
APPRAISAL REPORT: Proposed Mixed Credit Program for AT&T and the Indonesia Second Telecommunications Switch Development Project

*Bureau for Private Enterprise
U.S. Agency for International Development*

Prepared for: Bureau for Asia and Near East

*Sponsored by: Private Enterprise Development Support Project II
Project Number 940-2028.03
Prime Contractor: Ernst & Young*

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EXECUTIVE SUMMARY

A.I.D., in joining with the Export-Import Bank to help AT&T furnish concessional financing for the Indonesia Second Telecommunications Switch Development (STDI-II) Project, has an opportunity to:

- assist in generating substantial economic benefits for Indonesia by lowering the cost of expanding its telephone system;
- assist in generating approximately \$18 million per year in additional U.S. exports through the year 2000.

Indonesia has a telephone density that is among the lowest in the world. The STDI-II Project will significantly expand the country's weak telecommunications system, and therefore, is considered a key development priority for the country.

The project has three objectives: (i) to develop Indonesia's switch manufacturing capability, employing the latest technology; (ii) to install 350,000 digital telephone line units to support another 2 million subscriber lines; and (iii) to introduce an element of competition to break the sole supplier's locally established monopoly and lower prices.

The Government of Indonesia (GOI) has pre-selected a U.S. consortium (AT&T) and four other non-U.S. consortia to submit bids for supplying telephone switch equipment for STDI-II. The entire procurement is estimated to be worth \$440 million in combined foreign exchange and local currency costs. AT&T is proposing to supply the needed equipment and services under a joint venture with its Dutch and Spanish subsidiaries; the U.S. share of foreign exchange costs is estimated at \$60 million.

Indonesia requires that bidders on large capital projects submit concessional financing packages to cover the foreign exchange costs. This rule, known as Indonesia Presidential Decree No. 8, or INPRES 8, requires an interest rate of 3.5% over a 25 year term with a 7 year grace period.

AT&T will submit a strong technical bid. The more advanced technology used by AT&T will enable it to offer services that are not available in systems offered by its competitors. With respect to price, AT&T also has the capacity to offer a highly competitive proposal.

With respect to financing, however, AT&T is at a significant disadvantage. All competitors are likely to receive financing assistance from their governments that will enable them to offer INPRES 8 or better terms. It will take a \$60 million loan, including a \$23 million grant component, from the U.S. to complete AT&T's INPRES 8 financing package. A.I.D. is considering providing \$12 million of the required \$23 million; the remainder is to be provided by EXIM.

This report provides an appraisal of the economic benefits accruing to Indonesia and the U.S. from the STDI-II project, AT&T's technical competitiveness in this procurement, and an analysis of the financing requirements.

I. BACKGROUND

The Government of Indonesia (GOI) has pre-selected a U.S. consortium (AT&T) and four other non-U.S. consortia to submit bids for supplying telephone switch equipment for the Second Telecommunications Switch Development Project (STDI-II). The project is an important development priority for Indonesia. It is intended to expand the country's telecommunications facilities from the current capacity of 1.2 million lines to 3.0 million lines by 1993 according to projections in the new Indonesian Five Year Plan (REPELITA V).

A. Project Requirements

This phase of the project will require the supply and installation of 350,000 lines of switching capacity from 1991 through 1993. Approximately 50,000 lines are to be imported and installed in the first year (1991). The remaining 300,000 lines are to be manufactured in Indonesia with at least a 30% local content. Construction and furnishing of manufacturing facilities and training of employees and management are the responsibility of the winning bidder.

There are significant differences among the telecommunications technologies and equipment being offered by the competitors in terms of the fit with the Indonesian specifications, capacity for future expansion and customer services provided. Although Siemens (Germany) provided the switching equipment currently installed in Indonesia, this equipment can be integrated with the equipment to be provided in this phase. However, the supplier that is awarded the contract for STDI-II will effectively establish the technology standard for Indonesia's telecommunications system through the year 2000. For that reason, the winning bidder is virtually assured of being the supplier for all subsequent phases of expansion of Indonesia's telecommunications system.

From the standpoint of technical competitiveness, AT&T enjoys a significant advantage. The technical specifications for the equipment essentially follow the AT&T standard. Moreover, the more advanced technology used by AT&T enables it to offer services such as remote maintenance and other features that are not currently available in the systems offered by its competitors. In that the technologies offered by the other competitors are nearing the end of their life cycles and are not all that well suited to Indonesia's requirements, it is reasonably certain that AT&T would win the contract in an open and fair competition.

B. Financing Requirements

Past experience and current market intelligence indicate that each of the other competitors, Fujitsu, NEC, Alcatel (French and German joint-venture) and Ericsson (Australia) will receive credits

or other financing assistance from consortium members' governments. At a minimum, this assistance will bring the cost of financing the equipment sales down to the financing terms that have been established by the Indonesians. These terms are referred to as INPRES 8 and provide for 3.5% financing over a 25 year term with a seven year grace period. The Export-Import Bank (EXIM) issued a tentative commitment to AT&T to provide a \$60 million loan at INPRES 8 terms as part of the pre-qualifications package submitted to Indonesia. Subsequently, EXIM determined that it could not provide INPRES 8 terms and has requested grant assistance from other U.S. agencies to cover approximately one-half of the amount requested by AT&T.

Estimates submitted by EXIM indicated that a \$30 million grant portion combined with a \$30 million loan at standard EXIM rates (8.3% for 10 years with no grace) would reduce the financing costs to INPRES 8 terms; the analysis contained in this report estimates that a only \$23 million grant component is required to meet INPRES 8 terms. Subject to further analysis, A.I.D. is considering providing up to \$12 million in grant funds to EXIM, with the understanding that EXIM would provide the balance of the required financing. The Trade and Development Program (TDP) has agreed informally to support AT&T with a \$500,000 training program.

The total U.S. content of exports is estimated by AT&T to be \$91.0 million for the current project (1990-1994), and \$390 million over the initial ten years of the expansion program (1990-2000). Other foreign content will be provided by the consortium's other members, AT&T Network Systems International (Netherlands) and Telefonica Espana (Spain). The foreign content to be provided by the other members of the AT&T consortium is a bargaining lever in obtaining concessionary financing from the Spanish and Dutch governments and is a highly sensitive issue. Present indications are that exports from Spain and the Netherlands will be financed at INPRES 8 terms. Assuming that AT&T receives INPRES 8 from the U.S. and other governments involved, it will at least be on equal footing with its competitors in terms of its financing costs going into the negotiations.

It is generally acknowledged, however, that INPRES 8 financing terms are just a starting point and that the competitors will have to offer significantly softer financing terms in order to win. It will cost AT&T almost \$4.3 million for each 1% reduction in interest below INPRES 8 terms. Reducing the interest rate from 3.5% to 1% will increase AT&T's cost by nearly \$10.7 million.

The following sections of the report present an evaluation of the economic benefits accruing to Indonesia and the U.S., an independent assessment of the technical competitiveness of AT&T in this procurement and an analysis of the financing requirements.

II. DEVELOPMENTAL IMPACT

Indonesia currently has a telephone density that is among the lowest in the world. According to the 1989 CIA World Factbook, Indonesia has only 0.41 phones per 100 people. This is lower than the phone density in China (0.67 phones per 100 people). The chart on the following page compares phone density in several developing countries in East Asia.

Andrew Hardy ("The Role of the Telephone in Economic Development", Palo Alto: Stanford University, 1981) found a high correlation between telephone usage and economic development. The demand for telephone services no doubt benefits from economic development, but there are solid grounds for believing that the line of causation also runs from telecommunications to economic development. The STDI-II project will have several beneficial impacts on Indonesia's development. In addition to the direct economic benefits, the project will generate four types of indirect benefits: externalities, technology transfer and skill development, backward linkages, and export development.

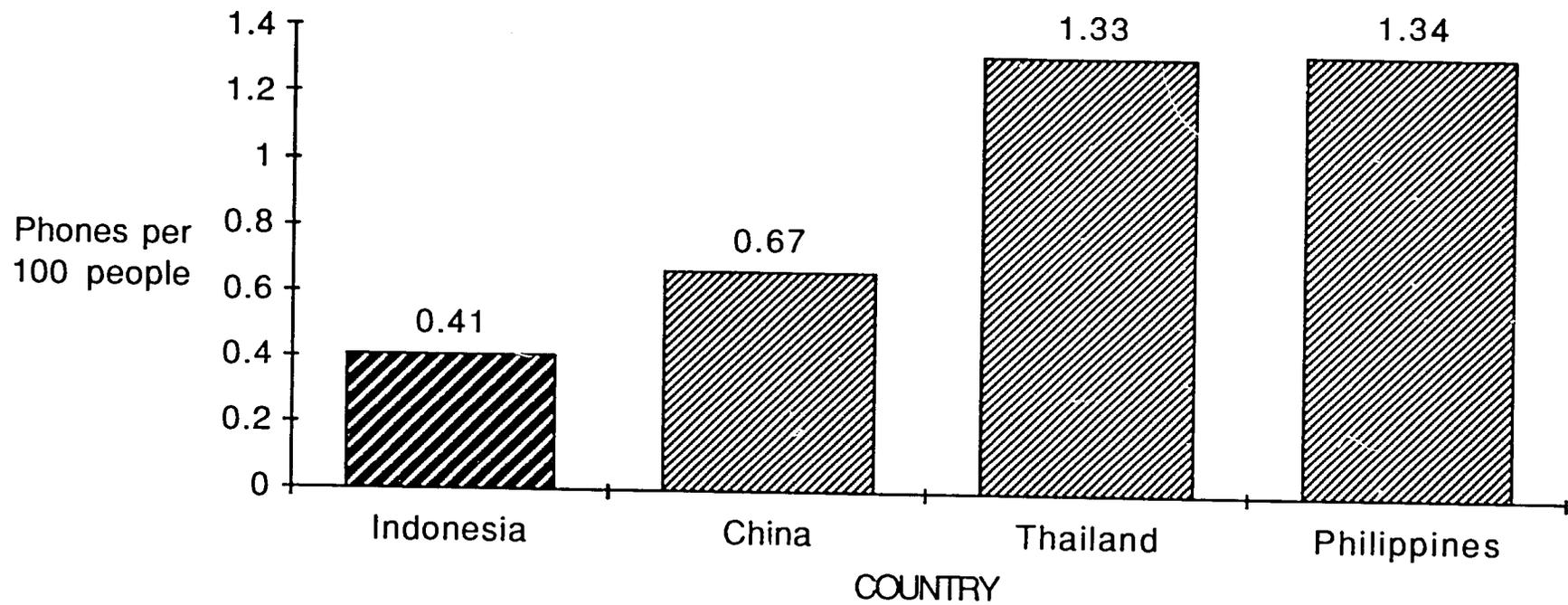
A. Direct Economic Benefits

The STDI-II project will produce direct economic benefits for its users, that is, residential and commercial telephone customers. The World Development Report 1988 (Washington: World Bank, 1988 p. 143) noted that "urban-based firms need transport and communications to do business with one another." It is important to note, however, that the STDI-II will have a significant impact beyond Indonesia's urban areas because a large number of the lines are designated for rural areas.

The STDI-II manufacturing component is likely to produce substantial direct economic benefits for Indonesia; the country's market size, resource availabilities, and lack of existing manufacturing capacity in switching equipment are all extremely favorable factors for the project. The World Bank noted that the "the development of efficient local telecommunication support industries (manufacturers, outside-plant and subscriber-connection contractors, and consulting firms) has been hampered by PERMUTEL's low and fluctuating level of investment."¹ In agreeing to a \$14.5 million loan that would improve PERMUTEL's investment capacity, the Bank acknowledged and endorsed the Government's objective to

¹ Report and Recommendation of the President of the International Bank for Reconstruction and Development to the Executive Directors on a Proposed Loan in an Amount Equivalent to US\$14.5 million to the Republic of Indonesia for the Telecommunications Technical Assistance Project. Report No. P-4387-IND. September 12, 1986, page 13.

INDONESIA'S TELEPHONE DENSITY COMPARED TO OTHER EAST ASIAN COUNTRIES



"develop sound construction, consulting and manufacturing industries to support the [telecommunications] sector."

The demand for switches is projected to grow rapidly in Indonesia over the next decade as new lines are added to the country's existing base. STDI-II will produce direct benefits for Indonesia by satisfying this demand from local production at a lower net foreign exchange cost than imports of similar switches from abroad. Moreover, this net foreign exchange savings should produce an acceptable economic rate of return on the investment in a local switchgear plant. Import replacement is not a good guide to project selection unless there is the prospect for efficient local production. The STDI-II manufacturing project is likely to be efficient and yield an acceptable economic rate of return for three reasons:

1. A large number of labor-intensive tasks involved in switch manufacturing will be conducted in Indonesia, which has abundant, low-cost labor.
2. The size of the Indonesian market offers substantial opportunities to exploit scale economies.
3. A proven, suitable manufacturing technology will be provided by AT&T.

An economic rate of return has not been computed for the STDI-II because comparable price data on inputs and outputs needed for the calculations are not readily available for technologically complex products such as switching gear. Nevertheless, the economic rate of return for STDI-II can be estimated indirectly by comparison with related projects in other developing countries. For example, in 1978 the World Bank approved a loan for switchgear manufacturing in India. The Project Performance Audit Report prepared in 1989 noted that the Bank had identified import-replacement as a high priority for the Indian telecommunications sector and had encouraged the Indian government to adopt electronic switching over the existing crossbar system. In the end, the Government of India decided to produce digital switches under a bilateral agreement with the Government of France, and production of switches under the Bank loan was dropped. While the Bank did not compute a formal economic rate of return for the manufacturing component in its appraisal of the overall project, it is clear that Bank staff regarded domestic production of switching equipment to be economically viable.

Another indirect means of judging the economic viability of STDI-II is the existence of successful export-oriented projects of similar size in other countries. AT&T maintains a switchgear production facility in Singapore which sells its products on the world market. Although the profitability of the Singapore joint venture is proprietary information, one must conclude from its

continued existence that it earns at least the average cost of capital of AT&T. Since Singapore's trade and domestic sectors are largely devoid of distortions that create differences between market and economic prices, one can conclude that the financial and economic rates of return for the project are equivalent. If one assumes further that Singapore's cost of borrowing does not exceed that of AT&T, the subsidiary generates economic benefits for the Singaporean economy.

B. Externalities

The expansion of telecommunications services will also produce indirect economic benefits. Many of Indonesia's workers and consumers will benefit even though they are not direct users of the system. The indirect benefits of telecommunication facilities are not normally reflected in economic rates of return calculations, but clearly are important in assessing the priority that telecommunication projects should have in Indonesia's development plans and in donor's assistance programs.

The evidence that projects such as STDI-II produce extensive externalities is substantial. A World Bank study by Robert J. Saunders, Jeremy Warford and Bjorn Wellenius (Telecommunications and Economic Development, Baltimore, Johns Hopkins University Press, 1983) outlines a wide variety of indirect means by which telecommunications improve the efficiency of industrial, commercial and agricultural sectors in developing countries. With specific reference to Indonesia, the Bank notes "improved telecommunications are critical to the [Indonesian] Government's efforts to attract foreign investment, develop non-oil exports and tourism to offset falling foreign exchange earnings from oil, reduce congestion in Jakarta and disperse industry and commerce to the small cities and outer islands, provide health, agricultural extension and other services to remote areas, and hasten national integration among the diverse and widespread population. Availability of reliable telephone and telex services would economize the use of transport facilities and improve the efficiency of the service sector" (Report No. P-4387-IND, p. 9).

Expanded telecommunications systems result in greater production efficiency and a wider array of consumer choices. The better the telecommunications system, the more relevant, accurate and timely business information is likely to be. Better information produces more efficient inventory control and improved scheduling of production runs and deliveries. The greater the telecommunications system, the more likely it is that firms will rely on outside and distant suppliers, reducing industry concentration and urban congestion.

Better information has similar effects on consumer choices. Markets are more efficient in the presence of low-cost and immediate information transmission. Through phone communication, consumers can seek out the lowest prices and sellers can seek out the highest prices. In Indonesia, for example, rural markets for capital are often segmented for reasons of geography and tradition, resulting in differential costs of capital. Greater access to telephone service by rural financial institutions and agents would reduce segmenting barriers and result in more similar borrowing and lending interest rates across the countryside. This in turn would produce more efficient investment and savings decisions.

One additional external benefit of local production of switching equipment will be the reduction in the number of switching technologies used in the country. The World Bank noted in its memorandum of the proposed loan to PERMUTEL the "extensive use of tied bilateral assistance, which has resulted in higher equipment costs and, more seriously, in the introduction of nine different switching systems in the country, each of which requires different operation and maintenance procedures, staff training, and spares. This has had a serious adverse impact on network operations and maintenance" (Report No. P-4387-IND, p. 13).

C. Technology Transfer and Skill Development

The joint venture to be established by AT&T in Indonesia to manufacture the 300,000 lines of network switching required in the last three years of the STDI-II project will enable Indonesia to acquire technology it would not be able to develop on its own. In order to meet the projected levels of foreign content, it will be necessary for AT&T to train Indonesian workers in production technology and establish a capacity to manufacture the 300,000 lines of switching required in the last three years of the project. It will also be necessary to train additional personnel required to provide installation and maintenance services on the expanded telecommunication system.

D. Backward Linkages

Production of line switching equipment in Indonesia will not be completely vertically integrated. As a result, the STDI-II project will stimulate local production in a number of supplier industries including metal fabrication, battery and power equipment and electronic component manufacture and assembly. Indonesia has specified that the local content of the switching equipment will increase from 30% initially to 35% by the end of the fifth year of the project. However, expansion of the telecommunication system will also create demand for peripheral equipment such as telephone handsets, pagers and various supporting services.

E. Export Development

The joint venture established by AT&T to manufacture line switching equipment locally is very likely to establish Indonesia as a dominant supplier of switching and other telecommunications equipment to Asian and Pacific Rim countries. Although AT&T has some production facilities in other countries in the region, notably Singapore, these plants do not have sufficient capacity to meet projected demand. Expanding production beyond the base required for STDI-II to meet regional demand will be easy to accomplish and an obvious benefit to be derived from the project. With AT&T's marketing channels, advertising and export development experience, the joint venture and supporting industries could generate significant foreign exchange for Indonesia over the next 10-15 years.

III. ASSESSMENT OF TECHNICAL COMPETITIVENESS OF AT&T

Information provided by AT&T and the U.S. Embassy in Jakarta indicates that the Indonesians regard AT&T as the preferred supplier to STDI-II. The following discussion presents an independent assessment of the compatibility of the AT&T telecommunications technology with the STDI-II technical specifications and its significance relative to the competitors' systems.

A. Summary of Indonesian Technical Requirements

Permutel, the Indonesian telecommunications organization, has set two objectives for the STDI-II project. The first is to install a total of 350,000 digital telephone line units to support the addition of nearly two million subscriber lines. A second objective of the project is to create local capability to manufacture a digital switch that employs the latest telecommunications technology and reduces the dependency on the sole system (Siemens) currently in use.

1. Principal Requirements of the Tender

The Permutel tender requires:

- Supply, installation and guarantee of 200,300 digital telephone line units in 36 site locations, including outside plant covering 321,870 primary cable pairs and supporting facilities which will involve:
 - field survey, design and supply and installation as well as operational test and maintenance of the switching and associated facilities required to integrate the expanded system with the existing system;
 - supply, construction and operational test and maintenance of outside plant and associated supporting facilities required for integration into the existing system;
 - preparation and submission of project documentation including as-built drawings; and
 - training of personnel.
- Supply, installation and guarantee of 149,700 digital telephone line units manufactured in Indonesia for 74 site locations not including outside plant and supporting facilities which will require:
 - field survey, design, supply and installation as well as acceptance test and maintenance to assure satisfactory integration with the existing telecommunication system;

- preparation of project drawings and as-built drawings.
- Establishment of a second digital telephone factory to be managed as a joint venture with an Indonesian firm.

2. Source Content

The 50,000 lines to be provided in the first year of the project will be 100% foreign content. The digital telephone factory to be managed by the joint venture must be in operation by the end of the second project year. The factory must produce a total of 300,000 lines in years 2 through 4 with a domestic content that increases from 30% to 35% over the period.

3. Physical Outside Plant

The Indonesian Outside Plant Specification provides for the installation of 321,870 principal cable pairs at 36 central office locations.

a. Nature of Requirements

The tender requires that wherever possible all tenderers shall use:

- 1) Indonesian resources for the source of various cable types.
- 2) Indonesian sub-contractors for the implementation of outside plant works.

b. Implications for Bidders

The cost of materials and installation, for all bidders, will essentially be a constant. The variant will be in the foreign content, field survey, project management, technical expertise, and training.

4. Buildings and Supporting Facilities

The Indonesian Buildings and Supporting Facilities Specification provides for the modification of 47 existing buildings, construction of 54 new prototype buildings with associated supporting facilities, i.e., power plants, air conditioning, fire protection, furniture and access roads.

a. Indonesian Content

The instructions to tenderers specifies, wherever possible, all tenderers shall use:

- 1) Indonesian resources for the source of batteries diesel

generating sets, rectifiers, air conditioning, etc.

- 2) Indonesian sub-contractors for the implementation of building alterations and construction of new prototype buildings.

b. Implication for bidders

The cost of materials, alterations and construction of new buildings with access roads is a constant. The variant will be in the foreign content, field survey, project management, and training.

B. Applicability of the AT&T Equipment to Requirements

The technical specifications established by Permutel for the digital switching equipment required for the STDI-II project draw upon international telecommunication standards that rely to a considerable extent on technology and design features developed by AT&T.

1. Technical Specifications (Book II - Part 1)

The Perumtel technical specification is a comprehensive document providing the general requirements for a Stored Program Control Time Division Switching System fulfilling the needs of the New Indonesian Five Year Plan, Repelita V.

The specifications are based upon standards published recently by the Consulting Committee on International Telecommunication Technology (CCITT). The CCITT document is the international equivalent of the AT&T Local Switching Systems General Requirements and Features publications which sets standards for the U.S. telecommunications industry. Both sets of standards require similar features in telecommunications systems, but allow for different means of implementation.

2. AT&T Digital Switch and Microprocessor features

Permutel's technical specifications can easily be met by the #5ESS-PRX which is an augmented version of the #5ESS design originally developed by AT&T. The #5ESS and #5ESS-PRX have been used extensively in the international environment in many situations requiring basic CCITT features and adaptation to existing local deviations from the CCITT standards. The AT&T digital switches are providing excellent service as a local and/or transit exchange switch. It is estimated that AT&T has installed 20 million lines incorporating this switch in the U.S. and other countries.

The #5ESS processor is a Very Large Scale Integrated (VLSI) with the potential for providing:

- a) a fully integrated switching system for all network levels, including a small switch solution for rural applications; and
- b) advanced digital features, such as ISDN, common channel signaling #7 and advanced Centrex.

It will be necessary for AT&T's competitors for STDI-II to develop adjunct microprocessors in order to provide the advanced digital features available with the #5ESS processor. This has implications for the cost, reliability and maintainability of the competitors' digital switching systems.

3. Peripheral Interface Equipment

The #5ESS/#5ESS-PRX digital switching system provides for a wide range of Network interfaces (line and junctures). These interfaces include Host Switch Modules, and multi-module and single module RSMs. Remote modules can be interconnected with the host system through digital metallic, optical or microwave facilities.

4. Signaling System Requirements

Perumtel intends to introduce Integrated Service Digital Network (ISDN) advanced Centrex utilizing Signaling System #7 as a national standard. The #5ESS-PRX digital switching system manufactured by AT&T is capable of providing Signaling System #7 interfaces.

5. Operations and Maintenance

The AT&T digital switching system holds a distinct advantage in remote maintenance capabilities. The technology employed enables the Remote Operations and Maintenance Center to simulate the local maintenance center and perform all diagnostic and maintenance functions except, those requiring physical presence such as, replacing printed circuit boards, running cross-connections and substituting magnetic tapes.

AT&T has virtually set the world standard for corrective and remote maintenance procedures, and provides the operations and maintenance features specified in the Technical Specification as an integral function of the #5ESS digital switching system.

6. Man Machine Language (MML)

The OMC communications data channel uses the x.25 protocol or SS#7-OMAP as standard #5ESS features. This is not a standard

feature of the competitors' switch technologies and will require some adaptation or augmentation of their systems to conform to Permutel's specifications.

7. Software

The software used with the AT&T #5ESS-PRX digital switching system is modular in design and written in a High Level Language meeting the requirements of the Technical Specification.

C. Assessment of Competitors' Positions

1. Suitability of Standard Design

The competitors' digital switching designs are fully compatible with the international (CCITT) environment. However, certain features requested in the new Indonesian Technical Specification may require adjunct processors and additional development efforts to achieve total compliance.

2. Potential Pricing Implications

The #5ESS digital switching system can be provided at highly competitive prices. In the U.S. domestic telecommunications market, the intense competition between AT&T and Northern Telecom has driven the price per line down to the \$250 range. Although Alcatel, Ericsson, Siemens and NEC have each made a serious effort at one time or another to compete in the U.S. market, none of these firms has been able to compete successfully on technical or price grounds and have essentially abandoned the U.S. market.

D. Summary of AT&T Competitive Position

The high degree of compatibility between the AT&T digital switching system and Permutel specifications, as well as the many features built into the switch design that are well-suited to the Indonesian telecommunication environment, lead to the conclusion that AT&T will be the winner of the technical competition. This is particularly likely in that the ability of the various competitors to meet all of the technical specifications and match some of the features offered by the AT&T switch is unproven.

In the absence of any consideration of the cost of financing, it would appear that AT&T is offering a highly price competitive product. This conclusion is borne out by AT&T's experience in other international competitions, notably in Egypt and Korea, in which concessional financing has not been a factor. When financing does enter as a factor in the competition, AT&T is at a disadvantage. The softer financing terms offered by competitors reduce the effective price per line to levels that are below the AT&T price.

The U.S. telecommunications sector, and in particular, the switching equipment industry, has been hurt severely by foreign competitors' access to concessional financing. A study conducted by EXIM examines the impact of foreign tied aid credit financing on U.S. industries (Report to the U.S. Congress on Tied Aid Credit Practices, April 1989). With reference to the switching equipment, the report states:

"Potentially lost sales of "hi-tech" central office switching equipment totaled over \$700 million, making it the product most affected by foreign tied aid credits. This enables foreign competitors to capture major LDC markets, effectively limiting LDC market accessibility to U.S. exporters of this product." (p. 185)

Foreign exchange costs are of significant concern to the Indonesians and all indications are that the financing terms, which ultimately translate into the price per line, will be the dominant factor in the selection of the winning bidder. All other factors being equal, the AT&T bid will be approximately \$23.0 million higher than its competitors if AT&T bears the difference in cost between EXIM financing terms (8.3% and 10 year term with no grace period) and the payment terms stipulated by INPRES 8 (3.5% and 25 year term with a 7 year grace period). This difference is unacceptable in a bidding situation in which the differences among the total prices offered by competitors is likely to be in the range of \$5-\$10 million and leads to the conclusion that the AT&T bid would be rejected on the basis of price.

E. Implications for U.S. Content of STDI-II Equipment

As part of the analysis of the AT&T technical and price competitiveness, independent estimates were developed of the distribution of prices and sources of components making up the entire AT&T bid.

1. Anticipated Distribution of First Stage of Procurement

The following figures were provided by AT&T and are based upon an initial estimate of \$440 million in dollar equivalents for the total STDI-II bid. The distributions should be regarded as order of magnitude estimates as the final bid price will not be made available publicly by AT&T to protect its competitive position.

The estimated distribution of foreign exchange and content for 350,000 digital switching lines and Support Facilities is shown below:

Foreign Exchange	<u>\$ Million</u>
AT&T - US	\$60
NSI - Dutch	95
Telefonica - Spain	<u>35</u>
Foreign Exchange	190
Local Currency	<u>250</u>
Total Cost 350,000 Lines incl. Buildings and Support	\$440
\$ per line	\$1,260

The following estimates were developed independently and should not be regarded as official pricing figures provided by AT&T. The distribution and order of magnitude of the estimates has been verified with AT&T, however.

Allocation of Per Line Costs

<u>Item</u>	<u>\$/Line</u>	<u>Distribution of Content (%)</u>	
		<u>Foreign</u>	<u>Local</u>
Switch	\$350	70	30
O & M	50	80	20
Buildings & Support	200	20	80
Outside Plant	350	20	80
Power Equipment	100	70	30
Training	100	60	40
Management	<u>100</u>	60	40
\$ per line	\$1,250		

DISTRIBUTION OF PROVISIONING \$
FOR INITIAL 350,000 LINES

I T E M	D I S T R I B U T I O N O F C O N T E N T					DISTRIBUTION OF FOREIGN CONT \$/line		
	%		\$/LINE			US 32%	HOLLAND 50%	SPAIN 18%
	LOCAL	FOREIGN	TOTAL	LOCAL	FOREIGN			
SWITCH	30	70	350	105	245	78	123	44
O&M	20	80	50	10	40	13	20	7
BUILDING & SUPPORT	80	20	200	160	40	13	20	7
OSP	80	20	350	280	70	22	35	13
POWER	70	30	100	70	30	10	15	5
TRAINING	40	60	100	40	60	19	30	11
PROJECT MGMT.	40	60	100	40	60	19	30	11
TOTAL			1,250	705	545	174	273	98

Note: These estimates of the distribution of content are based upon a total bid of \$440 million.

IV. ANALYSIS OF FINANCING TERMS AND PRICE IMPLICATIONS

A. Introduction and Methodology

Based on preliminary figures provided for purposes of this position paper, the bid price is assumed to be the equivalent of US\$440 million of which US\$190 million constitutes the foreign exchange component. The GOI anticipates 100% financing of the foreign exchange element. A preliminary estimate of the distribution of foreign exchange expenditures provided by AT&T is shown on the following page.

The RFP states that the foreign exchange portion of the program will be financed by soft loan(s) from consortia member governments or other financial institutions proposed by Tenderer. In addition, although PERMUTEL is able to provide rupiah financing for goods and services originating from Indonesia, Tenderer is encouraged to include maximum eligibility for rupiah financing in such loan(s).

The loans are to be at no less than INPRES 8 level terms meaning a 3.5% interest rate, with repayment of the loan(s) over a period of 25 years including a 7 year grace period.

1. Issues and Basic Assumptions

Available documentation indicates that the financial institutions in the Netherlands and Spain are willing to provide INPRES 8 level financing for their respective foreign exchange components providing the financing terms from the USA, in this case the Export Import Bank of the United States (EXIMBANK), meet the INPRES 8 level requirements.

EXIMBANK has been aware of this Project for some time, and in a letter dated November 1, 1988 informed the Indonesian Minister of Tourism, Posts and Telecommunications that, subject to the final approval of its Board of Directors, EXIMBANK would cooperate to arrange financing for the proposal on financing terms which conform to, or are more favorable than, the requirements of INPRES 8.

Presently, EXIMBANK is unable to meet INPRES 8 level financing terms and is requesting other Government Agencies such as USAID to provide assistance in the form of a grant to narrow the gap between financing terms EXIMBANK is able to offer and those at INPRES 8 level. EXIMBANK has indicated it might be possible to consider concessionary lending terms sufficient for it to help in reaching the total grant requirement.

**AMOUNTS TO BE FINANCED BY EACH
PARTICIPATING GOVERNMENT**

<u>Country</u>	<u>Amount</u> (in millions)	<u>Percent of Total Project</u>	<u>Percent of Foreign Exchange</u>
U.S.A.	\$60	13.6%	31.6%
The Netherlands	\$95	21.6%	50.0%
Spain	<u>\$35</u>	<u>8.0%</u>	<u>18.4%</u>
	\$190	43.2%	<u>100.0%</u>
Indonesia	<u>\$250</u>	<u>56.8%</u>	
	<u>\$440</u>	<u>100.0%</u>	

A comparison between EXIMBANK's current financing terms and those at INPRES 8 level involving US\$60 million shows the following:

	<u>EXIMBANK Financing Terms</u>	<u>INPRES 8 Financing Terms</u>
Interest rate	8.3%	3.5%
Drawdown period	4 years	4 years
Grace period	none	7 years
Repayment period	10 years	18 years
Frequency of Payments	semi-annual	semi-annual
Total time-span	14 years	29 years

The issues associated with bringing EXIMBANK's financing terms down to INPRES 8 level (concessionary financing) in the form of a grant can be classified as follows:

- a) What is the required amount to bring EXIMBANK's financing terms down to INPRES 8 level?
- b) Is the level of concessionality within the framework of the March 1987 agreement between several OECD countries on "tied credits"?
- c) What contribution is AT&T willing to make?
- d) What are the implications of such a grant for GOI, US Trade, AID and AT&T?
- e) Does such a grant create excessive profit for AT&T?
- f) Does such a grant make AT&T competitive in its response to the RFP?

Much of the information required for a conclusive analysis of the financing requirements is proprietary and could seriously jeopardize AT&T's competitive position if released. Because of this limitation on the availability of cost and pricing information it was necessary to make a larger than usual number of assumptions in conducting the analysis. The assumptions that provide the basis for the analysis are:

1. All lending will flow to and all debt service will flow from PERMUTEL.
2. The US participation in the financing is for an amount not to exceed US\$60 million.

3. Included in the "foreign exchange content" is an additional US \$31 million of US exports financed by the Dutch and Spanish financial institutions at INPRES 8 level (Source: AT&T letter to EXIMBANK dated 8/1/89).
4. Included in the US\$60 million segment are some non US origin items which present no problem to EXIMBANK/USAID.
5. Excluded from the financing arrangement proposed by AT&T are any provisions for building and furnishing the Second Digital Telephone Factory.
6. Included in the US \$60 million is an undetermined amount of front-end capital equipment, none of which will find its way into the Second Digital Telephone Factory as part of AT&T's equity or any other contribution.
7. The domestic (Indonesian) content of switches manufactured in Indonesia is estimated at 30% in 1992 (1st year operation of the Second Digital Telephone Factory) rising to 32% and 35% for years 1993 and 1994 respectively.
8. Aside from the 15% down-payment allowed under the proposed contract, the remainder of the US \$60 million loan will be drawn down in relatively equal annual installments of 17%, 21%, 23% and 23% respectively over the 4 year draw down period. (Illustration 1 in Annex A depicts the estimated drawdown pattern of the US \$60 million loan over a four year period).
9. The discount rate or cost of money used in computing Net Present Value is 10%.

2. INPRES 8 Financing Terms/Level of Concessionalality

INPRES 8 level financing is classified as a "tied aid" or "mixed" credit as it generally combines standard export financing with grants or soft loans in a single financing package. Such mixed credits are subject to a March 1987 agreement between several OECD countries including the USA requiring a) a minimum concessionalality level of 35% and b) a market related Discount Rate for each currency.

The concessionalality level is a measure of the degree of "softness" of a "tied aid" or "mixed credit." It is the difference between the nominal value of a loan and the Discounted Present Value of the future debt service payment to be made by the borrower. The difference is expressed as a percentage of the nominal value of the loan. (Source: EXIMBANK June 1989)

On the basis of a US \$60 million loan at INPRES 8 level terms and using a Discount Rate of 10%, the Present Value of the debt service payment to be made by PERMUTEL amounts to approximately USD \$24 million.

Applying the principals set forth under the March 1987 "tied aid" agreement such a loan has a concessionality level of 49% which is well above the minimum 35% requirement. The real market related Discount Rate is based on a formula presently known only to EXIMBANK.

As indicated earlier INPRES 8 level financing terms call for 100% financing at a 3.5% interest rate and a 25 year repayment term including a 7 year grace period. Competitive financing offers, according to AT&T are equal to and most likely better than INPRES 8 terms.

3. Probable AT&T Financing Position

In examining the letters from the Netherlands, Spain and EXIMBANK, it becomes clear that US financing on INPRES 8 terms is needed in order to obtain the European financing on similar terms. Based on the preliminary figures used as a possible bid-price (US \$440 million), at present, financing for equivalent US \$190 million or 43% of the total project is hanging in the balance.

Assuming that the European standard export financing terms are similar to those of EXIMBANK a total of approximately US \$75 million will have to be eliminated from the bid-price in order to make-up for the possible loss of financing on INPRES 8 terms.

Since it is anticipated that final financing terms will go below the INPRES 8 level and AT&T has stated that it will absorb such differential, it is doubtful that AT&T is able to respond to the RFP, without INPRES 8 level financing being in place for the full foreign currency component equivalent of US \$190 million of which the US \$60 million forms an integral part.

4. Calculations of Magnitude of INPRES 8 Financing Requirements

The consulting team concludes that the total possible bid price conveyed by AT&T to USAID and EXIM and the distribution of the various currencies are reasonable in relation to the specifications set forth in the RFP, and that AT&T is competitive in price. In other words, based on technical merits and price, AT&T is in a strong competitive position for the project. On financing, though, AT&T is at a significant disadvantage. All competitors will receive financing assistance from their governments that will enable them to offer INPRES 8 terms or better. Without assistance, AT&T will not be competitive on the basis of finance alone.

Using a Discount Rate of 10% and the assumptions of a 4 year drawdown in relatively equal installments, the Present Value of the repayment program under EXIMBANK's terms for US \$60 million and those under INPRES 8 terms differ by US \$23 million. In other words, starting with EXIMBANK's standard terms, it would take a US \$23 million grant component to enable EXIMBANK to offer a US \$60 million loan on INPRES 8 terms. A major shift in the assumed loan drawdown pattern during the initial 4 years such as assuming the US \$60 million drawn down on "day 1" increases the differential to somewhere between US \$28 and US \$30 million.

EXIMBANK, in its calculations, arrives at a grant requirement of approximately US \$30 million and a concessionality level of 48.78%. The reason for the difference is caused, according to EXIMBANK, by the OECD regulations which do not recognize the effect of an extended draw down period. The EXIMBANK calculation is based on one up front disbursement of the entire US \$60 million.

Although EXIMBANK recognizes that their calculation is based on an artificial system and may not be technically or mathematically correct, it must express the grant element in the loan according to OECD rules. EXIMBANK has further indicated that the Indonesians, when analyzing the financing package may well interpret the grant element according to OECD rules and therefore the concessionary aspect of the loan should be expressed at the US \$30 million level.

Notwithstanding EXIMBANK's explanation, the fact remains that in reality only US \$23 million is needed to bring EXIMBANK's standard export credit terms down to INPRES 8 levels. This difference, arising from the widely divergent financing terms, represents the magnitude of the grant being solicited by EXIMBANK to arrive at INPRES 8 financing terms for the US \$60 million. USAID's possible share towards such a grant now under consideration, is envisaged at US \$12 million with the balance to come from EXIMBANK in the form of a reduction in its standard credit terms.

According to AT&T's letter to EXIMBANK dated August 1, 1989 the total value of US origin items to find its way in the bid-proposal price amounts to US \$91 million of which US \$31 million will be financed by the Dutch and Spanish financial institutions leaving US \$60 million to be financed by the USA.

Assuming that under Berne Union regulations the Dutch and Spanish standard export credit terms are similar to those of EXIMBANK it can be concluded that the European financing contains a concessionary component of approximately US \$12 million directly related to US origin goods and services.

5. Sensitivity Analysis to Changes in US Financing Component

Based on a mathematical model using US \$10 million as a base and the same assumption for the loan drawdown pattern of the US \$60 million as outlined before, an increase or decrease in the US financing component of US \$10 million corresponds to an increase or decrease in the grant requirement of US \$3.8 million.

B. Implications of Adjusting EXIMBANK's Standard Financing Terms

1. The Government of Indonesia Perspective

The Government of Indonesia has made INPRES 8 terms a pre-requisite of the pre-qualification process for this RFP and the pre-qualified Tenderers have indicated that financing on INPRES 8 terms is available. The total debt service amount arising from EXIMBANK's standard export credit terms is almost identical to the total debt service amount under INPRES 8 terms as indicated below.

(US \$000)		
	<u>EXIMBANK</u> <u>terms</u>	<u>INPRES 8</u> <u>terms</u>
Loan draw down period		
Years 1-4		
Loan Repayment	0	0
Interest	12,000	5,000
Grace Period		
Years 5-11		
Loan Repayment	42,000	0
Interest	23,500	14,700
Balance of Period		
Years 14-29		
Loan Repayment	18,000	60,000
Interest	2,600	19,400
Total:		
Number of Years	14	29
Loan Repayment	60,000	60,000
Interest	<u>38,100</u>	<u>39,175</u>
	<u>98,100</u>	<u>99,175</u>
Net Present Value of	47,200	24,200
Total Debt Service		

The illustrations in Annex A depict the differences between EXIMBANK terms and INPRES 8 terms with respect to cumulative debt service (Illustration 2), net present value of cumulative debt service (Illustration 3), and outstanding loan balances for the entire loan repayment period (Illustration 4).

The benefits arising from INPRES 8 terms will enable the GOI to repay a "foreign exchange" obligation over a longer time period without incurring a substantial amount of additional costs in nominal terms.

A potential drawback to INPRES 8 terms lies in the fact that the manufacturing life cycle for the type of equipment involved is 15 years and could be less with advances in technology. This does not mean that the equipment needs to be replaced after 15 years; on the contrary, the equipment will continue to function well. After 15 years, however, a manufacturer would be unlikely to produce the same type of equipment because more sophisticated systems would have been developed in the meantime. This means that the GOI will still be paying for the expansion phase long after the equipment is surpassed by more sophisticated technologies.

This observation applies to the entire foreign exchange segment of the bid price or the full equivalent of US \$190 million.

2. US Trade Perspective

Under Indonesia's 5 year plan (REPELITA 5) the scope of work under this RFP covers an initial phase of a planned expansion of 600,000 lines of which this phase covers 350,000 lines or 60%. Although there is no guarantee that the successful Tenderer under this phase will also be awarded the balance of the program, the difficulty and cost of integrating a digital switch provided by another supplier virtually assures that this will be the case.

Should AT&T be successful in its Bid, AT&T will become one of the two manufacturers of digital switching equipment in Indonesia. Indications are that the local content of the manufacturing plant will not erode the US content of future requirements. The local content factor will primarily be at the expense of the Dutch and Spanish who are presently carrying out all or most of the activities planned for the new Indonesian Manufacturing Facility. In addition, if successful, AT&T will have a commanding presence in the entire Far East region.

The August 1st AT&T letter indicates that in addition to the US \$91 million included for this phase of the Indonesian program, future US exports to Indonesia, until the year 2000, may reach another US \$300 million. However, AT&T qualifies this statement in two ways, namely:

- a) that US content is based on maximum price but that, in practice, the actual price may be substantially lower and
- b) that 85% of such US content consists of equipment.

Adjusting the amount of the additional US \$300 million by AT&T's qualifications and using a reduction in price of 30% still leaves total anticipated US potential exports to Indonesia at approximately US \$180 million, (15 times the \$12 million grant sought from USAID). An estimate developed by the Department of Commerce suggests that \$1 billion in US exports translates into 25,000 person-years of employment. Applying this statistic to the AT&T situation suggests that the potential exports to Indonesia would provide approximately 4,500 person-years of employment.

Neither the estimated exports nor the employment benefit measure the net benefits to the United States of providing official assistance for this project. AT&T's labor and other resources would have alternative productive uses in our economy, even if they were not devoted to the STDI-II effort in Indonesia. The profit realized by AT&T and its suppliers from this procurement is a more accurate estimate of the net benefit to the United States from investing in STDI-II.

3. A.I.D. Perspective

If AID agrees to the EXIMBANK proposal it will be required to provide 50% of a US \$23 million grant. The Agency might want to consider several options for reducing the impact of providing such a grant from its limited resources:

1. AID might obligate the funds annually over the next four years as the loan is drawn down.
2. AID might commit the funds but with the understanding that if a multi-agency fund is established as a result of the interagency review of "tied credit" currently in progress, the AT&T transaction will be funded from this source.
3. AID might treat the matter as a reimbursable grant tied to potential future AT&T business in Indonesia based upon the possibility that AT&T, if successful in Phase I, will be invited to carry out Phase II of the telecommunication program set forth under REPELITA V. At such point in time AT&T could have the obligation to repay the grant either partially or in total. Under such a scenario, the recovery of the Indonesian market development costs, incurred to date, can be recovered in part from "future business" rather than just from Phase I of the REPELITA V telecommunication expansion program. To the team's knowledge, there are no precedents for this approach in A.I.D.; the Trade and Development Program provides grants for feasibility studies which are reimbursable if business development is successful.

C. Implications for AT&T of Meeting Financing Terms beyond INPRES 8 Levels

It is important to note that financing assistance, if provided by AID and EXIMBANK, will only bring the financing terms down to INPRES 8 levels and enable AT&T to meet the "going in" conditions of the procurement. It is virtually certain that the financing terms offered to the Indonesians will be the subject of extended negotiations and ultimately will be set at terms that are considerably "softer" than INPRES 8. These concessions might take the form of a lower interest rate, a longer grace and repayment period or some combination of these conditions.

Unconfirmed indications suggest that the four competitors will offer better than INPRES 8 financing terms, possibly as low as a 0.75% interest rate and 40-year repayment terms. Substantial savings accrue to the GOI under these "softer" terms; it is clear they will be seeking to obtain the best financing terms possible.

Support for terms better than INPRES 8 terms was provided in the November 1988 letter from EXIMBANK to AT&T in which the Bank expressed willingness to consider providing financing on terms "more favorable than INPRES 8." AT&T has indicated that the Dutch and Spanish financial institutions are willing to provide below INPRES 8 level terms without recourse to AT&T. AT&T has indicated that it is prepared to absorb the differential between INPRES 8 and "final" financing terms as it applies to the US \$60 million loan component.

Calculations made for the purpose of this position paper confirm that for every 1% decrease in the interest rate from 3.5% (INPRES 8) down to the final agreed upon terms the cost will be nearly US \$4.3 million. A final interest rate of 1% therefore would create a differential of more than US \$10 million to be 100% absorbed by AT&T and would further erode potential profits from this project. Furthermore, the investment associated with establishing the Second Digital Telephone Factory, required under the RFP, is not included in the bid price. AT&T anticipates a minimum investment on its part of US \$4.0 million and having to assume the liability for this venture in case of default. There is no guarantee that this venture will generate sufficient returns.

D. Summary of Price Competitiveness of AT&T

Based on the technical analysis and projections developed of the distribution of foreign content and overall pricing structure, it appears that AT&T is in a strong competitive position for the STDI-II project, before financing costs are considered.

However, when financing is considered, AT&T is at a competitive disadvantage in that its competitors are all receiving financing assistance that will enable them to offer INPRES 8 or better financing terms without adverse impact on their prices. At present, AT&T has achieved a partial solution by obtaining INPRES 8 or better financing from the Dutch and Spanish financing institutions for a significant portion of its foreign exchange requirements.

It will take US \$23 million to make AT&T competitive on the basis of financing terms requested under the RFP. It does not appear that a sufficient profit margin exists in the eventual bid price enabling AT&T to absorb such an amount. Having to add this amount to the bid price will endanger AT&T's competitiveness in that this bid is viewed as a "life or death" situation by all of the competitors in terms of the future market for their products in Asia, as well as Indonesia. All indications are that each competitor is prepared to accept very low or no profit and to "buy in" in the hope of assuring a large future market for their telecommunication technology. Under these circumstances, it is reasonable to expect that any competitor that has included excessive profit in its price will lose the bid.

ANNEX A

This Annex includes the following tables and illustrations:

Table 1 and Illustration 1:

Estimated drawdown pattern of the US \$60 million loan over a four year period.

Table 2 and Illustration 2:

The cumulative debt service amount applicable to a US \$60 million loan under EXIMBANK's standard terms as well as under INPRES 8 terms.

Table 3 and Illustration 3:

The Net Present Value of the total debt service associated with the US \$60 million loan under EXIMBANK's standard terms and under INPRES 8 terms. The difference between the Net Present Value figures of US \$47.2 million (EXIMBANK) and \$24.2 million (INPRES 8) represents the required grant element of US \$23 million.

Table 4:

Net Present Value of the Interest Differential Between INPRES 8 terms at 3.5% and 2.5%.

Illustration 4:

A comparison of the outstanding loan balances of a US \$60 million loan under EXIMBANK's standard terms and those under INPRES 8 terms for the entire loan repayment period.

TABLE 1

U.S. \$60 MILLION DRAW DOWN PATTERN

<u>Year</u>	<u>Amount</u>	<u>Cumulative Amount</u>
Year 1: First Half	14.0	14.0
Year 1: Second Half	5.0	19.0
Year 2: First Half	6.5	25.5
Year 2: Second Half	6.5	32.0
Year 3: First Half	7.0	39.0
Year 3: Second Half	7.0	46.0
Year 4: First Half	7.0	53.0
Year 4: Second Half	7.0	60.0

U.S. \$60 MILLION LOAN DRAW DOWN PATTERN

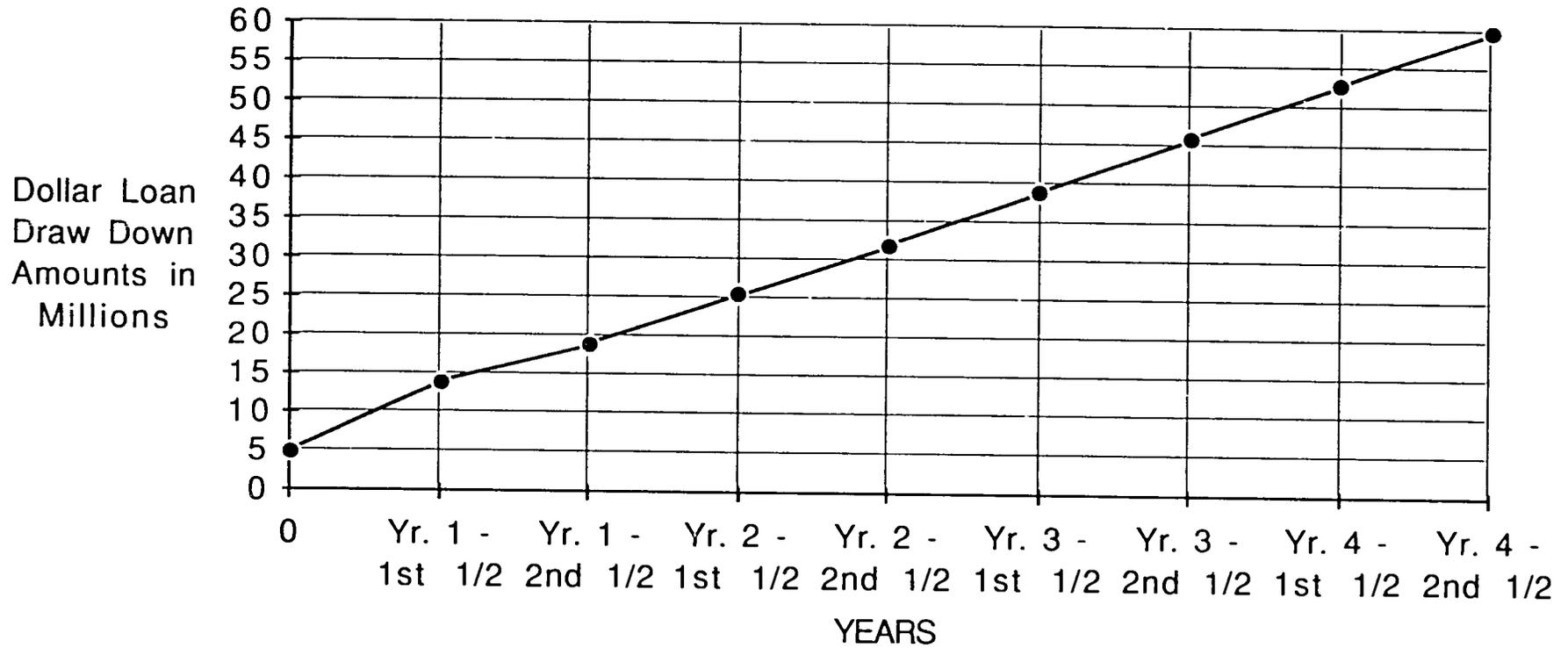


TABLE 2

CUMULATIVE DEBT SERVICE FOR A \$60 MILLION LOAN
UNDER EXIM BANK TERMS AND INPRES 8 TERMS

1. Factors

	<u>EXIM BANK</u>	<u>INPRES 8</u>
Loan Amount	\$60 million	\$60 million
Interest	8.3%	3.5%
Drawdown Period	4 years	4 years
Grace Period	N/A	7 years
Repayment Schedule:	20 semi-annual payments, starting 6 months into 5th year, in the amount of \$3 million each.	36 semi-annual payments, starting 6 months into 12th year, in the amount of \$1.667 million each.

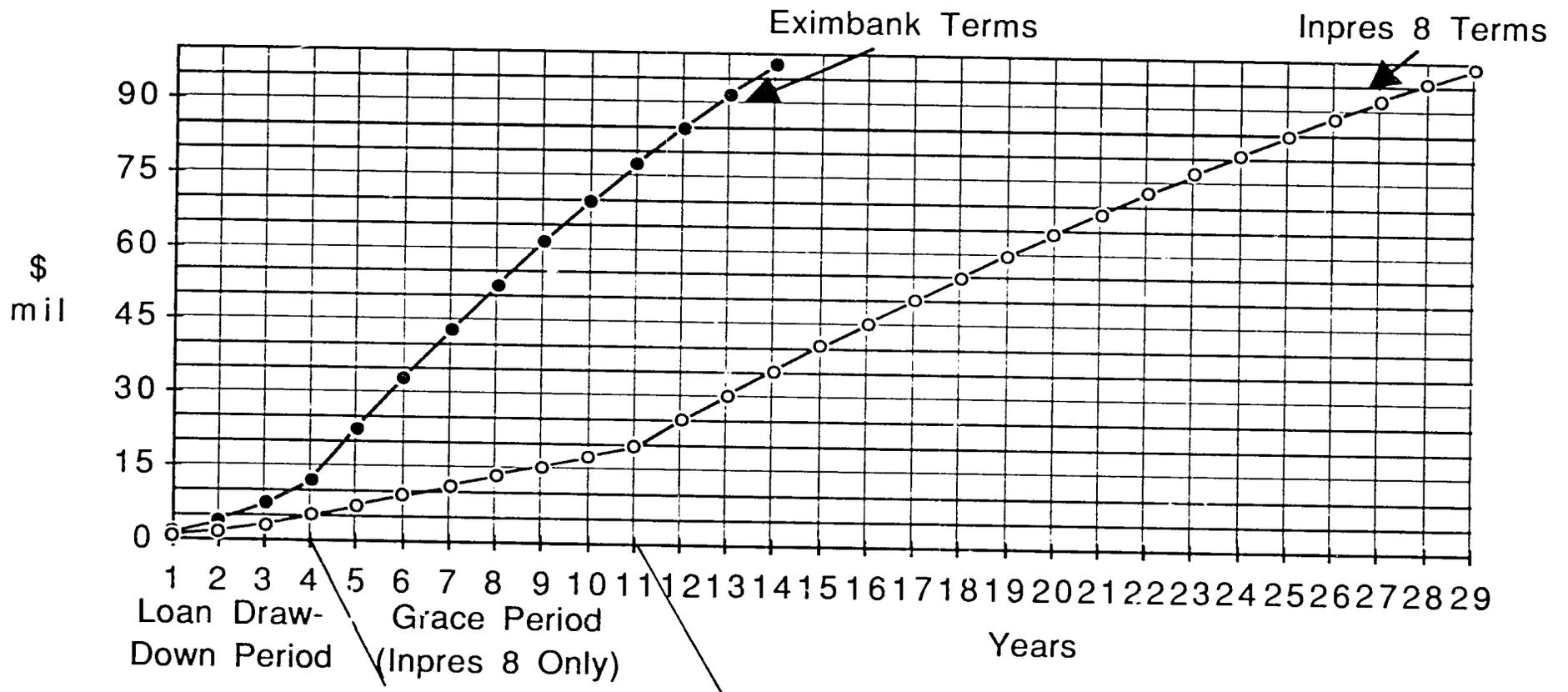
2. Calculation

Years 1-4:	Per drawdown schedule. Interest only.	Per drawdown schedule. Interest only.
Years 5-14:	Principal and interest on declining balance	
Years 5-12:		Grace period. Interest only.
Years 12-29:		Principal and interest on declining balance.

3. Conclusion

TOTAL DEBT SERVICE UNDER EXIM BANK TERMS:	US \$98.100 million
TOTAL DEBT SERVICE UNDER IMPRES 8 TERMS:	US \$99.175 million

U.S. \$60 MILLION LOAN CUMULATIVE DEBT SERVICE



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TABLE 3

NET PRESENT VALUE OF DEBT SERVICE FOR A \$60 MILLION LOAN
UNDER EXIM BANK TERMS AND INPRES 8 TERMS

1. Factors

	<u>EXIM BANK</u>	<u>INPRES 8</u>
Total Debt Service	\$98.100 million	\$99.175 million
Discount Factor	10% per annum or 5% semi-annually	10% per annum or 5% semi-annually

2. Conclusions

NET PRESENT VALUE UNDER EXIM BANK TERMS: \$47.2 million

NET PRESENT VALUE UNDER INPRES 8 TERMS: \$24.2 million

THEREFORE, THE AMOUNT OF THE GRANT
REQUIRED TO MAKE UP THE DIFFERENCE
BETWEEN EXIM BANK TERMS AND INPRES
8 TERMS IS: \$23.0 million

U.S. \$60 MILLION LOAN NET PRESENT VALUE OF DEBT SERVICE UNDER EXIMBANK TERMS AND INPRES 8 TERMS

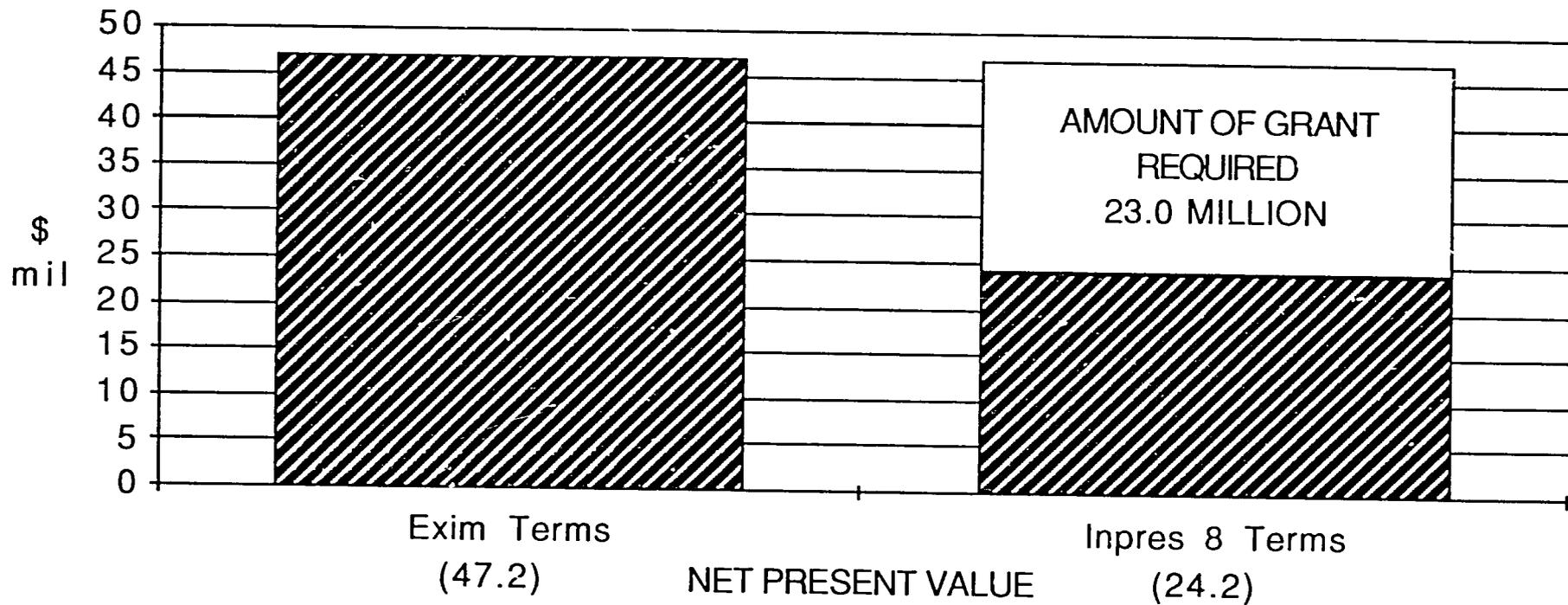


TABLE 4

NET PRESENT VALUE OF THE INTEREST DIFFERENTIAL BETWEEN
INPRES 8 TERMS AT 3.5% AND 2.5%

1. The Factors

The analysis is based on the same US \$60 million loan drawn down in the same proportions as outlined before; the same 7 year grace period applies and repayment is in 36 semi-annual installments starting in year 12.

Interest rate calculations at 3.5% and 2.5% respectively.

Discount factor 10% per annum or 5% semi-annually.

2. The Conclusions

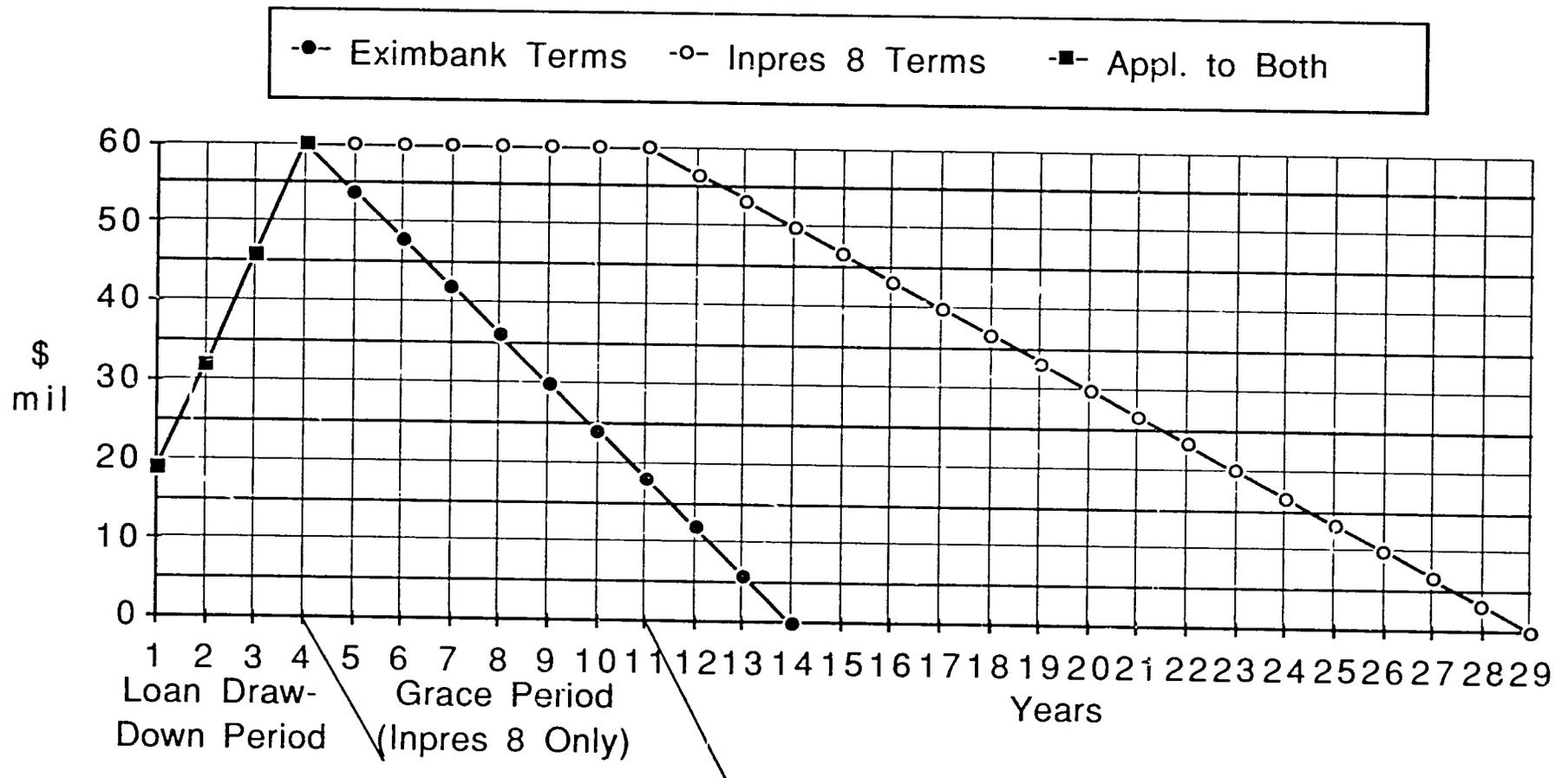
NET PRESENT VALUE OF INTEREST UNDER INPRES 8 TERMS AT 3.5% INTEREST:	\$ 14.843 million
NET PRESENT VALUE OF INTEREST UNDER INPRES 8 TERMS AT 2.5% INTEREST:	\$ 10.573 million
INTEREST DIFFERENTIAL	\$ 4.270 million

SHOULD AT&T NEED TO NEGOTIATE TERMS BELOW INPRES 8 TERMS, IT WOULD NEED TO ABSORB \$4.270 MILLION FOR EACH 1% DECREASE FROM 3.5%.

A FINAL INTEREST RATE OF 1% WOULD THEREFORE CREATE A DIFFERENTIAL OF US\$ 10.675 MILLION TO BE ABSORBED ENTIRELY BY AT&T.

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U.S. \$60 MILLION LOAN OUTSTANDING LOAN AMOUNT



ANNEX B

PRICE/LINE OF DIGITAL CLASS 5 SWITCH INSTALLATIONS
 IN THE U.S. DOMESTIC TELECOMMUNICATIONS MARKET
 1983 - 1991e

	<u>Total Lines</u>	Digital Class 5 Switch <u>Capital Spending*</u> (US \$ millions)	<u>Price/Line*</u>
1983	2,000,000	\$790	
1984	4,200,000	\$1,600	
1985	9,700,000	\$3,600	
1986	10,800,000	\$3,800	
1987	11,500,000	\$3,800	\$330
1988	11,400,000	\$3,200	\$281
1989	11,200,000	\$2,600	\$232
1990	10,800,000	\$2,300	\$213
1991	10,800,000	\$2,100	\$194
1992	10,900,000	\$2,000	\$183

* Switching and initial software only; excludes an additional 25% in other in-place costs such as overhead and labor. Also excludes add-ons of hardware and software and service revenues.

Source: Goldman Sachs, Investment Research Report, "Industry Update: The U.S. Digital Class 5 Switch Market," p. 13.

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