93	2.18
Trunk routes	9.65	46.17	55.82	1.55	7.40	8.95
Telegraph & Telex						
Switching	0.22	1.41	1.63	0.04	0.22	0.26
Teleprinters	0.28	1.67	1.95	0.04	0.27	0.31
Buildings	21.11	-	21.11	3.38	-	3.38
Vehicles, Construction Machines & Misc. Equipment	2.91	1.60	4.51	0.46	0.26	0.72
Sub-total	52.25	104.39	156.64	8.36	16.73	25.09
Contingencies						
Price	9.36	25.33	34.69	1.50	4.06	5.56
Physical	0.34	1.32	1.66	0.06	0.21	0.27
PROJECT TOTAL	62.0	131.0	193.0	9.9	21.0	30.9

3.04 The project cost estimates for equipment to be imported are based on recent quotes obtained by P&T from suppliers of equipment and services; and on information on world price levels provided to them by visiting ITU missions. For local expenditures, they are based on prevailing civil works, buildings and staff costs and customs charges. The estimates are reasonable.

Contingencies

3.05 Price contingencies provided for in the estimates of total project cost amount to 24% of foreign exchange costs and 18% local costs. The year-by-year allowances on foreign exchange costs are FY76, 7%; FY77, 16%; FY78, 25%; and FY79, 33%. These allowances should be ample since in telecommunications technological developments continue to be a cost reducing factor and the competition between suppliers is high. Moreover, the cost of the principal raw material, copper, has rapidly returned from the high levels of 1974 to a reasonable relationship with those costs previously prevailing. Fuel costs have only a small direct impact on the manufacture of telecommunication equipment.

3.06 A physical contingency provision has been allowed to cover uncertainty as to the trunk traffic increase which will occur when higher standard service is offered. It amounts to 5% of both the foreign exchange and local costs of the traffic dependent component of the trunk service items in the project. No other physical contingencies have been allowed for. Review of P&T's proposals carried out by the mission in conjunction with the ITU experts indicated that the quantities for local switching and other trunk items have been estimated accurately, and for the distribution networks, where a large number of component works are involved, deviations from individual estimates will tend to balance in the aggregate.

Items for IDA Financing

3.07 An IDA Credit of US$21.0 million is proposed which would finance 100% of the foreign exchange cost of the project and would be allocated between the different components in the amounts shown under foreign costs in the table in para. 3.03.

Procurement

3.08 All of the equipment to be financed by the credit would be procured through international competitive bidding in accordance with Bank Group guidelines, with the exception of the following, estimated to cost approximately US$380,000 or less than 2% of the credit amount, where it is proposed that equipment be directly purchased without competitive bidding:

(a) 1,000 lines of switching equipment to complete the 10,000 line unit serving the center of Rangoon.

(b) equipment to enable the existing automatic equipment in Rangoon to interwork with the new equipment to be obtained under international competitive bidding; and

(c) cable network accessories of the type familiar to P&T staff and which have proved themselves in very wet and humid conditions, at an estimated total cost of US$100,000. P&T does not have the resources at present to carry out quickly the time-consuming task of testing alternative products for suitability under Burmese conditions.

Disbursements

3.09 The proposed IDA Credit would be disbursed against the CIF cost of imported equipment and materials and the foreign exchange costs of services and training. Annex 6 shows estimated disbursements from the proposed Credit. As the project is part of a continuing investment program, it is proposed that any savings be made available, after consultation with IDA, for the purchase of additional items of the same type.

Execution

3.10 P&T has the capability of planning, designing and executing the project. P&T's staff will install all local distribution networks, subscribers' apparatus and open wire carrier sets. P&T's staff will assist in the installation of the long distance transmission facilities, telephone exchanges and telex exchange under supervision of the supplier's engineers.

3.11 P&T has sought UNDP/ITU assistance for the provision of experts to assist principally with procurement of switching, telegraph, radio relay and multiplex equipment. In addition, the experts would provide relief to P&T in the early years of the project period in meeting the peak work load for detailed planning. UNDP funds have been allocated and an agreement is now being finalized; to shorten lead-time, ITU has already commenced recruitment of the experts.

4. JUSTIFICATION OF THE PROJECT

4.01 The country economic reports on Burma stress the importance of stimulating output, of improving efficiency in most fields and of encouraging enterprise. The 1973 economic report (No. 168a-BA) points to the inadequacy of telecommunications as one of the bottlenecks to the growth of output of productive sectors. Investment in telecommunications facilities has been almost totally neglected and the present service is very poor (see Section 2) being comparable to that existing in the developed countries at the start of this century when telephones were first being used (see Annex 8).

4.02 The project is a balanced allocation of the limited resources available to P&T and provides the minimum level of development necessary to adequately remove the bottleneck to growth. It provides services connecting key distribution and production centers in the main production area of the country from the Lower Burma (Rangoon, Bassein, Moulmein) to the upper dry zone (Mandalay), along the Irrawaddy River (Prome, Magwe). Rice production and distribution are concentrated in this area and vital transportation activities and important industrial developments are carried on along the Irrawaddy River. Sufficient investment is allocated to upgrading the service given to existing subscribers by replacing worn out and outdated exchange equipment and line plant and by augmenting the traffic carrying capacity of the network and the remainder is allocated to partially meeting the demand for new connections. The project forms an integrated development of the network in accordance with a sound national telecommunication plan (see Para. 4.15).

4.03 The realization of objectives in agricultural, commercial, industrial, administrative or social fields requires coordination of a number of individual human efforts and the marshalling of several inputs at dispersed locations. Telecommunications are vital for achieving such coordination efficiently. Telecommunications overcome the impediment of distance and dispersion of operations and permit the fast personal contact and information interchange which is indispensable to management in a present day economy. This in turn leads to increased productivity and lower capital requirements and operating costs in all sectors.

4.04 Poor telecommunications service in Burma is undoubtedly a factor in the management problems now being experienced throughout the country in production; in marketing; and in commodity distribution. This is shown clearly in Annex 7 which records data obtained from interviews of the senior management of public corporations with different types of large scale operations of consequence for the Burmese economy. For example, amongst other

similar cases it shows that transport sector management is unable to use its limited capacity (boat, trucks, etc.) efficiently and, in the agriculture sector, effective allocation of tractors in cooperative undertakings to fit with daily needs is made very difficult and even the procurement of spare parts and fuel is often delayed. The Burmese Government has recognized that the national benefits from improved efficiency in enterprises of all types will be considerable and therefore gives high priority to this investment.

Demand for Telecommunications Services

Local Telephone Service

4.05 Because of the low level of investment, P&T has been able to provide only 3,500 telephone connections over the last five years, bringing the total of DELs at December 31, 1973 to 22,970. Though potential users have been actively discouraged from seeking service, the waiting list, maintained for the 13 largest towns only, has grown at about 8% per annum and as of December 31, 1973 stood at 5,942 (4,940 in Rangoon and 1,002 in the remaining 12 towns). Even with future growth at this highly damped rate, demand (DELs plus waiting applicants) at the end of FY79 would be 44,000 DELs. The number of DELs provided at March 31, 1979 is expected to reach 36,200 under the project; leaving a waiting list of about 8,000 (see Annex 8). But experience in other developing countries indicates that the growth of demand will be much greater and a more likely estimate would place unsatisfied demand at at least 28,000 (see Annex 8). The scale of provision is therefore very modest.

4.06 The 7,200 lines to be provided in Rangoon will cater partially for outstanding demand in the capital and will bring improved service to existing customers by removing some of the overload resulting from excessive usage of the limited number of services now available.

4.07 Outside of Rangoon the remaining 9,800 lines of the project are spread as single exchange units serving the next 12 largest cities. The project will replace the present old and unreliable manual facilities with automatic service and provide for a limited amount of growth.

Trunk Service

4.08 The present trunk network is based principally on very old pole routes which have been exploited to their maximum capacity. Delays on trunk calls have been increasing because of lack of sufficient circuits for traffic and increasing outages due to age of the line plant and to copper wire thefts. As a result traffic carried has been static or declining over recent years (see Attachment to Annex 7). If the proposed replacement of the backbone -- Mandalay-Rangoon-Moulmein route -- of the trunk network is not carried out as scheduled, this deterioration of service will continue with the possibility that a complete breakdown could occur within a few years. An example is the current Moulmein-Tavoy route which is rapidly becoming unworkable.

4.09 The expansions required on the main routes in 1979 to provide good quality trunk service to existing and new subscribers have been estimated on the basis of experience under similar conditions within the region and are reasonable. The table at the end of this paragraph shows the number of circuits now existing and those required for public traffic in 1979. In addition a further increase in capacity is required for future growth and for other needs e.g. for leased lines, radio program lines and telegraph bearers. The figures in the table highlight the acute paucity of circuits at present.

	Existing	Required 1979
Rangoon-Mandalay	21	170
Rangoon-Prome	9	67
Rangoon-Pegu	4	59
Rangoon-Bassein	11	89
Rangoon-Moulmein	12	78
Mandalay-Meiktila	6	54
Mandalay-Magwe	6	68

4.10 In addition to improving the main routes as shown in the preceding paragraph improved service is also urgently required for Akyab and Tavoy -- important towns which serve as focuses for the economic activities in two regions. At present Akyab is connected by only one circuit provided through use of HF radio. The service is poor because of the inadequate traffic handling capacity and the inherent transmission inadequacy of HF radio working. Service to Tavoy is also very poor because the old pole route from Moulmein to Tavoy is almost continuously unworkable.

4.11 Microwave radio routes connecting Rangoon to Mandalay, Moulmein and Bassein and serving main centers in between, particularly those where automatic exchanges are being provided in the project, have been selected as the least cost method of providing the capacity required in this backbone of the Burmese trunk network. Low capacity radio spur routes will connect Akyab (12-60 channels depending on detailed route survey) and Tavoy (6-12 channels) to the new network which will give significantly improved service to these more remote centers at minimum cost and will avoid works in inacessible or insecure areas.

4.12 Automatic trunk switching centers to be provided in Rangoon and Mandalay will enable STD to be provided between automatic exchanges on the microwave radio routes. New manual trunk exchanges will be located at 10 provincial centers providing improved access to the new network for the hinterland they serve.

4.13 The improved trunk network will bring additional benefits through the increased capacity, the quality of transmission and the reliability of service then available. Apart from providing improved telephone service to the public, it will be possible to relay at low cost programs from Rangoon

to regional centers for broadcasts using standard medium frequency waves. The major part of the Burmese population will then benefit from broadcasts of good strength and fidelity which can be received with low cost receivers. P&T will also be able to provide leased lines for Government authorities (railways, airline, security, etc.) and other large enterprises where required for efficient operation, avoiding the alternative of separate more costly investments for inferior facilities.

4.14 The new trunk network also provides the reliability needed for expansion of machine-based telegraphy. The small investment included in the project for telegraphy will give a significant improvement in the present public telegram service and will lay the foundation for its further development. National telex which will be introduced on a small scale will assist management of the large commercial enterprises.

Least-Cost Solution

4.15 Despite the fact that no significant investment has been made for more than a decade in development of the Burmese network, P&T's staff has kept abreast of world developments and has prepared a master plan for future development of their national network. P&T's ideas have been reviewed by ITU experts and the resulting plans have enabled the project to be designed to meet the urgent immediate needs and also to lay the basis for progressive development of an efficient and economical network, serving the whole nation.

4.16 The facilities to be provided and the engineering methods proposed were determined by P&T after discussions with ITU experts and the Association's identification mission. They were reviewed during the appraisal in collaboration with an ITU mission of three experts who were in Rangoon at that time to finalize the UNDP/ITU telecommunications training and advisory projects and found to be least-cost solutions for meeting the service objectives.

Rate of Return

4.17 The internal rate of return on the project, defined as the discount rate which equalizes the stream of expected revenues attributable to the project with the capital and operating costs, excluding taxes, is 22% (Annex 9). If the foreign exchange component is shadow priced, the rate of return would decrease to 15%. Sensitivity analysis was conducted and even with an unfavorable combination of main parameters, the rate of return would decrease from 22% to not less than 15%.

4.18 Since all the above internal rates of return exceed the opportunity cost of capital in Burma, the foregoing indicates that, on average, the prices subscribers are asked to pay will exceed the long run marginal cost of telephone service. Normally this would imply that subscribers are able to demonstrate, by their willingness to pay, the benefits they receive from telecommunication facilities and therefore the justification of investments in the sector. In the case of Burma, where 60% of the users are Government subscribers, the use of payments as an economic measure may not be acceptable in all cases. However, the Government of Burma has directed that publicly-owned enterprises should, within the next few years, become profit-oriented in which case the role of price in signaling the justification of investment in telecommunications will become increasingly significant. The kind of benefits that result from telecommunications for such enterprises are summarized in Annex 7, which describes the series of interviews with directors

of major Government business enterprises and provides a qualitative background to the internal rate of return calculation. Over and above these privately perceived benefits however there are external benefits which accrue to parties other than those who pay directly for use of the facilities.

5. THE BENEFICIARY

5.01 P&T, the beneficiary of the proposed credit, is responsible for the provision and operation of all public telecommunication services in Burma. The responsibilities and relationship to Government are set out in paragraphs 2.05 and 2.06.

Organization and Management

5.02 Since March 1972 when P&T changed from its previous position of a Government department to that of a Government owned corporation, P&T's management has been reorganizing its operation to accord with the new status so as to function effectively on commercial lines (see para. 2.06).

5.03 Accordingly a new financial relationship with the Government has been defined to place them on a commercial footing and steps have been taken within P&T to establish an appropriate commercial accounting system (see para. 5.07). P&T's organizational structure basically follows conventional lines and is satisfactory (see Chart WB9506). However, minor modifications should be considered in order to meet the requirements of the growing operations. Because of the insignificant volume of expansion works in the last decade, no separate group exists to plan, supervise and execute these construction activities. Such a group will be required to control these efforts in the future when larger expansion programs will be required. Also the financial and accounting responsibilities are currently placed in different organizational units. These functions are complementary and should be combined in one unit for effective functioning. P&T's management is aware of these two organizational weaknesses which presently, due to the small scale of their operations, are not creating any major difficulties. P&T should make the necessary changes at some future date in line with their expanding operations and requirements.

5.04 P&T has been organized and has been functioning during the past two years with the necessary degree of autonomy and is in a position to manage its operations on an efficient commercial basis. Its senior management staff is competent and adequate to discharge its responsibilities.

Technical Staff and Training

5.05 At present, P&T has 4,200 staff employed on telecommunications. Their professional engineers (about 50 in number) are capable and have kept abreast of current technical progress through overseas training and visits sponsored under various aid programs. Their technicians and skilled staff

have done a commendable job in keeping their old plant operative and in maintaining the more modern switching equipment in the Rangoon network in good condition.

5.06 P&T has a small technical training school which has been providing some simple basic technical training. The visiting ITU mission was also finalizing a US$1 million UNDP/ITU project, included in the UNDP indicative program for Burma, aimed at upgrading this school to meet the staff requirements necessary for the proposed expansion of the Burma network. The time schedule prepared for this project has been designed so that training facilities are ready in time to re-train the craftsmen and technicians needed for project execution and to operate the proposed expanded and modernized network. Formalities between the Government of Burma and UNDP are at an advanced stage and it is expected that the project leader will commence work in Burma before the end of 1975 as planned.

Accounting

5.07 P&T's accounting system is on an accrual basis and provides for a segregation of corporate activities between Posts and Telecommunications operations. An effective record of plant investment, supported by a recent inventory, is maintained. However, the procedures and formats under which the accounting data are recorded and compiled into final accounts have been carried over from the cash system of accounting utilized prior to 1972. These procedures should be revised to fit into the accrual accounting system, meet current data requirements of management and make possible the utilization of accounting machines and computers. P&T and the Government of Burma are aware of the accounting system deficiencies and have employed a new Chief Accounts Officer to provide the direction and staff leadership required. They have also obtained the services of a systems consultant through Colombo Plan Assistance for a one year period commencing in January 1975. P&T plans to complete the accounting system review and have the improved system in operation for the FY77. It was agreed during negotiations that necessary improvements of the accounting system will have been instituted for the accounts of FY77.

5.08 Billing and collection procedures for non-government subscribers are satisfactory. Collections of Government accounts have not been effective and large outstanding accounts exist. At September 30, 1974, K 14.1 million or 78% of the outstanding accounts receivable were owed by Government subscribers, representing approximate 13 months' billings to this class of subscriber. Of this amount K 9.5 million was for services prior to September 30, 1973. The Ministry of Finance and Planning assured the mission that the Government of Burma and P&T would agree to a plan to settle the Government's old outstanding accounts and that the Government would assure the timely payment of current billings. During negotiations it was agreed that in the future all Government subscribers will pay current billings on a timely basis and will clear accumulated arrears with all reasonable accounts being paid by September 30, 1977.

Audit

5.09 Audits of all Government entities and corporations are required by the Constitution to be performed by the Central Audit and Inspection Office. The Central Audit and Inspection Office has a division which is devoted to the conduct of commercial type audits of Government corporations. This division is composed of commercially trained accountants headed by chartered accountants who are experienced in the conduct of commercial audits and, it appears, should be able to perform an audit of P&T that will satisfy Association requirements. There are no commercial accounting firms of any appreciable size doing business in Burma. During negotiations it was agreed that an annual audit of P&T shall be performed by the Central Audit and Inspection Office and that audited financial statements including the auditors' opinion shall be transmitted to the Association within six months after the close of the fiscal year.

Tariffs

5.10 A summary of the current telecommunications tariff is provided in Annex 10. Although they have not been revised since the early 1960s the tariffs are generally comparable with the tariffs in many other developing countries. Monthly rental of K 20 (US$3.21) and the trunk call charge for shorter distance calls are comparatively on the high side while the longer distance trunk call charges and, to a lesser extent, the local call charges are on the low side. The revenue per DEL is also somewhat low at US$138 per annum due primarily to the poor trunk service and low trunk usage.

5.11 The levels of the tariffs are presently adequate and have produced acceptable rates of return on past operations and have generated adequate funds to meet the limited past expansion programs. Since this condition is expected to continue through FY77 and telecommunication services are currently so poor as to make tariff increases extremely unpopular and difficult to justify, no increases in tariffs have been proposed until FY78. The 1978 tariff increase, estimated at K 5.4 million (36% of local telephone revenues) is proposed for the telephone rental and local call charge tariffs. The second tariff increase proposed for 1979, coincident with the initiation of STD, would reflect a rate structure change for trunk calls. This tariff increase is estimated to increase trunk revenues K 9.7 million (57%) in FY80, the first full year of its adoption. Tariff increases to generate these revenues are needed for earning an adequate rate of return (see para. 6.12) and for the financial plan (see para. 6.06).

5.12 The tariff structure generally follows conventional practices except for two departures - namely, a flat rate billing has been adopted for billing Government subscribers and trunk call charges level out for distances over 50 miles.

5.13 Government subscribers are charged a rental of K 37.50 per month compared to K 20 for non-government subscribers but are not charged for the

number of local calls made, the difference in rental in effect provides compensation to P&T for 175 calls per month which is consistent with the average number of calls currently experienced by metered subscribers. A test of Government subscribers, however, has shown a significantly higher calling rate. The Government and P&T agree that this practice is not desirable since it encourages high usage and is one of the reasons for the congestion being experienced in the local network. This practice also will be incompatible with pulse metering to be initiated with the introduction of STD. P&T plans to discontinue this flat rate billing practice as soon as the billing unit in the P&T is in a position to handle the additional work involved. During negotiations it was agreed that P&T will eliminate flat rate billing of Government subscribers as soon as possible but not later than the beginning of FY77.

5.14 The current trunk tariff provides call charges for calls of distances of 0-10 miles, 10-25 miles, 25-50 miles and over 50 miles. The tariff structure provides for no rate steps for calls of distances over 50 miles which is inequitable and not conventional. The tariff proposed for initiation coincident with STD operation would create rate steps for 0-25, 26-50, 51-100, 101-200, 201-400 and over 400 miles with a lower than the present charge for the shorter distances and a higher charge for the longer distances. With the initiation of STD, a lower late-night tariff should also be established.

Taxes and Insurance

5.15 P&T is required to pay normal custom duties on imported materials and equipment and is also subject to an income tax at the rate of 50%.

5.16 P&T, in the past, has not maintained property damage insurance coverage on its assets except for vehicles. P&T's assets have a wide geographic distribution and therefore present a limited concentration of risk. Experience elsewhere has confirmed that risks of significant damage to telecommunications plant are minimal and rehabilitation is comparably not expensive except in the event of a national catastrophe which is normally not included in the insurance coverage. P&T management however stated that they would review this position and take action if adequate protection could be obtained at a reasonable cost. Additional insurance, if desired, would have to be arranged through the Government insurance department.

6. FINANCES

Background

6.01 Prior to 1972 P&T as a department of Government was required to deposit all receipts from operations in the Union Consolidated Fund and received all necessary operating funds and expansion funds (which

were extremely limited) from Government. In 1972 P&T was reorganized as a Government Corporation and provided with a degree of autonomy to handle its operations (see para. 5.04). Under this new organization P&T is required to deposit all receipts in the Union Consolidated Fund which are then credited to P&T's account and is allowed to withdraw funds for operations and systems expansion in accordance with its approved plan. The consolidated fund therefore functions in the same manner as a commercial bank account. Fund requirements in excess of the above must be borrowed from the People's Bank or other designated authority and serviced on commercial terms. No equity funding will be provided by Government.

Postal Operations

6.02 P&T in addition to its telecommunications services operates the postal services for Burma. Postal operations have made a small profit in most past years and P&T and the Government of Burma intend to continue to maintain a postal tariff which will cover postal expenditures and do not intend to use telecommunications receipts to support postal operations or development programs. During negotiations it was agreed that funds from telecommunications operations will not be made available for postal operations or development until all financing requirements for telecommunications have been met.

Past Performance

6.03 Commercial accounting practices were utilized for the first time for the period October 1, 1973 to March 31, 1974. P&T's telecommunications rate of return after taxes on net plant for this six month period was the equivalent of the annual rate of 12% and its operating ratio (excluding income taxes) was 63%. P&T had no long-term debt at March 31, 1974. These results are satisfactory.

Present Financial Position

6.04 A summary of the financial position of P&T's telecommunication operations as of March 31, 1974 is given below. A detailed statement is shown in Annex 11.

	K	US$	%
	(in millions)		
Assets			
Fixed Assets			
Gross plant in service	105.0	16.8	
Less: Accumulated depreciation	62.6	10.0	
Net plant in service	42.4	6.8	55
Net Current Assets	34.5	5.5	45
Total Assets	76.9	12.3	100
Liabilities			
Equity	73.2	11.7	95
Other Liabilities	3.7	.6	5
Total Liabilities	76.9	12.3	100

6.05 P&T has recently completed an inventory of its plant and has established the original cost and depreciated value based on expected lives. No effort has been made to revalue the assets to reflect inflationary trends or different currency parities. Most of the assets except for the telephone plant in Rangoon are old and obsolete and provide very poor quality service, also these obsolete assets bear little similarity to the type of modern plant which would be utilized if this old plant were to be replaced. Also the gross and net values as shown in para. 6.04 are reasonably close per DEL to estimated current values in other projections. Since no significant difference in value would be produced by revaluation, the distortion to the rate of return would be minimal. The present values of gross and net plant are therefore acceptable.

Financing Plan

6.06 Source and Application of Funds Statement for telecommunications operations is presented in Annex 12. A summary of the telecommunications financing plan for the project, FY1976-79 is shown below:

	K	US$	%
	(in millions)		
Requirements			
Construction program			
Ongoing works	14.4	2.3	7
Proposed project	190.2	30.5	86
Future program	15.5	2.5	7
Total requirements	220.1	35.3	100
Sources			
Internal generation	62.8	10.1	
Less: Debt service	18.9	3.0	
Net internal generation	43.9	7.1	20
Decrease in working capital	16.0	2.6	7
Proposed IDA Credit*	128.5	20.6	58
Local borrowing	20.0	3.2	9
Customer deposits and provident fund contributions	.9	.1	1
Future program financing	10.8	1.7	5
Total sources	220.1	35.3	100

*The total proposed Credit is US$21.0 (K 131.0) millions of which US$0.4 (K 2.5) millions of retention payments will be disbursed during FY80.

6.07 The above financing plan estimates that internal generation and deposits will produce 21% of the fund requirement. An additional 7% will also become available by the reduction of the abnormally high working capital position. A further 58% of the total requirement will be provided by the proposed IDA Credit. The balance of 9% for the current program will be covered by local borrowing from the People's Bank on commercial lending terms in accordance with the Government decree on funds for Government corporations.

6.08 The financial projections assume that the proceeds of the Credit will be relent by Government to P&T for a period of 24 years including a four year grace period with an annual interest rate of 8½%. A subsidiary loan agreement incorporating these terms and providing that the exchange risk should be borne by P&T will be a condition of effectiveness of the proposed Credit. As a result of this IDA Credit and local bank financing P&T's debt-equity ratio will change from 0/100 at March 31, 1974 to 62/38 at March 31, 1979. Internal generation will cover annual debt service at least 2.1 times during each year of the project period. Both the debt-equity and the debt-service ratio are satisfactory. During negotiations agreement was reached on the inclusion of the standard covenant in the Credit Agreement requiring the agreement of the Association before contracting new debt unless the net revenues of P&T cover the maximum future debt service at least 1.5 times.

6.09 The financial plan, based on tariff increases in FY78 and FY79 (see para. 5.11), is satisfactory for the project period. However, the rapid increase in the level of debt servicing requirements during the project period and the need for additional debt financing in the future may present a problem in future expansion programs following the project. Since the pattern of revenues will significantly change during the project period due to the many changes in the physical structure of the telecommunications network, e.g., improved trunk facilities and STD operations; the magnitude of the financing requirements for the further expansion beyond the project cannot be accurately gauged at this time and should be subjected to a thorough review near the end of this period when new revenue patterns will have been established and the requirements of the subsequent development program more completely known.

Future Financial Results

6.10 Forecast income statements for telecommunications operations are given in Annex 13. A summary of the results during the project period is shown below.

Year ending March 31:	1975	1976	1977	1978	1979	1980
Revenue (K million)	31.7	32.8	34.4	42.2	50.7	75.0
Operating income	6.7	5.9	5.6	9.9	14.6	26.6
Operating ratio (%)	57	64	70	68	65	50
Rate of return after taxes	16.7	14.8	12.1	12.4	10.1	13.1

6.11 Operating revenues are projected to increase in proportion to the growth of subscribers and as a result of increased trunk revenues after the installation of the microwave systems and the initiation of STD in 1979. Revenue projections also reflect proposed tariff revision in FY78 and FY79 (see para. 5.11). Expense projections reflect growth rates experienced in the past adjusted for the anticipated staffing levels.

6.12 With the proposed tariff increases in FY78 and FY79, the internally generated contribution is adequate to ensure the funding of the project and the servicing of debt. The financial projections show a rate of return on average net fixed assets in operations of not less than 10.1%, after income taxes (50%), during each year of the project period. Agreement was obtained during negotiations that tariffs will be maintained at a level to produce a rate of return on average net fixed assets in operations of not less than 10%.

6.13 Indicators which will help monitor P&T's performance are given in Annex 14.

7. RECOMMENDATIONS AND AGREEMENTS

7.01 During negotiations agreement was reached on the following points:

(a) P&T will institute improvement to the accounting system for the accounts of FY77 (para. 5.07);

(b) the Government will take necessary action to clear the arrears and assure prompt payment of future billings to Government (para. 5.08);

(c) P&T accounts will be audited annually by the Central Audit and Inspection Office and audited statements will be submitted to IDA within six months after the close of each fiscal year (para. 5.09);

(d) P&T will eliminate flat rate billing of Government accounts by the beginning of FY77 (para. 5.13);

(e) P&T will not utilize the funds of its Telecommunications Branch to support the operation or development program of its Postal Branch unless all telecommunications requirements have been met (para. 6.02);

(f) P&T will incur no debt without the agreement of IDA unless the net revenues cover debt service at least 1.5 times (para. 6.08); and

(g) P&T will maintain telecommunications tariffs at a level adequate to assure a minimum rate of return of 10% (para. 6.12).

7.02 A condition of effectiveness is that the subsidiary loan agreement incorporating the relending terms for the proceeds of the proposed Credit will be signed (para. 6.08).

7.03 With the above agreements the project is suitable for an IDA Credit of US$21.0 million.

BURMA

POSTS AND TELECOMMUNICATIONS CORPORATION

INTERNATIONAL TELEPHONE STATISTICS

COUNTRY	POPULATION 1/ Jan. 1, 1974 (000's)	GROSS NATIONAL PRODUCT - 1972 Per Capita US$	GROSS NATIONAL PRODUCT - 1972 Per Capita Growth Rate (1960-72) %	TELEPHONES - JANUARY 1974 NATIONAL Total No. (000's)	NATIONAL Per 100 Population	NATIONAL Av. Annual Growth Rate (1965-74) %	NATIONAL Automatization %	PRINCIPAL CITIES 2/ Total No. (000's)	PRINCIPAL CITIES 2/ Per 100 Population	PRINCIPAL CITIES 2/ Percentage of National %	REST OF COUNTRY Total No. (000's)	REST OF COUNTRY Per 100 Population	REST OF COUNTRY Percentage of National %
AFRICA													
Algeria	16,118	430	3.2	221	1.37	4.7	79.1	164	6.09	74	57	0.42	26
Egypt	35,473	240	1.5	472	1.33	n.a.	92.4	299	1.88	63	173	0.88	37
Ethiopia	27,626	80	2.6	61	0.22	11.0	88.7	49	3.44	80	12	0.05	20
Ghana	9,443	300	0.0	52	0.55	4.8	89.8	44	2.88	84	8	0.10	16
Ivory Coast	4,497	340	4.2	25	0.56	3.6	90.7	17	2.88	69	8	0.20	31
Malawi	4,799	100	3.6	17	0.35	9.6	90.2	8	4.55	44	9	0.20	56
Nigeria	70,884	130	2.0	106	0.15	5.8	76.3	61	3.20	57	45	0.07	43
Senegal	4,203	260	(0.8)	32	0.75	2.3	92.2	29	3.37	90	3	0.10	10
Sudan	17,567	120	-	51	0.29	3.7	91.1	45	2.95	88	6	0.04	12
Zaire	22,738	100	3.3	25	0.11	2.4	76.0	15	0.62	61	10	0.05	39
AMERICA													
Canada	22,306	4,440	3.6	11,668	52.31	5.2	99.5	5,592	59.15	48	6,076	47.28	52
Colombia	23,218	400	1.8	1,080	4.65	10.2	97.6	640	8.72	59	440	2.77	41
Costa Rica	1,917	630	3.1	89	4.62	15.2	98.2	82	10.44	93	7	0.58	7
El Salvador	3,807	340	2.2	46	1.20	7.6	96.9	40	2.81	87	6	0.25	13
Guatemala	5,569	420	2.2	53	0.95	8.5	100.0	53	4.94	100	-	-	-
Trinadad and Tobago	958	970	2.8	66	6.92	6.1	99.9	41	41.14	62	25	2.93	38
United States	210,420	5,590	3.0	137,762	65.47	4.5	99.9	68,419	73.35	50	69,343	59.20	50
Venezuela	11,507	1,240	1.8	504	4.38	6.8	98.8	431	9.13	85	73	1.08	15
ASIA													
Burma	29,411	90	0.8	29	0.10	2.4	69.8	20	1.03	70	9	0.03	30
India	588,889	110	1.1	1,590	0.27	7.7	80.7	832	2.57	52	758	0.14	48
Indonesia	128,078	90	2.1	269	0.21	2.6	62.8	157	1.51	58	112	0.10	42
Iran	31,753	490	6.3	553	1.74	11.8	90.8	469	5.45	85	84	0.36	15
Iraq	10,608	370	2.7	129	1.22	7.6	92.4	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Japan	109,316	2,320	9.4	38,698	35.40	12.2	94.5	16,711	42.61	43	21,987	31.37	57
Malaysia	11,421	430	3.1	234	2.05	6.8	95.3	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Nepal	11,453	80	0.7	9	0.08	11.8	76.2	9	2.97	99	-	-	1
Pakistan	67,353	130	3.3	195	0.29	5.0	83.0	140	1.49	72	55	0.10	28
Philippines	39,451	220	2.2	410	1.04	10.5	97.6	342	4.23	83	68	0.22	17
Singapore	2,202	1,300	7.1	250	11.36	12.2	100.0	250	11.36	100	-	-	-
Syria	6,890	320	3.4	143	2.08	7.1	89.4	121	5.23	85	22	0.48	15
Thailand	40,700	220	4.6	265	0.65	15.0	94.6	210	4.89	79	55	0.15	21
EUROPE													
France	52,923	3,620	4.9	11,337	21.66	7.1	91.4	7,255	46.76	64	4,082	10.91	36
Germany (Fed. Rep.)	61,965	3,390	3.7	17,803	28.73	8.1	100.0	7,810	44.39	44	9,993	22.52	56
Sweden	8,144	4,480	3.2	4,984	61.20	3.9	100.0	2,416	72.95	48	2,568	53.13	52
Switzerland	6,501	3,940	2.9	3,604	55.44	5.4	100.0	1,728	73.01	48	1,876	45.37	52
United Kingdom	56,064	2,600	2.3	19,095	34.06	6.7	99.6	7,665	44.33	40	11,430	29.48	60
Yugoslavia	21,039	810	4.8	1,004	4.77	10.5	97.4	496	16.13	49	508	2.83	51
OCEANIA													
Australia	13,176	2,980	3.1	4,659	35.36	5.7	94.8	3,210	37.73	69	1,449	31.04	31
Fiji	551	270	2.7	23	4.09	8.3	86.9	13	16.16	55	10	2.16	45
New Zealand	3,043	2,560	2.1	1,411	46.35	3.9	92.0	1,066	51.23	76	345	35.81	24
Papua New Guinea	2,491	290	5.6	32	1.30	14.3	97.6	24	17.01	74	8	0.36	26

SOURCES:

1. G.N.P.: World Bank Atlas 1974

2. Telephone Statistics: World's Telephones by AT&T (January 1, 1974)

NOTES:

1/ Population at January 1, 1974 derived from the "Total Telephones" and "Telephones per 100 Population" appearing in AT&T's publication "World Telephones" (January 1, 1974)

2/ "Principal Cities" are those considered principal cities in "World Telephones" (January 1, 1974) except for United States where principal cities are those of 100,000 and over population appearing in "World Telephones" (January 1, 1974)

n.a.: not available

ANNEX 1

BURMA

POST AND TELECOMMUNICATIONS CORPORATION

APPRAISAL OF THE FIRST TELECOMMUNICATIONS DEVELOPMENT PROJECT

Basic Data
(as at December 31, 1973)

I. Local Telephone

Number of telephone stations	29,411
Number of subscriber connections (DEL)	22,970
Automatic	15,479
Manual	7,491
Annual growth in subscriber connections (last three years)	3.8%
Number of telephone exchanges	
Total	136
Automatic	5
Manual	131
Installed capacity	27,320
Exchange fill	84%
Unsatisfied demand for subscriber connections	
Total	5,942
As a percentage of satisfied demand	26%
As a percentage of total demand	21%

II. Long Distance Telephone

Total number of long distance circuits	329
Open wire carrier channels	172
Microwave channels	21
Physical circuits	131
HF radio circuits	5

III. Telegraph and Telex

Number of telegraph offices	283
Number of telex offices	1
Telex subscribers	30

IV. International Facilities

Telephone circuits	8
Telegraph circuits	10
Telex circuits	3

V. Staff

Total staff	8,796
Total telecommunications staff	4,200
Number of staff per 1,000 telephone (stations)	143

April 22, 1975

BURMA

POSTS AND TELECOMMUNICATIONS CORPORATION

APPRAISAL OF THE FIRST TELECOMMUNICATIONS DEVELOPMENT PROJECT

Existing Facilities

A. Long Distance Facilities

1. One old valve-type 24-channel microwave system working in the 2GHz band connects Rangoon with Bassein with drop-offs at Twante, Manbin, Wakema and Myaungmya. All other long distance facilities throughout the network are provided on open wire pole routes carrying copper or copperweld pairs with, in some cases, 3, 4, or 12-channel carrier systems working on them. The total number of trunk circuits is 329.

2. Trunk calls are handled manually and, because the number of lines is inadequate to meet the traffic needs of existing customers, callers have to wait normally for one to two hours and sometimes more than a day.

3. Transmission quality is poor due to the old age of the lines and equipment. For calls involving many of the exchanges in more remote areas, transmission has been further degraded due to their connection being made for reasons of expediency to the nearest point in the network without regard to the requirements of the national transmission plan. The service is also subject to frequent interruption due to the high fault-liability of the old open wire lines, the obsolescent equipment and the frequent theft of copper wire.

B. Local Facilities

4. As at the end of 1973 there were 136 telephone exchanges servicing a total of 23,000 telephone subscribers (DELs); the total number of telephone stations being 29,411.

5. Telephone service in the city of Rangoon is relatively reliable, with five L.M. Ericsson crossbar exchanges installed between 1954 and 1961. The interexchange signalling system is an obsolescent DC pulsing one. Ninety-one percent of the installed capacity has been utilized and congestion exists during busy periods in the central city exchanges. Mandalay, the second largest city, is equipped with a 1,500 line CB exchange originally recovered from Rangoon. It is in poor condition due to the fact that it is well beyond its expected life. Two other small central battery exchanges of a similar age exist in Moulmein and Maymyo. All other exchanges are of the magneto local battery type.

6. In Rangoon the subscribers' distribution networks make use of paper insulated and lead-sheathed cables in conduits, armoured ones laid directly in the ground, self-supporting aerial cables and open wires together with distribution cabinets and pillars. In other cities, there is much greater dependence on open wires and pole lines and the fault incidence is high particularly during the wet season. Open wires on pole routes are the usual methods to supply subscribers' lines in rural areas.

7. Details of the types of exchanges, capacities, and working lines are as follows:

Sr. No.	Name of Exchange	Type	Switch Board Quantity	Capacity	No. of DELs on 31/12/73	Total Telephones 31/12/73
	RANGOON			17,000	15,479	20,541
	City					
1	Maungtawlay	Autom. ARF		9,000	8,993	12,471
2	Hanthawaddy	"		3,000	2,633	3,125
3	Tamwe	"		3,000	2,260	2,782
4	Insein	"		1,000	630	989
5	Mayangon	"		1,000	963	1,174
	District			340	222	335
1	Hmawbi	Magneto/LB	1	50	41	75
2	Kayan	"	1	20	22	22
3	Thongwa	"	1	20	12	12
4	Hlegu	"	1	20	17	79
5	Seikkyi	"	2	30	22	33
6	Syriam	"	1	100	56	58
7	Taikkyi	"	1	50	23	23
8	Twante	"	1	40	22	26
9	Kungyangon	"	1	10	7	7
	Prome Sub-division			745	483	530
1	Prome	Magneto/LB	5	300	228	253
2	Gyobingauk	"	1	20	16	16
3	Letpadan	"	1	50	30	33
4	Minhla	"	1	50	18	20
5	Nattalin	"	1	20	15	16
6	Okpo	"	1	20	10	10
7	Paungde	"	1	50	29	31
8	Padaung	"	1	20	19	19
9	Paukkhaung	"	1	20	10	10
10	Shwedaung	"	1	20	17	22
11	Tharawaddy	"	1	100	53	59
12	Thegon	"	1	20	11	12
13	Zigon	"	1	25	19	21
14	Monyo	"	1	10	8	8

Sr. No.	Name of Exchange	Type	Switch Board Quantity	Capacity	No. of DELs on 31/12/73	Total Telephones 31/12/73
	Toungoo Sub-division			560	478	590
1	Toungoo	Magneto/LB	3	150	155	200
2	Nyaunglebin	"	2	80	50	69
3	Pegu	"	4	250	220	259
4	Pyu	"	1	40	29	37
5	Shwegyin	"	1	20	13	14
6	Yedashe	"	1	10	7	7
7	Thandaung	"	1	10	4	4
	Bassein Sub-division			1,220	845	964
1	Bassein	Magneto/LB	4	300	264	338
2	Bogale	"	1	20	18	19
3	Dedaye	"	1	20	12	12
4	Ingapu	"	1	20	8	9
5	Danubyu	"	1	20	19	19
6	Henzada	"	2	150	112	126
7	Kyaiklat	"	1	50	26	26
8	Kyaunggon	"	1	10	11	12
9	Kyonpyaw	"	1	20	18	18
10	Lemyethna	"	1	10	8	8
11	Maubin	"	1	100	65	74
12	Moulmeingyun	"	1	20	15	15
13	Myanaung	"	1	100	32	34
14	Myaungmya	"	1	100	73	78
15	Ngathainggyaung	"	1	10	7	8
16	Pyapon	"	1/2	70	58	62
17	Wakama	"	1	50	29	30
18	Yandoon	"	1	50	37	39
19	Yegyi	"	1	40	15	18
20	Zalun	"	1	20	13	14
21	Kyankin	"	1	10	5	5
	Moulmein Sub-division			1,180	868	1,015
1	Moulmein	CB	2	550	428	520
2	Kyaikhto	Magneto/LB	1	20	17	19
3	Mudon	"	1	50	19	21
4	Thanbyuzayet	"	1	20	16	19
5	Thaton	"	1	100	69	78
6	Ye	"	1	20	19	21
7	Belin	"	1	20	11	11
8	Tavoy	"	2	150	118	123
9	Mergui	"	1	100	72	74
10	Paan	"	1	100	68	96
11	Kawkareik	"	1	50	31	33

Sr. No.	Name of Exchange	Type	Switch Board Quantity	Capacity	No. of DELs on 31/12/73	Total Telephones 31/12/73
	MANDALAY					
	City			1,570	1,249	1,546
1	Mandalay	CB	15	1,500	1,206	1,498
2	Amarapura	Magneto/LB	1	50	34	35
3	Patheingyi	"	1	20	9	13
	District			1,200	749	891
1	Maymyo	CB	1	300	142	166
2	Myitnge	Magneto/LB	1	20	12	14
3	Kyaukse	"	1	60	60	84
4	Meikhtila	"	2	200	141	206
5	Thazi	"	1	50	26	26
6	Pyawbwe	"	1	50	29	29
7	Yamethin	"	1	50	43	46
8	Pyinmana	"	1	100	76	85
9	Mahlaing	"	1	40	14	15
10	Myingyan	"	2	200	129	138
11	Mogok	"	2	20	13	15
12	Lewe	"	1	20	5	5
13	Kyaukpadaung	"	1	50	37	37
14	Wundwin	"	1	20	11	12
15	Momeik	"	2	20	11	13
	Sagaing Sub-division			1,340	858	1,004
1	Sagaing	Magneto/LB	2	200	128	149
2	Myinmu	"	1	50	18	19
3	Monywa	"	2	200	157	166
4	Shwebo	"	1	100	84	122
5	Kawlin	"	1	50	20	21
6	Katha	"	1	100	53	62
7	Kalewa	"	1	20	19	21
8	Kalemyo	"	1	50	36	39
9	Mawlaik	"	1	50	18	19
10	Wuntho	"	1	10	10	10
11	Ye-U	"	1	20	16	18
12	Ngazun	"	1	10	8	8
13	Myaung	"	1	10	8	8
14	Myitkyina	"	2	200	114	169
15	Mogaung	"	1	50	16	19
16	Mohnyin	"	1	20	13	13
17	Bhamo	"	1	50	47	48
18	Haka	"	1	50	45	45
19	Falam	"	1	50	28	28
20	Mindat	"	1	50	20	20

Sr. No.	Name of Exchange	Type	Switch Board Quantity	Capacity	No. of DELs on 31/12/73	Total Telephones 31/12/73
	Magwe Sub-division			670	569	668
1	Magwe	Magneto/LB	2	150	133	172
2	Yenanchaung	"	1	80	77	85
3	Chauk	"	1	50	43	56
4	Minbu	"	1	70	55	72
5	Taungdwingyi	"	1	50	43	46
6	Thayet	"	1	60	56	64
7	Aunglan	"	1	40	39	39
8	Pakokku	"	1	80	69	77
9	Natmauk	"	1	10	8	8
10	Minhla	"	1	10	10	10
11	Myothit	"	1	10	8	8
12	Nyaungoo	"	1	60	28	31
	Taunggyi Sub-division			1,025	792	898
1	Taunggyi	Magneto/LB	3	300	293	364
2	Shwenyaung	"	1	50	19	23
3	Kalaw	"	1	50	29	33
4	Aungban	"	1	50	28	28
5	Loilem	"	1	45	42	43
6	Kengtung	"	1	70	48	49
7	Kyaukme	"	1	100	59	59
8	Hsipaw	"	1	50	32	32
9	Lashio	"	2	150	106	122
10	Kutkai	"	1	20	16	18
11	Naunghkio	"	1	20	15	15
12	Namsang	"	1	20	13	13
13	Namtu	"	1	10	10	10
14	Loikaw	"	1	90	85	89
	Arakan Division			470	377	429
1	Akyab	Magneto/LB	3	250	235	276
2	Kyaukpyu	"	1	80	52	57
3	Sandoway	"	2	70	59	64
4	Buthidaung	"	1	20	9	10
5	Maungdaw	"	1	50	22	22
	GRAND TOTAL:			27,320	22,970	29,411

BURMA

POSTS AND TELECOMMUNICATIONS CORPORATION

Annual Program Expenditures
(thousands of Kyats)

	FY 75			FY 76			FY 77			FY 78			FY 79			FY 80			FY-75-80		
	Local	Foreign	Total	Local	Foreign	Total	Local	Foreign	Total	Local	Foreign	Total	Local	Foreign	Total	Local	Foreign	Total	Local	Foreign	Total
THE PROJECT																					
Local Telephone Facilities																					
Exchange Equipment					156	156	2,854	8,639	11,493	1,714	11,284	12,998	1,116	3,949	5,065		-		5,684	24,028	29,712
Distribution Networks							2,245	3,589	5,834	5,907	8,674	14,581	2,165	2,699	4,864				10,317	14,962	25,279
Subscriber Apparatus							42	125	167	269	1,414	1,683	187	760	947	22	187	209	520	2,486	3,006
Trunk Line Facilities																					
Switching Equipment							313	1,206	1,519	1,163	9,650	10,813	81	1,206	1,287				1,557	12,062	13,619
Radio and Multiplex Equipment							2,315	6,874	9,189	4,538	27,269	31,807	1,427	7,069	8,496	204	1,589	1,793	8,484	42,801	51,285
Open Wire Carrier Equipment							216	337	553	557	2,698	3,255	393	337	730				1,166	3,372	4,538
Telegraph and Telex																					
Switching Equipment							36	140	176	184	1,265	1,449							220	1,405	1,625
Terminal Units (Teleprinters)							43	167	210	160	1,192	1,352	80	307	387				283	1,666	1,949
Buildings				3,716		3,716	9,635	-	9,635	7,761	-	7,761							21,112	-	21,112
Miscellaneous																					
Vehicles, Construction Machines, Miscellaneous Equipment Items				13		13	1,888	200	2,088	867	1,243	2,110	143	160	303				2,911	1,603	4,514
Sub-Total				3,729	156	3,885	19,587	21,277	40,864	23,120	64,689	87,809	5,592	16,487	22,079	226	1,776	2,002	52,254	104,385	156,639
Price Contingencies				280	11	291	2,675	3,343	6,018	4,803	15,894	20,697	1,550	5,451	7,001	54	626	680	9,362	25,325	34,687
Physical Contingencies				-	1	1	73	282	355	186	721	907	52	200	252	31	121	152	342	1,325	1,667
TOTAL PROJECT				4,009	168	4,177	22,335	24,902	47,237	28,109	81,304	109,413	7,194	22,138	29,332	311	2,523	2,834	61,958	131,035	192,993
P&T's ONGOING WORKS																					
Local Telephone Facilities	279	686	965	668	2,248	2,916	565	1,782	2,347	534	1,781	2,315							2,046	6,497	8,543
Trunk Facilities	68	532	600	112	815	927	28	180	208	-	-	-							208	1,527	1,735
Telegraphs	34	96	130	95	323	418	101	298	399	92	310	402							322	1,027	1,349
Replacement Works	226	667	893	312	1,289	1,601	187	1,077	1,264	248	1,077	1,325							973	4,110	5,083
Miscellaneous	22	-	22	117	-	117	124	-	124	63	-	63							326	-	326
TOTAL ONGOING WORKS	629	1,981	2,610	1,304	4,675	5,979	1,005	3,337	4,342	937	3,168	4,105							3,875	13,161	17,036
SUBSEQUENT DEVELOPMENT PROGRAM																					
Local Telephone Facilities													3,267	7,471	10,738	22,804	29,883	52,687	26,071	37,354	63,425
Trunk Facilities													384	843	1,227	1,758	9,913	11,671	2,142	10,756	12,898
Telex and Telegraph													-	-	-	331	311	642	331	311	642
Contingencies													1,038	2,494	3,532	8,991	15,040	24,031	10,029	17,534	27,563
TOTAL SUBSEQUENT PROGRAM													4,689	10,808	15,497	33,884	55,147	89,031	38,573	65,955	104,528
TOTAL OVERALL PROGRAM	629	1,981	2,610	5,313	4,843	10,156	23,340	28,239	51,579	29,046	84,472	113,518	11,883	32,946	44,829	34,195	57,670	91,865	104,406	210,151	314,557

* Local costs include 10% customs on imported equipment.

April 28, 1975

ANNEX 4

BURMA

POSTS AND TELECOMMUNICATIONS CORPORATION

APPRAISAL OF THE FIRST TELECOMMUNICATIONS DEVELOPMENT PROJECT

Project Works

1. Local Telephone Facilities

	Estimated In-Service Dates	Capacity
(a) Local Exchanges:		
Rangoon		
Maungtanlay	December 1976	1,000 Line Units
"	February 1978	2,600 "
Mayangon)		2,000 "
Thingangyun)	November 1977	1,000 "
Mingaladon)		600 "
Other Cities		
Moulmein, Bassein, Prome	April 1978	2,600 "
Mandalay, Meiktila, Magwe, Pegu	September 1978	4,800 "
Akyab, Taunggyi, Toungoo)		
Lashio, Myitkyina)	February 1979	2,400 "
	Total	17,000 "

(b) Distribution Network, Cables, Cabinets, Terminals, etc., and Subscriber Apparatus:

Rangoon		
Maungtanlay	December 1976	cabinets, terminals, etc.
"	January 1978	2,600 DELs
Mayangon, Thingangyun, Mingaladon	November 1977	3,600 "
Other Cities		
Moulmein, Bassein, Prome	April 1978	2,600 "
Mandalay, Meiktila, Magwe, Pegu	September 1978	4,800 "
Akyab, Taunggyi, Lashio, Myitkyina	February 1979	2,400 "
	Total	16,000 "

2. Long Distance Facilities

(a) Microwave System and Spur Radio		
Rangoon-Mandalay	November 1978	480 Channels
Rangoon-Moulmein	November 1978	180 "
Rangoon-Bassein	February 1978	120 "
Akyab-Prome	September 1978	60 "
Moulmein-Tavoy	December 1978	12 "

	Estimated In-Service Dates	Capacity
(b) Open Wire Carrier Systems	December 1978	213 Channels
(c) Automatic Trunk Exchanges:		
Rangoon	September 1978	800 Terminations
Mandalay	September 1978	600 "
(d) Ten Manual Trunk Exchanges:		
Rangoon	February 1978)	21 positions
Moulmein, Bassein, Prome	April 1978)	
Mandalay, Magwe, Pegu, Meiktila	September 1978)	
Akyab, Taunggyi, Lashio, Myitkyina Toungoo	February 1979)	
3. Telex and Telegraph		
Switching	February 1978	120 Line Units
Subscriber Units and Gentex Office	February 1979	80 "
4. Miscellaneous		
Construction vehicles and specialized machines (e.g. borer for roadway crossings) for distribution networks; telegraph and telephone office equipment (e.g. rotary directory files and for information services).	Various (December 1976 - December 1977)	

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BURMA

POSTS AND TELECOMMUNICATIONS CORPORATION

APPRAISAL OF THE FIRST TELECOMMUNICATIONS DEVELOPMENT PROJECT

Estimated Schedule of Disbursement

IBRD Fiscal Year and Quarter	Cumulative Disbursement at End of Quarter (US$ '000)
1975/76	
March 31, 1976	27
June 30, 1976	27
1976/77	
September 30, 1976	27
December 31, 1976	27
March 31, 1977	4,019
June 30, 1977	5,322
1977/78	
September 30, 1977	7,928
December 31, 1977	11,838
March 31, 1978	17,052
June 30, 1978	17,407
1978/79	
September 30, 1978	18,116
December 31, 1978	19,181
March 31, 1979	20,600
June 30, 1979	20,600
1979/80	
September 30, 1979	20,600
December 31, 1979	21,000

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BURMA

POSTS AND TELECOMMUNICATIONS CORPORATION

APPRAISAL OF THE FIRST TELECOMMUNICATIONS DEVELOPMENT PROJECT

The Impact of the Project on Business Enterprises

Introduction

1. The Bank's 1973 Economic Report has recognized that "inadequate transportation and telecommunications constitute increasingly constraining bottlenecks to the growth of output". The nature of the problems being caused by the telecommunication services deficiencies and the impact the project will have on individual business enterprises is reviewed in this annex.

2. The data for the annex was obtained from interviews of the senior management of public corporations with different types of large scale operations of consequence for the Burmese economy to reveal more clearly the impact and need for telecommunication services. While no effort at quantification of these benefits has been made, the size and nature of the operations and the obvious usefulness of telecommunications clearly demonstrates the savings in operational costs, in capital investment and in inventories as well as increased efficiency and assurance of dependability are much larger than the small investments in providing telecommunications services. The Corporations were:

(1) Agricultural Mechanization Corporation (AMC)
(2) Trade Corporation 1 (TC1)
(3) Industrial Planning Corporation (IPC)
(4) Myanma Oil Corporation (MOC)
(5) Movement Control Committee (MCC)
(6) Inland Water Transport Corporation (IWTC)
(7) Road Transport Corporation (RTC)
(8) Tourism Corporation (TC20)
(9) Burma Broadcasting Service (BBS).

3. Attachment 1 to this annex summarizes the functions of the Corporations and the size of their operations, identifies the officers interviewed, and records the main specific points made in each interview.

Conclusions from the Interviews

4. The managers interviewed were unanimous in asserting that general operation of their enterprises was seriously impeded by the present poor and

deteriorating state of the telecommunications service. Waiting times on successful trunk calls and the number of calls which cannot be connected at all are increasing (see Attachment 2). They were sure that the improved services envisaged through the project would bring significant improvement in efficiency and effectiveness in their fields.

5. The summary of the interviews in the attachment shows quite clearly that the managers of these important corporations see lack of good telecommunications inhibiting them in the areas of resource utilization; knowledge of market requirements; coordination of activities; provision of raw material to industry; purchasing and collection of agricultural and industrial products; maintenance of agricultural machinery, motor vehicles, boats, etc., and industrial machinery; and distribution of commodities. The attachment also shows the considerable size of operations of these entities confirming that the benefits from any improvement in efficiency will be substantial.

6. The interviews covered only a sample of the enterprises in Burma but it is obvious that the difficulties identified and the gains to be made from the project would apply in similar measure to all enterprises and services whether government or private and whether large or small.

7. The interview with the Burma Broadcasting Service identifies a substantial benefit which will be obtained as a by-product of the project. It will facilitate wide coverage of Burma, with radio broadcasts for which good reception will be obtained with cheap receivers.

February 28, 1975

1. AGRICULTURE MECHANIZATION CORPORATION (AMC)

Functions and Scope of Operations

1.1 AMC is responsible for the management of government-owned tractors and irrigation pumps which entails planning, procurement and distribution including leasing to cooperatives; training of farmers and workers; maintenance; and procurement and distribution of spare parts and fuel.

1.2 The organization has two divisions with headquarters in Rangoon and Mandalay each responsible for stations spread over Burma. The table shows the scale of their operations.

	68/69	69/70	70/71
Tractor stations	88	88	88
Number of tractors	6,615	6,216	6,365
Agriculture tractors			
AMC	3,958	3,241	3,391
(Cooperatives)	(52)	(1,555)	(2,055)
Average field hour per tractor (hour)	313	313	326
Average acre ploughed by tractor (acre)	175	186	202

Official Interviewed

1.3 Managing Director.

Main Information Obtained

1.4 (i) At present only 56 of the 88 tractor stations have telephone facilities and trunk calls are generally subject to long delays even in places with telephone facilities. Problems caused thereby are:

(a) Scheduling of tractors according to farmers' plans is difficult.

(b) Ordering of spare parts and fuel and obtaining of help for repair tasks beyond the local staff have to be arranged by messenger, telegraphs or mails in many cases. This is slow and costly in the form of lost production. For example, it often takes one day by a messenger from a village cooperative to reach the nearest tractor station. Location of parts or diversion of mechanics available in one place to where they are needed is difficult if not impossible to arrange in most cases. Twenty percent of tractors

are not functioning properly because of lack of spare parts.

(c) Spare parts inventories are difficult to maintain at efficient levels due to the need to maintain parts at most locations.

(ii) Purchasing and distribution of fuel requires close contact with Myanma Oil Corporation. Lack of telecommunications causes a good deal of waste effort by management of both organizations.

(iii) It is proposed to reorganize the Corporation into ten divisions with headquarters at Rangoon, Mandalay, Bassein, Akyab, Sagaing, Magwe, Pegu, Shan, Karen and Moulmein and run the field operations from these stations. Success of this step will depend on adequate telecommunications to permit efficient coordination and control.

2. TRADE CORPORATION 1 (TC1)

Functions and Scope of Operations

2.1 TC1 is the official trader for paddy and rice in Burma. It purchases paddy directly from farmers and distributes rice to consumers. It is responsible for establishing the purchasing and selling prices.

1974/75 Paddy Purchase by TC1

	(In thousand) baskets	Market value (million K)	No. of depots
Kachum	2,300	20.70	32
Karen	350	3.15	64
Sagaing	9,700	87.30	150
Tenasserim	500	4.50	17
Pegu	42,500	382.50	170
Magwe	1.900	17.10	76
Mandalay	3,600	32.40	80
Mon	6,300	56.70	48
Arakan	5,700	51.30	53
Rangoon	17,000	153.00	80
Shan	70	.63	15
Irrawaddy	56,000	504.00	210
(basket approx. equal to 46 pounds)	145,920	1,313.28	945

Source - Working People's Daily - December 1974.

Official Interviewed

2.2 Managing Director.

Main Information Obtained

2.3 (i) At present most communication depends on messengers and letters. It will not be possible to achieve real efficiency in planning, purchasing and distribution until efficient telecommunications are available.

(ii) During the purchasing period (late November and December) headquarters need immediate reporting from the 900 buying centers to efficiently coordinate and control purchases.

(iii) Efficient distribution requires reliable and timely data on consumer needs throughout Burma.

(iv) Avoidance of damage and other losses requires immediate reporting of rains, infestation, etc. for remedial actions to be organized.

3. INDUSTRIAL PLANNING CORPORATION (IPC)

Functions and Scope of Operations

3.1 IPC is coordinating 12 industrial corporations under the Ministry of Industry. They are: Textile, Food, Ceramic, Pharamaceuticals, Chemicals, Metal, Paper, Petro-Chemical, Heavy, Electric Power and General Industries Corporations. IPC is responsible for project planning; technological planning; production planning; man power planning; material planning; economic planning and general administration. In particular, (a) procurement of raw material and (b) distribution of final goods are its important function. Major industries are located along the Irrawaddy from Rangoon to Mandalay. IPC is planning and coordinating the Irrawaddy west bank development plan for the mobilization of surplus labor in the area and the utilization of natural resources, such as natural gas for power and for fertilizer production.

Officials Interviewed

3.2 Managing Director; Assistant Director, Foreign Relations; and Director, Project Planning.

Main Information Obtained

3.3 (i) For production planning, daily reports from factories are very important. Coordination of raw material procurement for these industries depends on having accurate and up-to-date information from each factory and this requires periodic reporting and close management liaison.

(ii) Corporations will be operated on commercial basis in the future. They will have more autonomy and be allowed to make a profit. To make the system work, efficient management is necessary and ready communications between the units and with IPC will be needed.

(iii) Transportation of products depends on IWTC. Efficient arrangements for boats through IWTC requires good communication between IWTC and industries.

(iv) Developing the Irrawaddy west bank needs good communications between newly developed areas and administrative centers. Communications traffic is expected to increase. Furthermore, availability of good telecommunications will expand the areas which can be considered in planning for industrial development.

(v) Efficient production planning and efficient distribution of products require constant information on market requirements.

(vi) Maintenance of continuous production requires availability of all the inputs at each of the factories and requires urgent communications to signal and remove shortages caused by disruptions to suppliers.

4. MYANMA OIL CORPORATION (MOC)

Operation and Scope of Operations

4.1 MOC is responsible for: exploration for new oil resources; refining; and distribution of final oil products (gasoline and diesel oil) to the whole country. Exploration of oil fields is going on in two areas. One area is along the Irrawaddy, from Lepangdow (north of Pagan) down to Myanaung, where at present 30,000 barrels of oil is produced daily. The other area is the offshore exploration near Akyab. Seismic exploration is being conducted in these areas.

Table 1 - Onshore Oil Production

Known Field	Production 1,000 barrel/day
Lepangdow	10.0
Chauk	1.3
Yenangyuang	3.6
Mann	12.0
Prome	1.5
Myanaung	2.0
	30.4

Reserve - not known

Table 2 - Oil Production
(1,000 barrels)

61/62	3,638.3
64/65	3,171.6
68/69	4,973.3
69/70	4,878.3
70/71	5,166.7

Officials Interviewed

4.2 Director, Senior Geophysicist.

Information

4.3 (i) Exploration in remote areas requires frequent contact with headquarters concerning material and provisions required for explorations and for updated reports to headquarters etc. At present, all communications have to rely on HF radio contact, which is more expensive, poorer in transmission quality and less reliable than standard public telecommunications facilities.

(ii) Efficient distribution of oil products requires considerable improvement of telecommunications. It is vital to have accurate, up-to-date information available on the needs of retailers and on the availability of supply and transportation.

(iii) Organization of transport from the wells to the refineries at Chauk and Rangoon and for distribution of the products throughout Burma requires close liaison with the transportation corporations. A great deal of management effort could be saved and improved results could be obtained with good telecommunications.

5. MOVEMENT CONTROL COMMITTEE (MCC)

Functions and Scope of Operations

5.1 MCC is coordinating the movement of essential commodities, rice, timber, sugar, oil, and coal, in entire Burma. It controls both private and government productions and arranges transportation using Road Transport, Inland Water Transport, and Railways Corporation.

Official Interviewed

5.2 Director of the Committee.

Main Information Obtained

5.3 (i) Requests for transportation of commodities are sent to MCC, where they coordinate among Road Transport, Inland Water Transport, and Railways. These requests are now mostly placed by mail and naturally there is a delay in responding to the requests; it is impossible to avoid cases where the consumers do not get commodities and manufacturers cannot ship goods efficiently. The problems will not be solved until good telecommunications are available.

(ii) Township and Division Committees send monthly reports on what they requested, what they sent (particularly agricultural commodities) and what they received. Good telecommunications are necessary to clarify reports, to respond to emergencies and to efficiently coordinate operations.

(iii) Coordinating transportation requires efficient telecommunication. Shipment is often not arranged in time through lack of information, unshipped goods pile up at one station while the consumers elsewhere wait for the same goods. With good telephone facilities, the turnover of carriers will be improved and distribution system will work efficiently.

6. INLAND WATER TRANSPORT CORPORATION (IWTC)

Functions and Scope of Operations

6.1 IWTC operates on Burma's major navigable water. It provides regular passenger and cargo services, on the Irrawaddy, the Chindwin, the Delta, the Arakan and Moulmein. It carries 100% of oil produced in Burma; every year about 300 million gallons (1 million tons) of oil produced in Minbu, Myanaung and Yenaunchang is transported to Chauk and Rangoon (Syriam) refineries. Then refined oil products are shipped to Prome, Mandalay and Bassein by IWTC. It also carries two thirds of cement (2/3 of 200 thousand tons a year) produced in Thayet to Mandalay and Rangoon. About 300 thousand tons of rice is shipped to Rangoon every year from the lower Irrawaddy-Delta area then part is reshipped to upper Burma, via Prome and Mandalay on the Irrawaddy.

Table 1 - Freight Carried by IWTC

Ton (1,000)	68/69	69/70	70/71	71/72	72/73
Rice	201	197	280	315	114
Cement	109	121	132	148	175
Petroleum	782	826	906	1,060	1,091
Ton miles (1,000)					
Rice	37,285	46,407	61,644	71,272	19,943
Cement	22,683	25,996	30,181	32,437	38,473
Petroleum	153,546	143,928	162,575	225,000	249,642

Table 2 - Transportation by IWTC

(In thousand)	68	69	70	71	72
Passenger - miles	264,026	210,930	225,541	230,381	213,969
Freight ton miles	342,406	334,157	396,650	411,900	375,544

Table 3 - Transportation of Oil Products
(Provenance/destination)

	Tonnage (1,000)		
Crude Oil	71	72	73 (6 months)
Yenaunchang/Chauk	164.9	156.2	69.4
Myanaung/Syriam	227.6	141.2	41.5
Minbu/Chauk	93.3	101.2	66.0
Minbu/Syriam	197.0	313.0	145.2
Petroleum			
Chauk/Thayet	51.3	54.8	17.8
Syriam/Prome	29.3	22.8	6.3
Syriam/Mandalay	28.2	20.2	5.6
Chauk/Mandalay	125.5	132.2	56.8
Syriam/Bassein	13.2	18.9	7.9

Official Interviewed

6.2 Director, Planning.

Information

6.3 (i) IWTC is controlling the movement of their boats from their headquarters in Rangoon through key stations such as Prome, Mandalay and Bassein. For its daily operation, waiting time for telephone service is intolerably long. They cannot utilize their vessels efficiently when it takes two to three hours to call even key and important stations such as Prome and Mandalay; others take a much longer wait. For example, very often it is not possible to divert a boat for an unscheduled stop to pick up extra cargo, because of the poor telecommunications.

(ii) When boats fail or other emergencies occur, immediate information is required for management to make alternative arrangements and notify shippers and customers, to arrange for repair parts and to take any other steps to minimize damage and losses.

(iii) General operations of the Corporation are hampered by the very limited and delayed telephone service.

7. ROAD TRANSPORT CORPORATION (RTC)

Functions and Scope of Operations

7.1 RTC is responsible for transportation of both passenger and freight. In 1974 for freight transportation, there were 23 branch stations operating a total 2,427 trucks. RTC covers the country from Myitkina, Lashio to Bassein and Moulmein with its major operations being along Rangoon - Toungoo - Meiktida - Mandalay and Rangoon - Magwe - Kyankpadauny - Mandalay road system. Operation along this route accounted for 56.9% of the total operation of RTC in 1973/74. The Rangoon - Magwe - Mandalay route covers the Irrawaddy east bank where major industrial plants are located.

Table 1 - Freight ton-mileage by RTC
(in thousand)

1970/71	80,405
1971/72	80,784
1972/73	84,112
1973/74 1/	32,777

Table 2 - RTC - Freight Tonnage of Major Products
(in thousands tons, six months of 1973/74)

Rice	91.2
Paddy	18.0
Sugarcane	56.4
Sugar	12.8
Timber	9.1
Oil	41.2
Road Metal	7.5
Others	409.7
	645.9

1/ Data for six months only.

Table 3 - RTC - Branch Stations and Ton-mileage of Freight
(six months of 1973/74)

	No. of Trucks	Ton-mileage Conveyed (Thousand)	Utilization ratio Ton-mile/truck	Freight Revenues (K Thousand)
South Okkalapa	203	2,463	12.1	2,017
Kamayut	159	1,367	8.7	1,737
Rangoon	230	6,484	28.2	3,275
Lashio	79	834	10.5	778
Kalay	100	190	1.9	642
Tounggyi	445	2,345	5.2	5,616
Myitkyina	137	680	4.9	499
Mandalay	299	2,794	9.3	2,162
Moulmein	85	1,009	11.9	776
Kamaung	10	9	0.9	NA
Toungoo	115	2,763	24.0	984
Akyab	19	94	4.9	227
Minhla	122	2,891	23.7	1,287
Pakokko	75	559	7.4	454
Kyaukpy	8	13	1.6	NA
Sandoway	17	25	1.5	146
Meiktila	72	2,840	39.4	1,901
Thaton	16	240	16.0	NA
Bassein	45	456	10.1	209
Magwe	79	2,506	31.7	1,133
Shwebo	50	585	11.7	748
Kyaukpadaung	46	1,274	27.7	NA
Padaung	16	344	21.5	569
Total	2,427	32,777		

Official Interviewed

7.2 Director, Planning.

Information

7.3 (i) RTC is running an operation for which good, prompt communication is vital for efficiency. Trucks are not fully utilized at the moment because of lack of efficient telecommunications. Vehicles often return to the base empty while there are cargoes waiting on the road to be picked up for immediate shipment. Only efficient telecommunication will enable RTC to closely control their trucks and achieve high utilization.

(ii) Maintenance service is impeded because of inefficient telecommunication, (a) when trucks need repair on the road, sending for a repair team is often delayed because no telephone service is available at hand, (b) station management have to use messengers a great deal in carrying out their tasks with considerable waste of time and effort. For example, at Rangoon station, where 230 trucks are stationed, unnecessary errands amount to 30-40 a day because of lack of telecommunication.

8. TOURISM CORPORATION (TC20)

Functions and Scope of Operation

8.1 TC20 is responsible for tourism promotion and planning, and for hotel accommodations throughout Burma.

Table 1

	Number of Tourists			
	1969/70	1970/71	1971/72	1972/73
October-December	768	2,282	3,575	4,035
January-March	1,238	2,883	3,744	4,664
April-June	2,021	2,431	2,400	2,878
July-September	2,826	2,699	3,390	4,084
Total	6,853	10,295	13,051	15,661

Table 2

Amount of Foreign Currencies Exchanged By Tourists (Kyat in thousand)	
1969/70	3,855
1970/71	6,156
1971/72	10,408
1972/73	10,934

Officials Interviewed

8.2 Managing Director, Director Planning.

Main Information Obtained

8.3 (i) Tourism in Burma has great potential as an earner of foreign exchange. To encourage tourism the Government has extended tourist visas from three to seven days and has increased the tourist foreign exchange import allowance to US$500 equivalent. TC20 is promoting and developing Pagan, Mandalay, Tounggyi (Inle lake) and Ngapali (seaside resort), but improved telecommunications is vital for success because (a) travel and accommodations arrangement are difficult to arrange and more difficult to rearrange without good telecommunications; (b) tourists are reluctant to go to places without adequate telecommunications to help ensure certainty of accommodation and their well-being.

(ii) At present, facilities are completely inadequate. For example, Pagan is reached by only one trunk line.

9. BURMA BROADCASTING SERVICE (BBS)

Functions and Scope of Operations

9.1 BBS is the sole broadcasting corporation in Burma. It operates only from Rangoon with two medium wave transmitters (50 kw) and three short wave transmitters. Major program from BBS is for peasants, workers and the youth.

Officials Interviewed

9.2 Managing Director, Program Director.

Main Information Obtained

9.3 (i) With the cooperation of other ministries, such as Agriculture and Education, BBS is broadcasting educational programs to peasants, farmers, workers and the youth.

(ii) In particular, programs to farmers are coordinated by Peasant Program Committee which consists of specialists from government agencies related to agriculture. The Committee decides what should be broadcast in order to promote agriculture production. The program typically deals with information on use of fertilizer, pesticide; use of agricultural machine such as irrigation pumps, tractors; discussion on new developments such as high yielding plant varieties. Response from farmers to the program is high and BBS is receiving 3,000 letters a month asking questions about improved farming methods. In return, BBS, after consulting the specialists from agricultural departments, broadcasts answers and suggestions back to farmers.

(iii) However, medium wave radio from Rangoon does not reach many people (no more than 100 mile radius) and most of the population receiving the program are depending on shortwave radio. The shortwave broadcasting has the following disadvantage compared with medium wave; (a) it is less reliable and less clear; (b) shortwave radio receivers are more expensive; and (c) the region which can be reached is limited (less than 30% of the population is reached effectively at present).

(iv) BBS is planning a project to expand this service. The project intends to set up four medium wave stations at Prome, Magwe, Toungoun and Yamethin (10 kw transmitter each) and a powerful 100 kw transmitter at Mandalay. The cost for the project is small (about US$2 million).

(v) The present telecommunication project will provide a microwave system from Rangoon - Prome - Magwe - Mandalay, so that with small additional cost (US$50,000) lines can be provided to relay programs from Rangoon to the transmitting stations of the BBS project.

(vi) The benefit from the BBS project will be very large. Farmers can use cheaper receivers (about 1/3 of shortwave receiver) which will save considerable costs because of the large number of receivers - about one million in a few years - involved. The quality of reception will be far better. Seventy to 75% of the population will be reached.

ANNEX 7

ATTACHMENT 2

RANGOON CONGESTION

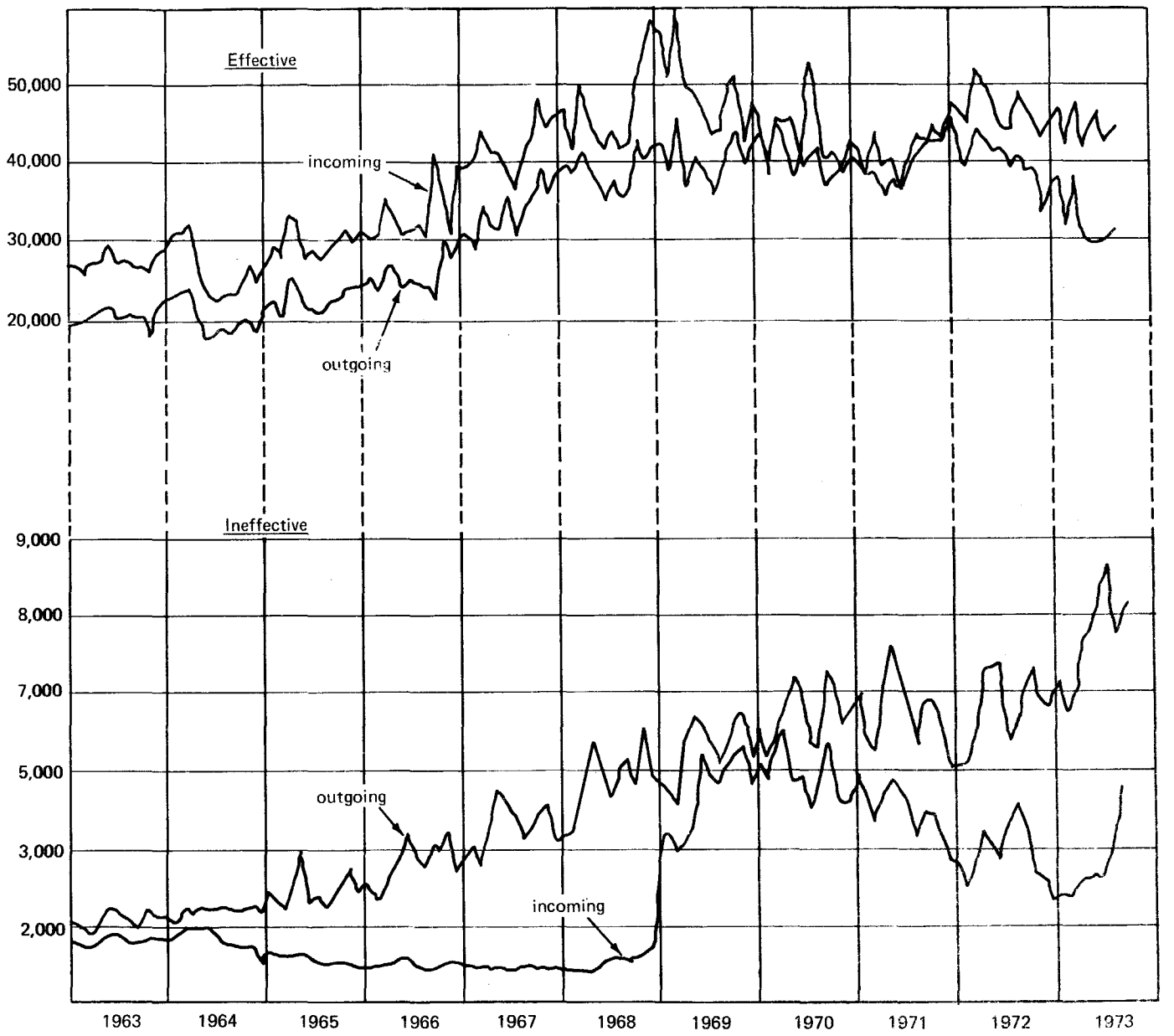
1. Figure 1 summarizes the performance of the trunk service to and from Rangoon since 1963 by showing the average number of effective calls per month over these years and the average number which could not be connected and were abandoned (ineffective calls).

2. Because of growing demand compared with almost fixed capacity of telecommunications facility outside Rangoon, the number of ineffective calls are growing constantly. For incoming calls, in addition to growing demand, the Rangoon system itself became overburdened and in recent years P&T has been compelled to bar a part of subscribers (up to 20%) trunk service during heavy traffic hours, thus ineffective calls have drastically increased since 1969 (see Chart 9658). Besides, system failures have been common, due to the outdated equipment in the trunk network and in local networks outside of Rangoon, and lack of adequate spare parts. The poor performance has discouraged subscribers from using the telephone service in spite of their growing need. Demand has thus been suppressed, especially in recent years.

3. The ratio of ineffective calls to effective calls for both incoming and outgoing calls is increasing. This clearly indicates the overall deterioration of the system due to obsolete facilities.

4. If the present system is left without any further rehabilitation, in a few years, this sector may not be able to offer even the level of less than adequate service for keeping the administrative structure together. Any continuation of the present stagnation could very adversely affect the working of economic sectors (transport, industry) and of essential economic services (distribution).

RANGOON TELEPHONE SYSTEM
Trunk Calls



World Bank–9658

BURMA

POSTS AND TELECOMMUNICATIONS CORPORATION

APPRAISAL OF THE FIRST TELECOMMUNICATIONS DEVELOPMENT PROJECT

Demand for Telephone Connections

1. The Burma telecommunications entity has maintained over the years a list of customers waiting for service in the 13 largest cities only. This record does not represent all of the unsatisfied demand in those places since potential customers have not only been deterred by the long waiting time but also have been actively dissuaded from applying.

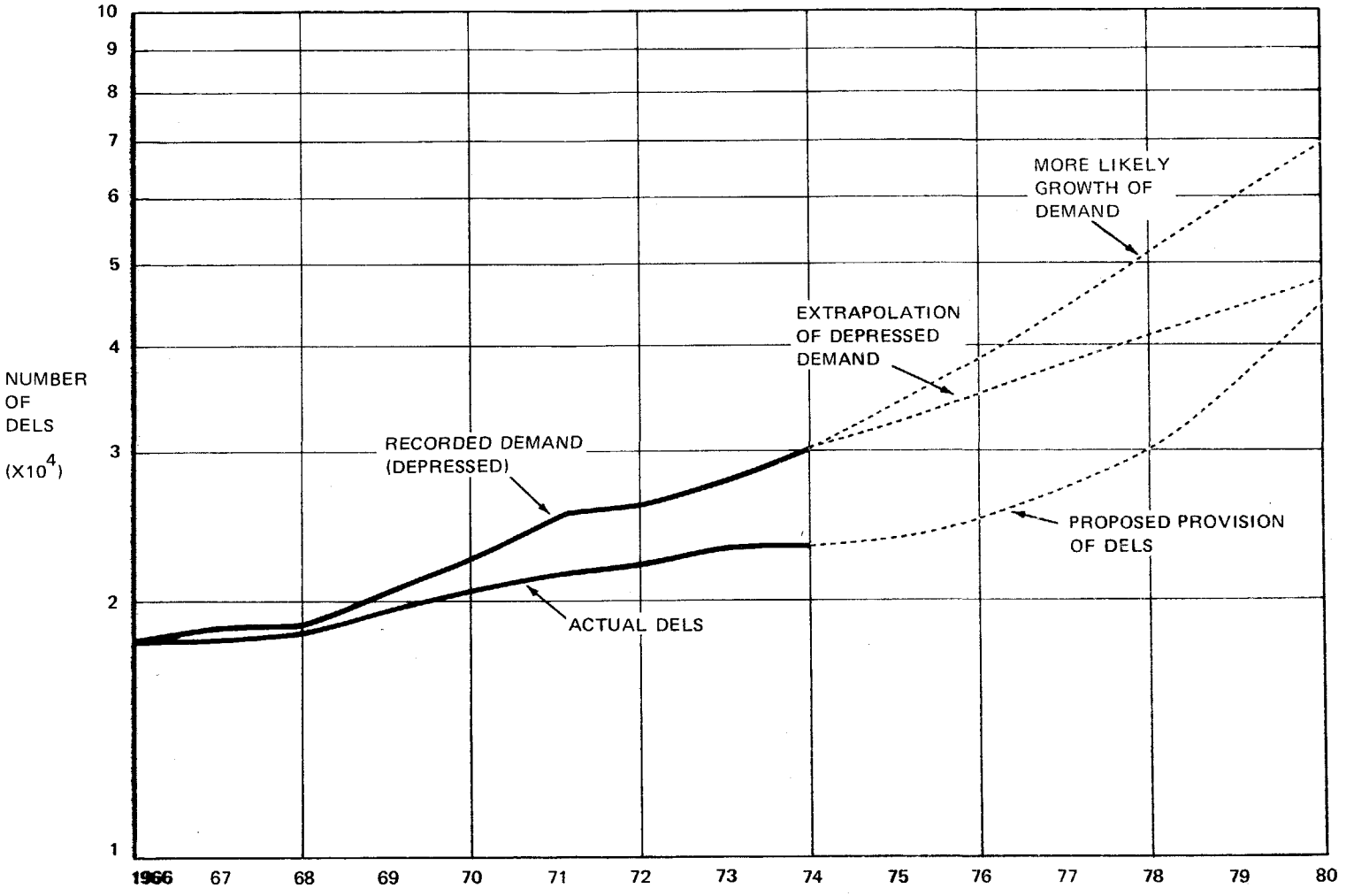
2. In order to show the conservative nature of the network expansion proposed in the project, this record of waiting applicants only in the 13 towns was used to represent the unsatisfied demand for telephone service in all Burma in assessing the historical demand for telephone service (subscribers served plus waiting applicants). Chart No. 9505 records the resulting figures and shows an extrapolation of them by an exponential curve of best fit as an estimate of future demand. It will be seen that even this conservative estimate gives a level of demand exceeding the network capacity available at the end of the project (end FY79) by about 8,000 DELs.

3. Also shown on the chart is another projection which is considered more realistic, though still conservative. It is based on the experience of many countries that have passed through the current level of development in Burma and assumes that demand for service doubles within five years (14% annual growth of demand). On this basis unsatisfied demand at the end of the project (end FY79) would be far larger - about 28,000 DELs.

4. But the real need for telecommunication services is much greater than the levels being discussed here. Generally, the Burmese population has no experience of what good quality telecommunications would do for the enterprises and social activities in which they take part. History in other countries shows that demand will rise as these possibilities are demonstrated to them with system improvement. Another demand generating factor is that the utility of the system grows with size. Figure 9657 shows how systems in the more developed countries have grown over the years in response to this growing demand for service. It will be seen that most of the developed nations were more developed telephone-wise in 1900 than Burma is today as measured by the number of main stations per 100 of population; a time when economic and business management were far simpler than they are today.

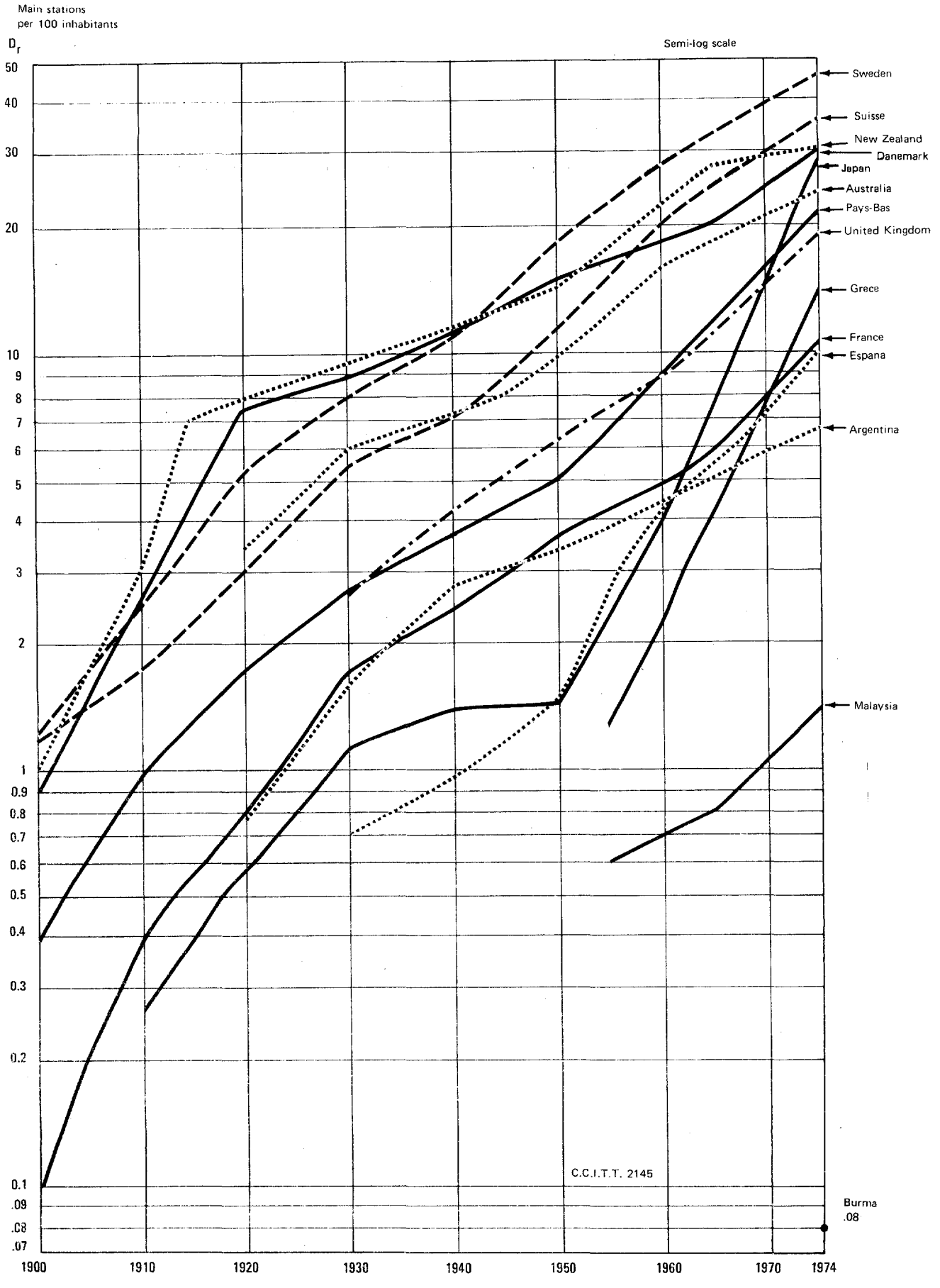
March 3, 1975

DEMAND FOR DIRECT TELEPHONE EXCHANGE LINES



World Bank—9505

DEVELOPMENT OF TELEPHONE DENSITY, 1900–1974



World Bank–9657

BURMA

POSTS AND TELECOMMUNICATIONS CORPORATION

APPRAISAL OF THE FIRST TELECOMMUNICATIONS DEVELOPMENT PROJECT

Rate of Return

Net Benefits and Rate of Return

1. Capital expenditures related to the project are based on 1975 prices and exclude taxes, duties and price contingency allowances. The cost and benefit streams are as follows:

Fiscal Year	Capital Expenditure	Operating Costs	Revenues	Net Benefits
	(in thousands of K's)			
1976	3,886	270	438	(3,718)
1977	35,691	906	1,430	(35,167)
1978	84,556	1,965	3,894	(82,627)
1979	14,306	4,198	11,620	(6,884)
1980	284	6,257	30,999	24,458
1981	(1,559)	6,831	39,431	34,159
1982-84	(1,559)	6,831	46,174	40,902
1985-98	-	6,831	46,174	39,343
1999	(14,028)	6,831	46,174	53,371

The rate of return on the project, defined as the discounted rate which equalizes the streams of net benefit as shown above is 21.55%.

Benefit Period

2. The period of benefits of the project extends from FY76, when the first disbursement will be made, to FY99 when, on average, the plant provided under the project will have completed its useful life in accordance with the present composite depreciable life of 23.5 years.

Theft of Line Wire

3. A negative investment of K 1,559 thousand has been included for the five year period FY80-84 to reflect, conservatively, the savings in the cost of line wire replacement resulting from the establishment of a microwave network and, thereby, the reduction of the theft of line wire.

Residual Value

4. The residual value of the capital improvements under this project has been estimated to be 10% of the original cost value. This residual value is expected to be available during FY99, the final year of the composite life of the plant provided under the project.

Shadow Pricing

5. The foreign exchange component of all capital expenditures and operating material costs can be shadow-priced based on an exchange rate of K 10.00 to US$1.00 rather than the current official exchange rate of K 6.24 to US$1.00. The resulting rate of return will be 15.05%.

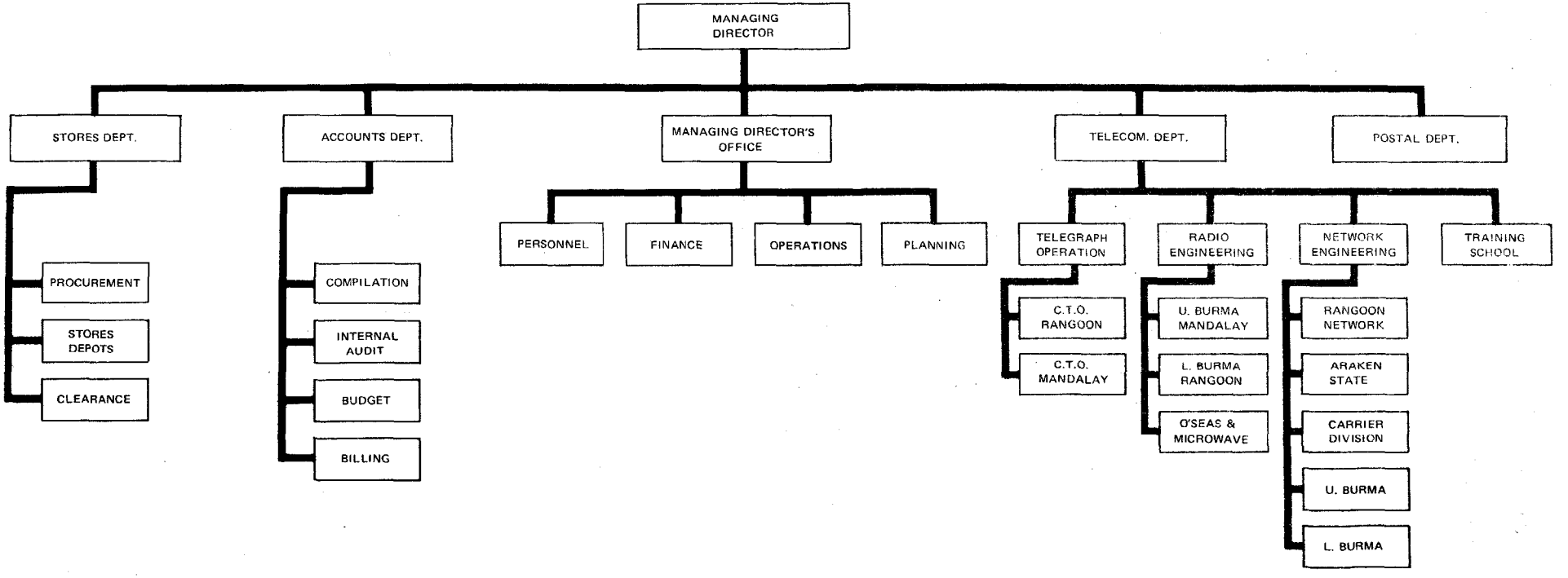
Sensitivity Analysis

6 A sensitivity analysis was performed which produced the following results:

	Rate of Return
Revenue decrease of 10%	19.25
Expense increase of 10%	21.15
Capital expenditure increase of 10%	19.85
Two year delay in completion of project	17.75
Unfavorable combination of conditions including:	
(i) 10% revenue decrease	
(ii) 10% operating expense increase	
(iii) 10% construction cost increase	
(iv) Two year delay in completion of project	14.55

April 22, 1975

EXISTING ORGANIZATION – BURMA POSTS & TELECOMMUNICATIONS CORPORATION



World Bank–9506

BURMA

POSTS AND TELECOMMUNICATIONS CORPORATION

APPRAISAL OF THE FIRST TELECOMMUNICATIONS DEVELOPMENT PROJECT

Representative Tariffs at November 30, 1974

	K	US$
1. Telephone		
Monthly rental		
Private subscribers	20.00	3.21
Government subscribers	37.50	6.01
Internal extension	8.00	1.28
Local call charge - private subscribers	.10	.02
Installation charge - private subscribers	60.00	9.62
Deposit - private subscribers	100.00	16.03
Trunk call charges (per 3 minutes)		
up to 10 airline miles	.50	.08
10 to 25 airline miles	1.00	.16
25 to 50 airline miles	2.00	.32
over 50 airline miles	3.00	.48
2. Telegrams		
First 16 words in Burmese or first 8 words in English	.60	.10
Each additional word	.10	.02
Surcharge on each telegram		
Ordinary	.25	.04
Express	.50	.08

March 3, 1975

BURMA

POSTS AND TELECOMMUNICATIONS CORPORATION

TELECOMMUNICATIONS BRANCH

Statement of Financial Position
(millions of Burmese Kyats)

	Actual		Forecast						
	Sept. 30		March 31						
As of:	1973	1974	1975	1976	1977	1978	1979	1980	1981
ASSETS									
Fixed Assets									
Plant in service	105.0	105.6	108.2	114.2	131.1	193.4	277.9	332.9	447.9
Less: Accumulated depreciation	62.6	64.5	69.0	73.7	78.9	85.8	95.8	108.8	125.4
Net plant in service	42.4	41.1	39.2	40.5	52.2	107.6	182.1	224.1	322.5
Plant under construction	-	-	-	4.2	38.9	90.1	50.4	87.3	71.7
Total Fixed Assets	42.4	41.1	39.2	44.7	91.1	197.7	232.5	311.4	394.2
Current Assets									
Cash and consolidated fund	17.6	17.2	31.4	31.2	13.2	10.1	9.1	6.9	6.8
Subscriber accounts receivable	15.1	16.3	13.8	12.9	12.7	12.9	14.2	17.0	19.5
Materials and supplies	9.0	8.7	8.9	9.8	10.0	10.5	11.0	11.5	12.1
Other current assets	3.8	3.7	.2	.2	.2	.3	.3	.4	.4
Total Current Assets	45.5	45.9	54.3	54.1	36.1	33.8	34.6	35.8	38.8
Total Assets	87.9	87.0	93.5	98.8	127.2	231.5	267.1	347.2	433.0
LIABILITIES									
Equity									
Capital-beginning of period	67.3	73.2	75.7	82.4	88.3	92.8	96.5	99.5	110.3
Current year's income	5.9	2.5	6.7	5.9	4.5	3.7	3.0	10.8	15.2
Total Equity	73.2	75.7	82.4	88.3	92.8	96.5	99.5	110.3	125.5
Long-term Debt									
Proposed IDA credit	-	-	-	.2	25.1	106.4	128.5	128.3	125.4
Local financing	-	-	-	-	-	20.0	20.0	26.0	34.0
Future financing	-	-	-	-	-	-	10.8	66.0	126.3
Total Long-term Debt	-	-	-	.2	25.1	126.4	159.3	220.3	285.7
Other Liabilities									
Customer deposits	2.7	2.7	2.7	2.8	3.0	3.1	3.5	4.1	4.8
Provident fund	1.0	1.0	1.1	1.1	1.1	1.1	1.2	1.2	1.2
Total Other Liabilities	3.7	3.7	3.8	3.9	4.1	4.2	4.7	5.3	6.0
Current Liabilities									
Income Tax	10.7	7.1	6.8	5.9	4.6	3.8	3.0	10.7	15.2
Other	.3	.5	.5	.5	.6	.6	.6	.6	.6
Total Current Liabilities	11.0	7.6	7.3	6.4	5.2	4.4	3.6	11.3	15.8
Total Liabilities	87.9	87.0	93.5	98.8	127.2	231.5	267.1	347.2	433.0
Debt-equity ratio					21/79	57/43	62/38	67/33	69/31

February 12, 1975

BURMA

POSTS AND TELECOMMUNICATIONS CORPORATION

APPRAISAL OF THE FIRST TELECOMMUNICATIONS DEVELOPMENT PROJECT

Notes and Assumptions on the Statement of Financial Position

1. Plant under construction - value at end of each fiscal year was determined on basis of engineering estimates of plant not commissioned at that date.

2. Subscribers accounts receivable - estimated values at year end initially reflect reductions relating to settlement of government accounts followed by increases relating to increased subscribers and billing amounts.

3. Material and supplies - estimated values reflect increases relating to growth of values of plant in service giving consideration to the write-off of obsolete material presently included in inventory values.

4. Customer deposits - estimated values reflect growth in number of non-government subscribers.

5. Provident fund - estimated values reflect increased number of employees and increased salary levels.

BURMA

POSTS AND TELECOMMUNICATIONS CORPORATION

TELECOMMUNICATIONS BRANCH

Statement of Sources and Applications of Funds
(millions of Burmese Kyats)

For Fiscal Year Ended March 31:	1975	1976	1977	1978	1979	1980	1981
Sources of Funds							
Internal Generation							
Net income before interest	6.7	5.9	5.6	9.9	14.6	26.6	36.1
Depreciation	4.5	4.7	5.2	6.9	10.0	13.0	16.6
Total Internal Generation	11.2	10.6	10.8	16.8	24.6	39.6	52.7
Borrowings							
Proposed IDA Credit	-	.2	24.9	81.3	22.1	2.5	-
Local cost financing	-	-	-	20.0	-	6.0	8.0
Future foreign exchange financing	-	-	-	-	10.8	55.2	60.3
Total Borrowings	-	.2	24.9	101.3	32.9	63.7	68.3
Customers Deposits	-	.1	.2	.1	.4	.6	.7
Provident Fund Contribution	.1	-	-	-	.1	-	-
Total Sources	11.3	10.9	35.9	118.2	58.0	103.9	121.7
Applications of Funds							
Construction	2.6	10.2	51.6	113.5	44.8	91.9	99.4
Debt Service							
Amortization							
Proposed IDA Credit	-	-	-	-	-	2.7	2.9
Total Amortization	-	-	-	-	-	2.7	2.9
Interest							
Proposed IDA Credit	-	-	1.1	5.6	9.9	11.1	10.9
Local cost financing	-	-	-	.6	1.2	1.4	1.8
Future foreign exchange financing	-	-	-	-	.5	3.3	8.2
Total Interest	-	-	1.1	6.2	11.6	15.8	20.9
Total Debt Service	-	-	1.1	6.2	11.6	18.5	23.8
Increase (Decrease) in Working Capital							
Cash	14.2	(.2)	(18.0)	(3.1)	(1.0)	(2.2)	(.1)
Other than cash	(5.5)	.9	1.2	1.6	2.6	(4.3)	(1.4)
Total Increase (Decrease) in Working Capital	8.7	.7	(16.8)	(1.5)	1.6	(6.5)	(1.5)
Total Applications	11.3	10.9	35.9	118.2	58.0	103.9	121.7
Debt Service Coverage	-	-	9.8	2.7	2.1	2.1	2.2

February 12, 1975

BURMA

POSTS AND TELECOMMUNICATIONS CORPORATION

TELECOMMUNICATIONS BRANCH

Income Statement
(millions of Burmese Kyats)

For the Fiscal Period:	Actual September 30 1971	1972	1973	1974 1/	Forecast March 31 1975	1976	1977	1978	1979	1980	1981
Operating Revenues											
Telephone	19.3	18.8	19.2	9.3	20.0	20.8	22.1	24.3	29.0	40.2	49.9
Telegraph	8.4	9.7	9.6	2.7	9.0	9.1	9.2	9.3	9.3	12.1	15.7
Telex	.6	1.1	1.1	.7	1.2	1.4	1.5	1.7	1.9	3.3	5.0
Other	.9	1.0	2.3	.6	1.5	1.5	1.6	1.5	1.6	1.7	1.8
Proposed tariff increase	-	-	-	-	-	-	-	5.4	8.9	17.7	21.9
Total Operating Revenues	29.2	30.6	32.2	13.3	31.7	32.8	34.4	42.2	50.7	75.0	94.3
Operating Expenses											
Operational costs	8.3	8.9	8.7	3.9	9.9	12.3	14.6	16.8	17.9	19.1	20.3
Maintenance and repairs	1.2	1.2	1.3	.6	1.1	1.2	1.4	1.6	1.8	2.0	2.3
Depreciation	-	-	3.6	1.8	4.5	4.7	5.2	6.9	10.0	13.0	16.6
Administrative Costs	1.0	1.0	2.0	2.1	2.7	2.8	3.0	3.2	3.4	3.6	3.8
Total Operating Expenses	10.5	11.1	15.6	8.4	18.2	21.0	24.2	28.5	33.1	37.7	43.0
Net Operating Income Before Taxes	18.7	19.5	16.6	4.9	13.5	11.8	10.2	13.7	17.6	37.3	51.3
Income Taxes	-	-	10.7	2.4	6.8	5.9	4.6	3.8	3.0	10.7	15.2
Net Operating Income	18.7	19.5	5.9	2.5	6.7	5.9	5.6	9.9	14.6	26.6	36.1
Interest Expense	-	-	-	-	-	-	1.1	6.2	11.6	15.8	20.9
Net Income	18.7	19.5	5.9	2.5	6.7	5.9	4.5	3.7	3.0	10.8	15.2
Average Net Plant in Service	NA	NA	NA	41.8	40.2	39.9	46.3	79.9	144.9	203.1	273.3
Annual Rate of Return	NA	NA	NA	12.0	16.7	14.8	12.1	12.4	10.1	13.1	13.2
Operating Ratio Before Income Tax %	NA	NA	48	63	57	64	70	68	65	50	46

1/ Fiscal year revised to April-March from October-September. The fiscal period 1974 was a six months period from October 1, 1973 to March 31, 1974.

February 12, 1975

BURMA

POSTS AND TELECOMMUNICATIONS CORPORATION

TELECOMMUNICATIONS BRANCH

Telephone Revenues
(millions of Burmese Kyats)

For the Fiscal Period	Year Ended Sept. 30 1973	Six Months Ended Mar. 30 1974	Year Ending March 31 1975	1976	1977	1978	1979	1980	1981
Rental	-	-	9.748	10.259	7.639	8.673	10.362	13.073	16.583
	9.514	4.774	-	-	-	-	-	-	-
Installation charges	-	-	.038	.071	.141	.197	.413	.607	.703
Local call charges	1.821	.884	1.805	1.805	5.438	6.276	7.287	9.338	11.489
Long distance charges	7.692	3.528	8.160	8.405	8.657	8.917	10.734	16.959	20.864
International call charges	.159	.090	.220	.227	.234	.241	.248	.255	.263
TOTAL	19.186	9.276	19.971	20.767	22.109	24.304	29.044	40.232	49.902

February 10, 1975

BURMA

POSTS AND TELECOMMUNICATIONS CORPORATION

TELECOMMUNICATIONS BRANCH

Estimated Expense Detail
(millions of Burmese Kyats)

For the Fiscal Period:	Year Ended Sept.30 1973	*Six Months* Ended March 31 1974	Year Ending March 31 1975	1976	1977	1978	1979	1980	1981
Operational Costs									
Direct labor	7.754	3.044	7.292	9.340	11.372	13.264	14.061	14.938	15.902
Variable costs									
Power	.303	.067	.367	.372	.378	.397	.417	.437	.459
Travelling allowance	.169	.105	.244	.300	.347	.394	.433	.477	.525
Total variable	.472	.172	.611	.672	.725	.791	.850	.914	.984
Fixed costs									
Establishment	-	.457	1.441	1.684	1.925	2.152	2.309	2.482	2.672
Transport charges	.117	.047	.161	.173	.185	.198	.212	.227	.243
Other fixed charges	.301	.113	.367	.389	.412	.437	.463	.491	.520
Total fixed	.418	.617	1.969	2.246	2.522	2.787	2.984	3.200	3.435
Total Operational Costs	8.644	3.833	9.872	12.258	14.619	16.842	17.895	19.052	20.321
Maintenance and Repairs									
Direct purchases									
Inland	-	.084	.115	.132	.152	.228	.262	.302	.347
Overseas	-	.282	.519	.597	.687	.736	.847	.973	1.120
Total direct purchases	-	.366	.634	.729	.839	.964	1.109	1.275	1.467
Outside labor charges	-	-	.133	.153	.176	.202	.233	.268	.308
Indirect materials	-	.126	.020	.022	.025	.029	.032	.037	.042
Operational maintenance									
Buildings	.296	-	.200	.216	.233	.252	.272	.294	.318
Vehicles, office equipment, furniture	1.029	.075	.060	.065	.070	.076	.082	.088	.095
Total operation maintenance	1.325	.075	.260	.281	.303	.328	.354	.382	.413
Administrative maintenance									
Buildings	-	-	.035	.040	.045	.050	.055	.060	.065
Office equipment, furniture, vehicles	-	-	.011	.012	.013	.015	.016	.018	.019
Total administrative maintenance	-	-	.046	.052	.058	.065	.071	.078	.084
Total Maintenance and Repairs	1.325	.567	1.093	1.237	1.401	1.588	1.799	2.040	2.314
Administrative Costs									
Pay and allowances	1.418	1.255	1.843	1.917	1.994	2.073	2.156	2.242	2.332
Indirect charges									
Printing and stationery	.373	.105	.555	.616	.684	.759	.842	.935	1.038
Others	.242	.732	.261	.292	.327	.367	.411	.460	.515
	.615	.837	.816	.908	1.011	1.126	1.253	1.395	1.553
Total Administrative Cost	2.033	2.092	2.659	2.825	3.005	3.199	3.409	3.637	3.885

January 17, 1975

BURMA

POSTS AND TELECOMMUNICATIONS CORPORATION

APPRAISAL OF THE FIRST TELECOMMUNICATIONS DEVELOPMENT PROJECT

Notes and Assumptions on Income Statement

Revenues

Telephone

Rental - Projected on basis of increased DELs with average rental per DEL stimulated 3% per year beginning with FY78. Reflects revision of government billing practice in FY77 reducing government rental charge and billing government customers for a local call charge at the level of tariffs used for private customers.

Installation charge - Projected on the basis of increased DELs with average charge per DEL stimulated 3% per year beginning with FY78.

Local call charge - Projected on the basis of increased DELs. Reflects revision of government billing practices in FY77 when the regular local call charge is to be initiated for all government calls. Average charge per DEL estimated to be K 210 in FY77; K 220 in FY78 and 79; and K 230 in FY80 and 81.

Long distance charges - Projected on basis of ITU traffic study which estimated traffic in erlangs (units for measuring traffic) for FY79. This traffic data was converted to billable minutes and then to revenues. Subsequent years' revenues were then estimated based on increased DELs with average charge per DEL stimulated 3% per year beginning with FY78.

Telegraph - Projected on the basis of very small annual increases until 1980 when telegraph revenues were stimulated 30% reflecting the proposed project and the number of machine locations being increased from 10 to 30.

Telex - Projected on the basis of very small annual increases until 1980 when national telex and gentex are introduced. Revenues stimulated 75% in 1980 and 50% in 1981.

Proposed Tariff Increases

1978 and subsequent years - A revenue increase is projected at 86% on local call charge revenue.

1979 and subsequent years - An additional revenue increase is projected based on the following stepped long distance tariff.

Airline miles	Three minute charge
0-50	K 1.50
51-100	K 3.00
101-200	K 4.50
201-400	K 6.00
over-400	K 7.50

Operational Costs

Direct Labor

1975-78 - Projected on the basis of planned increases in staff and a 3% annual increase in wages in accordance with past experience and current budget instructions.

1979-81 - Projected on the basis of a 6% increase per year.

Variable Costs - Travelling Allowances

1975-78 - Projected at experienced cost per employee.

1979-81 - Projected at 10% increase per annum.

Fixed costs - establishment - Projected by use of same method as used for direct labor.

Fixed costs - transport - Projected on the basis of an increase of 7% per year.

Fixed costs - other - Projected on the basis of an increase of 6% per year.

Maintenance and Repairs

Direct purchase - Projected on the basis of an increase of 15% per year.

Outside labor - Projected on the basis of an increase of 15% per year.

Indirect materials - Projected on the basis of an increase of 15% per year.

Operational maintenance - Projected on the basis of an increase of 8% per year.

Administration maintenance - Projected on the basis of an increase of K 5,000 per year for buildings and 10% for other than buildings.

Depreciation - Calculated at an anticipated composite rate of 4.25%.

Administrative Costs

Pay and allowances - Projected on the basis of an increase of 4% per year.

Indirect - printing and stationery - Projected on the basis of an increase of 11% per year.

Other - Projected on the basis of an increase of 12% per year.

Inflation

No factors for inflation has been specifically reflected in the projections of future expenses as the Government of Burma presently does not recognize inflation as a factor in future cost and, in fact, avidly pursues policies to prevent and limit its occurence. However the comparatively high increase percentage utilized for many expense projections were designed, with the acceptance of P&T's management, to include a factor for inflation. As a result of the Government policy, wage increases have been limited to 3% per annum while expenses, such as material purchases, contract labor, maintenance expenditure, printing and stationery, have been increased at rates of from 10 to 15% per annum.

March 4, 1975

BURMA

POSTS AND TELECOMMUNICATIONS CORPORATION

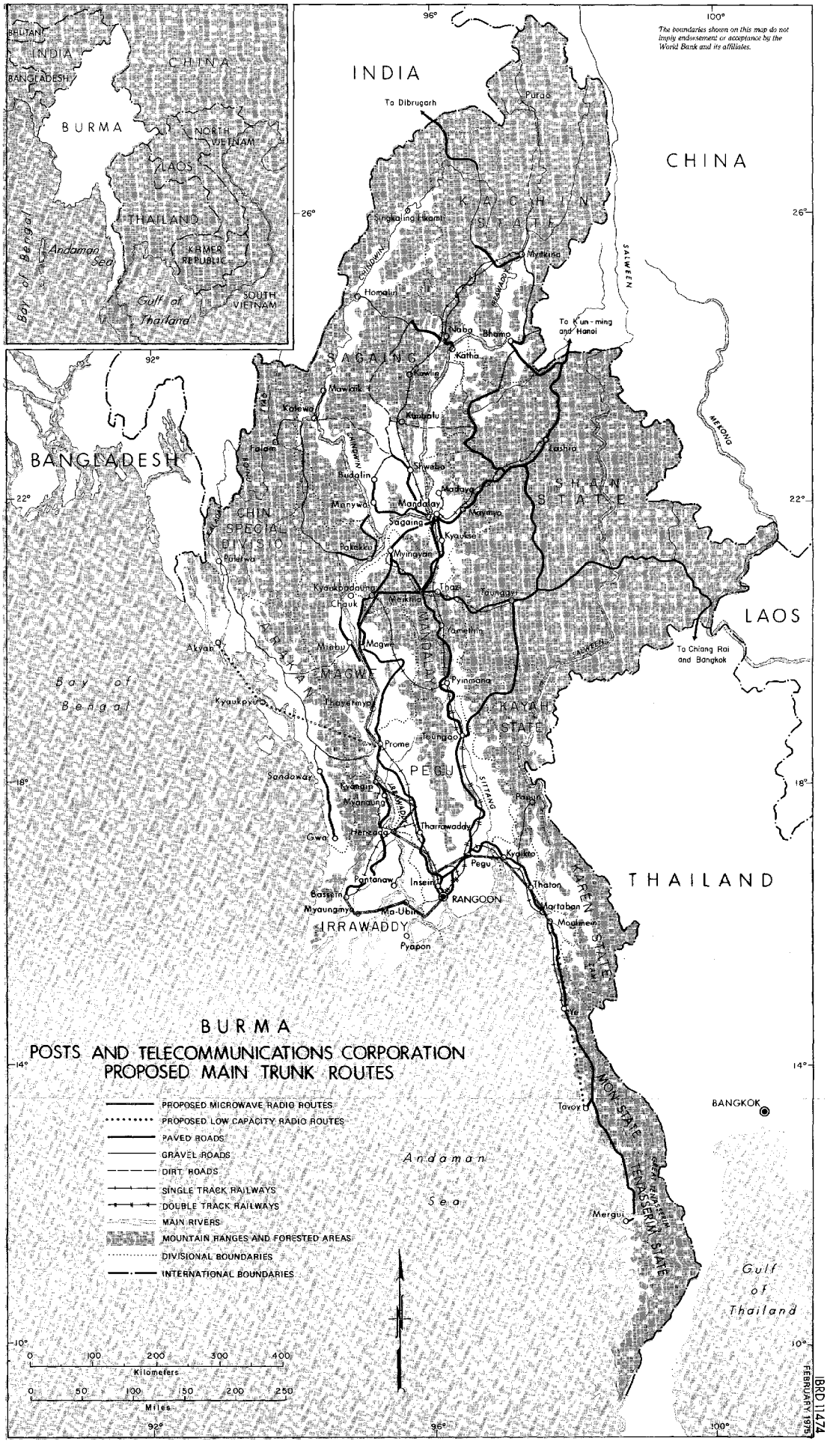
TELECOMMUNICATIONS BRANCH

Performance Indicators
(at March 31)

	Actual	Forecast					
	1974	1975	1976	1977	1978	1979	1980
			*********Project Period**********				
Exchange capacity - Automatic	17,000	17,000	17,000	18,000	24,200	34,000	44,800
Manual	10,320	10,500	10,700	11,000	11,200	7,200	7,200
Total	27,320	27,500	27,700	29,000	35,400	41,200	52,000
Number of DEL's	23,042	23,643	24,774	27,016	30,042	36,200	45,000
Exchange fill	84%	86%	89%	93%	85%	88%	87%
Number of telephones	29,494	30,250	31,500	34,500	38,000	46,500	57,500
Number of trunk circuits	329	329	329	329	329	680	750
Telephone revenue per DEL							
In Burmese K's	NA	857	859	853	1,041	1,144	1,426
In equivalent US$	NA	137	138	137	167	183	229
Operation ratio (before income taxes) %	63	57	64	70	68	65	50
Rate of return (after income taxes) %	12.0	16.7	14.8	12.1	12.4	10.1	13.1
Operating costs per DEL (K's)	NA	780	867	935	999	999	929

February 11, 1975

ANNEX 14


The boundaries shown on this map do not imply endorsement or acceptance by the World Bank and its affiliates.
INDIA
CHINA
BANGLADESH
LAOS
THAILAND
BURMA
NORTH VIETNAM
KHMER REPUBLIC
SOUTH VIETNAM
Andaman Sea
Gulf of Thailand
Bay of Bengal
To Dibrugarh
Purdo
Singkaling Hkamti
KACHIN STATE
Myitkina
Homalin
Naba
Bhamo
Katha
To Kun-ming and Hanoi
SAGAING
Kawlin
Mawlaik
Kalewa
Kanbalu
Falam
Leshio
Shwebo
Budalin
Monywa
Mandalay
Madaya
Kyaukse
SHAN STATE
CHIN SPECIAL DIVISION
Sagaing
Pakokku
Myingyan
Pakokku
Kyaukpadaung
Chauk
Meiktila
Thazi
Taunggyi
Kamethin
Akyab
Minbu
Magwe
MAGWE
MANDALAY
Pyinmana
Bay of Bengal
Kyaukpyu
Yenangyaung
KAYAH STATE
Toungoo
Prome
PEGU
Sandoway
Pegu
Kyaikto
Thaton
Martaban
Moulmein
Gwa
Henzada
Tharrawaddy
Pantanaw
Insein
RANGOON
Bassein
Myaungmya
Ma-Ubin
IRRAWADDY
Pyapon
KAREN STATE
Ye
MON STATE
Tavoy
TENASSERIM STATE
Mergui
BANGKOK
Andaman Sea
Gulf of Thailand
To Chiang Rai and Bangkok
BURMA
POSTS AND TELECOMMUNICATIONS CORPORATION
PROPOSED MAIN TRUNK ROUTES
PROPOSED MICROWAVE RADIO ROUTES
PROPOSED LOW CAPACITY RADIO ROUTES
PAVED ROADS
GRAVEL ROADS
DIRT ROADS
SINGLE TRACK RAILWAYS
DOUBLE TRACK RAILWAYS
MAIN RIVERS
MOUNTAIN RANGES AND FORESTED AREAS
DIVISIONAL BOUNDARIES
INTERNATIONAL BOUNDARIES
0 100 200 300 400
Kilometers
0 50 100 150 200 250
Miles
IBRD 11474
FEBRUARY 1975