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**Developing a Telecommunications Sector Policy
for the Government of the Republic of Zambia**

Time Sensitive Sector Issues - Task 7

DRAFT REPORT

October 1, 1993

I. Introduction and Objectives

The objective of this paper is to address four issues identified in Task Seven of the Scope of Work. The Scope of Work identifies these issues as the following:

- Presentation and analysis of immediate options to address the problem of mismatch of exchange capacity with external plant to reach subscribers; should include sub-contracting, revenue sharing, franchising, etc. Address potential impacts of each option on PTC and eventual privatization.
- Critique of proposed amendments to existing legislation concerning postal, telecommunications, and broadcast, and new legislation concerning interception in the context of world wide experience and in the context of developing a comprehensive telecommunications policy.
- Analysis of options to access INMARSAT land mobile services; membership in INMARSAT, revenue implications of non-Zambian registered use of INMARSAT services.
- Analysis of immediate options to provide increased service to rural areas; both in areas of commercial development (commercial farms, safari camps, mines) as well as in peasant farming areas.

Priority changes between the time the Scope of Work was written and the time of the first field trip resulted in a de-emphasis of the INMARSAT issue. Similarly, cellular licensing has become a more important issue than initially envisioned, and is discussed in Section V., "Analysis of Immediate Options to Provide Increased Service to Rural Areas..."

II. Presentation and Analysis of Immediate Options to Address the Problem of Mismatch of Exchange Capacity with External Plant to Reach Subscribers

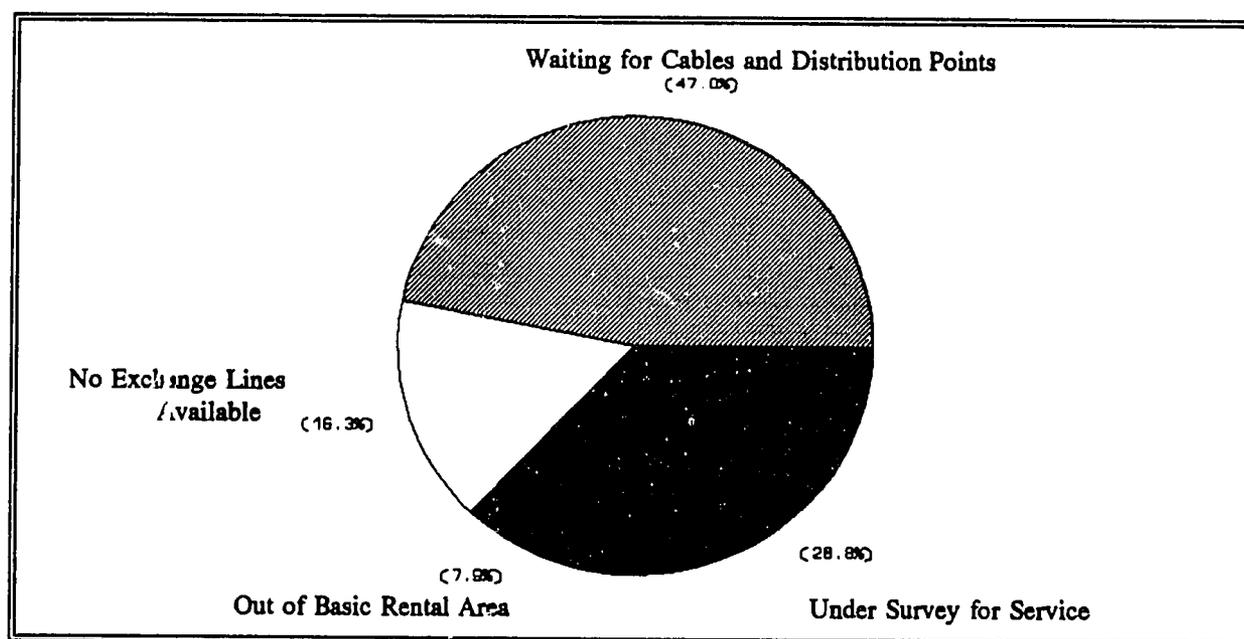
The mismatch of exchange capacity and external plant is actually a shortfall of external plant. In addressing this mismatch issue, the PTC needs to develop a well-conceived, long-term network development plan to guide expansion of the external plant. The sub-contractors are well suited for construction projects as long as adequate contractor screening and supervision procedures are in place. Additionally, PTC's current performance could be improved by actions such as completing external plant projects that have already been identified and providing external plant construction with adequate equipment, supplies and training. In the long run, increased subscriber penetration and revenue generation will make PTC more attractive to potential investors, but long-term sub-contract obligations may complicate the privatization process.

A. Description of Mismatch

The mismatch between exchange capacity and external plant capacity is actually an external plant shortfall. Insufficient external plant creates the illusion of surplus exchange capacity since there are unutilized exchange lines. When a circuit in use malfunctions, the line is simply plugged into another circuit, and the faulty circuit goes unrepaired. Total exchange capacity is currently reported to be 122,874 lines, but the **working** exchange capacity is unknown. As presented below, the number of lines in service is substantially less than total exchange capacity, with insufficient external plant accounting for nearly half of the difference.

		% of Demand
Total Expressed Demand	132,624	100.0%
<u>Of Which:</u>		
Lines In Service	70,756	53.4%
Installation in Progress	4,608	3.5%
Subscribers Waiting for Service	57,260	43.2%

The pie chart below shows the reasons for lack of service among the 57,260 potential subscribers waiting for service.



Insufficient external plant accounts for nearly 50% of the capacity shortage and is therefore a major factor in the failure to meet expressed customer demand.

B. Causes of Mismatch

Inadequate external plant capacity results from a combination of problems within the sector. The most severe problems contributing to the capacity shortage in Zambia fall into three general categories: planning, implementation, and supplier problems.

Problems existing in the planning process include the following:

- Donor funding has not sufficiently addressed the need for external plant.
- Current external plant construction focuses on cable rehabilitation rather than network expansion.

Problems in implementing external plant construction projects to increase capacity include:

- Limited motor pool assigned to the External Plant group impairing efficient management of limited External Plant human resources.
- Vandalism and theft of external cables.
- Inadequate stocking procedures of splicing and other cable construction materials (in addition to budgetary constraints on cable and wire purchases). This problem is exacerbated by the high turnover of experienced staff due to AIDS and fraud-related firings.
- Heavier gauge and more expensive cable is needed to compensate for long loop cable replacement, in keeping with PTC's current standards.

Finally, PTC has some difficulties in dealing with suppliers and sub-contractors. The largest supplier of external plant materials to PTC is ZAMEFA (Zambia Metal Fabricators), the only domestic manufacturer of copper telephone cables. ZAMEFA has a substantial price advantage in doing business with PTC, since foreign competitors are assessed up to 50% for import duties and taxes. There is a belief within PTC that ZAMEFA relies on this price advantage instead of providing responsive, competitive customer service to PTC. In attempting to force more competitive pricing and delivery schedules, PTC solicits foreign bids, which are sometimes competitive despite the import duties which have to be assessed.

A final risk associated with ZAMEFA's virtual monopoly on telecommunications cable is reliability of the supply of cadmium copper, which is used as drop wire into the home. Current health issues raised by ZAMEFA with the manufacturing of cadmium copper wire could further delay delivery of the final connection to the telephone user. In the event that manufacturing of this product is discontinued, alternative materials will have to be investigated, thus delaying final installation and possibly increasing costs.

Other supplier/sub-contractor relationships have been attempted in the form of hiring day laborers for cable trenching and contracting out cable laying operations. Experience with these relationships has raised the following issues:

- Inadequate supervisory staff for unskilled, casual labor limits the efficiency of cable trenching operations
- The External Plant group is reluctant to use outside contractors because of past experience in which contractors have damaged the cables.

C. Options for Addressing Mismatch

Immediate options for addressing the capacity mismatch focus on expanding external plant, i.e., the purchase and installation of cables. External plant expansion is a labor intensive process which lends itself well to private sector participation in the form of sub-contracting. PTC has been reluctant to work with sub-contractors because of previous experiences where contractors damaged PTC cables. Employing preventative measures to minimize the risk of contractor negligence is a more productive response to such experiences rather than eliminating the use of contractors altogether. Use of sub-contractors is advantageous since they provide a quick way to accomplish certain tasks and, in supporting well qualified contractors, PTC will improve the telecommunications business environment. In order to use contractors most effectively, PTC should do the following:

- Implement screening procedures for contractors, selecting a contractor based on training and qualifications of staff, general reliability and reputability, and experience with similar projects.
- Establish standards of construction for external plant and duct route.
- Limit contractor activities to civil works projects (e.g., pole installation, or trenching), restricting actual cable work to trained PTC staff.
- Provide adequate PTC supervision in the project planning stages to ensure that no existing network infrastructure is at risk of construction damage.
- When feasible, hire contractors on a turn-key basis and hold them to predetermined time, budget, and quality standards by means of penalties for non-performance.

Revenue sharing and franchising are options for private sector participation typically associated with large equipment purchases rather than construction projects. Under a revenue sharing arrangement, a vendor would provide equipment for very little cash up front, collecting some portion of the revenue generated by that equipment over its life. Franchising entails selling to a franchisee the right to operate some part of the network and

collect revenue associated with those operations. The franchisee would then be responsible for providing necessary network equipment. These options, along with other forms of supplier financing, should be considered for exchange equipment purchases (i.e., in the longer term) as a means of reducing dependence on donor funding.

Aside from contracting, several steps could be taken in the near term to improve PTC's response to external plant needs, including the following:

- Solicit donor funding for already identified external plant projects.
- Allocate more internal funding toward external plant expansion.
- Establish and maintain sufficient levels of external plant support material and establish restocking procedures to allow uninterrupted construction activities.
- Allocate more staff to external plant supervisory ranks and provide adequate training to enhance quality cable installation.
- Expand motor pool allocations to external plant construction crews to enhance mobility and efficiency of operations.
- Enhance competition within the supplier sector by lobbying to have import duties and taxes on foreign cable and wire reduced to allow for competition. This will reduce cable and wire cost and should result in shorter delivery intervals.

Finally, long term planning is critical in addressing capacity shortages. The single most important action is to formulate and adhere to a single, well conceived, long-term network development plan, revised at regular intervals, including both inside and outside plant. While supplier financing and donor assistance tied to other projects are very appealing in the short-term, these forms of assistance can be quite damaging in the long term by promoting capacity mismatches and equipment incompatibilities across the network.

D. Implications on PTC and Privatization

By addressing the mismatch issues, PTC will increase supply and telephone penetration throughout Zambia. Cost-effective investment will improve cash flow (i.e., paying subscribers will be added) and total asset value, since network infrastructure will be more extensive.

The impact of these options on potential privatization differ based on the type of actions to be taken. Many of these options (i.e., those related to PTC management, such as internal funding, supply procedures, manpower allocation, motor pool allocations) will have little to no effect on potential privatization, since these are changes which could be easily implemented by potential investors. These projects would improve cash flow, however, making PTC a more attractive borrower prior to privatization.

Another type of action, contracting with private sector turn-key contractors, may have

damaging effects on privatization, based on the terms of the contracts entered into by PTC. If prices paid are in excess of those that would apply to a strategic investor then the return on those investments at sale will be disappointing. In negotiating such contracts, potential benefits of establishing long term relationships (i.e., negotiating power) must be weighed against eventual drawbacks of privatizing a company with possibly unappealing contractual obligations.

A final type of activity involves taking advantage of PTC's current parastatal status. By virtue of being a government-owned entity, PTC can solicit donor financing and influence improvements of the supplier environment, thus bringing about improvements in business conditions that a private operator could not duplicate.

III. Critique of proposed amendments to existing legislation concerning postal, telecommunications, and broadcast and new legislation concerning interception

Critical issues in the sector must be addressed immediately to facilitate economic and infrastructure development. A well-defined policy statement needs to be established to provide the framework for subsequent revisions to the draft legislation. In the short-term, licensing of additional operators to upgrade the sector should be pursued with caution to ensure that any policies will fit the long-term goals of the MCT. This report presents a brief synopsis of the main issues pertaining to the draft legislation; a more thorough examination of legislation will follow in the Final Report.

A. Description of New Legislation Reviewed

The following five documents are addressed in this section:

- Telecommunications Policy Statement
- Communications Administration Act, 1993
- Telecommunications Act, 1993
- Radio Communications Act, 1993
- Postal Services Act, 1993

Another draft legislation regarding broadcast interception was not provided for our review.

Many policy issues regarding the telecommunications sector have not yet been resolved. Issues such as regulation, competition, interconnection, frequency management, and pricing have to be determined before enabling legislation is finalized. Accordingly, the policy statement should be the initial focus of discussion. Once the key issues are agreed upon from a policy standpoint, the associated legal requirements will be straightforward.

Because of the long lead time for the sale of PTC, Ministry of Communications and Transport (MCT) officials have apparently decided to focus on licensing additional operators now in order to upgrade the sector. In reviewing the proposed legislation, both the short- and long-term goals of the MCT must be kept in mind.

B. Comments on Individual Documents

1. Telecommunications Policy Statement

The Policy Statement focuses on three main objectives:

- Upgrade service in rural areas.
- Reduce the waiting list for service and increase utilized capacity of the system, currently reported to be only 44%.
- Improve the training and qualifications of PTC staff, which are blamed for the very low levels of revenue collections (less than 50%).

None of the stated objectives are reflected in the current draft legislation. Although alluding to them at times, the Policy Statement largely ignores crucial objectives such as:

- Improving quality of service indicators
- Increasing comparative advantage of the Zambian business sector when compared to other countries in Southern Africa
- Implementing economically efficient tariffs
- Creating a strong regulatory framework
- Insuring the transparency of the privatization and regulatory processes
- Possibly sharing the proceeds of an entity belonging to the Zambian people as a whole by selling small amounts of PTC shares to Zambian shareholders (e.g., "popular capitalism" schemes, such as those in Eastern Europe)

Additionally, the Policy Statement does not address the future relationship between newly-licensed private operators and the PTC (before or after privatization), nor does it clearly delineate the telecommunications sector to be liberalized.

The Policy Statement should discuss ways of achieving the stated objectives. For example, the current draft, while recognizing that the principal obstacle to the main objective (providing service to the countryside) is that "the rural areas are ... not profitable to operators" is silent about overcoming the expected operator reluctance. Among the alternatives that might be considered by the MCT to achieve this goal are the implementation of cost-based tariffs, creation of a fund from license fees that could be used to subsidize loss-making operations in the countryside, and opening up the rural sector to local operators interconnected to the main system.

2. *Communications Administration Act and Telecommunications Act*

Both the Communications Administration Act and the Telecommunications Act address establishment of the Controller of Communications and define the responsibilities of that office. For the sake of clarity, we recommend merging these two acts. Other topics currently addressed by the Communications Act and the Telecommunications Act are separation of the Postal and Telecommunications functions of the PTC, some aspects of the licensing process, and penalties for violating licensing agreements with the government.

Some aspects of the Controller of Telecommunications function have to be better defined. Specifically, the scope of authority granted to the Controller, the concentration of so much power in one person, and the relationship between the Controller and the MCT are not conducive to transparent regulation and increase risk for potential private investors. An alternative to this structure is creation of an independent board to regulate the sector, similar to the FCC in the U.S. and other oversight boards implemented in countries in both developed and developing countries. Diversification of such a board would minimize the authority of any one individual and would enable representation by critical interest groups, such as a subscribers organization.

Finally, the definitions used in the Telecommunications Act do not conform to those used in the rules and regulations of the International Telecommunications Union and the pertinent CCITT recommendations. Unless there are specific reasons for not doing so, these definitions should be harmonized.

3. *Radio Communications Act*

The draft Radio Communications Act is meant to supplement the recently enacted Broadcasting Act of 1993. At times, however, it is not limited to the allocation of radio frequencies and other topics should be reconsidered for inclusion in this act (e.g., suppliers licenses, transmission of blasphemous, indecent, obscene, or offensive language, negligent transmission of communications, offenses, disorderly behavior, interference with use of working of a radio station). These issues should be addressed in individual license agreements and should be the responsibility of the Ministry of Information and Broadcast.

As with the Telecommunications Act, the definitions should be harmonized with applicable ITU and CCIR rules and recommendations. Similarly, a mechanism for approval of petitions should be specified in the law.

4. *Postal Services Act*

As it stands now, the Postal Services Act grants self-regulatory powers to the Postal Services Corporation. This structure is generally not efficient and would be improved by creating an

independent regulatory body to function similarly to the future regulatory position for the telecommunications sector.

Additionally, the Postal Services Act establishes no mechanism within the regulatory framework for licensing competing operators to provide certain services, such as courier services. This framework should be established more clearly in future drafts of the Act. The regulatory body (or the Ministry) should have the right to grant licenses, including exclusive licenses for specifically-defined services.

Finally, the Postal Services Act, especially the sections pertaining to definitions, rules governing the liability of the Postal Services Corporation and the description of the scope of postal services, should be adapted as far as possible to the rules of the World Postal Convention of the World Postal Union of December 14, 1989.

C. General Recommendations

The changes to the draft legislation that are most important to the long-term restructuring effort are:

- The policy options available to the Zambian government must be further refined in view of the stated objectives for the sector. Other possible goals should be reviewed. The objectives and options chosen should be reflected in the draft legislation on posts and telecommunications.
- The role and composition of the Controller, especially its relationship to the MCT and policy-making functions, need to be defined. If feasible, a multi-person board should be created to serve as Controller with greatest independence from the MCT possible.
- Objective bidding procedures should be adopted to ensure the complete transparency of the privatization process.
- The myriad criminal penalties imposed for breaches of contractual obligations should be eliminated.
- An independent regulatory authority should be established in the postal sector, institutionally separate from the Controller, to avoid conflicts of interest with the Postal Services Corporation.

IV. Analysis of options to access INMARSAT land mobile services, membership in INMARSAT, revenue implications of non-Zambian registered use of INMARSAT services

An initial review of options for use of INMARSAT reveal that INMARSAT's land mobile services may not be a financially viable option for the Zambian telecommunications sector. While recognizing that the flexibility provided by INMARSAT would significantly enhance the current network, the cost may not justify membership. Other more affordable technologies, such as cellular, could adequately meet Zambia's telecommunications needs and represent more efficient investment opportunities.

A. Description and Cost of INMARSAT Services

INMARSAT is a well established internationally owned cooperative providing mobile communications worldwide. Initially founded to serve the commercial, distress, and safety needs of the maritime community, INMARSAT now provides satellite communications for all mobile applications.

INMARSAT services include the following:

- **INMARSAT "A"** was designed for maritime use and requires a very large mobile earth station, generally mounted on the superstructure of a ship. Land-based applications of INMARSAT A include establishing communications links where there is currently no telecommunications service available (frequently used by journalists) or augmenting an existing system for services not available (such as video, high speed data, or broadcast transmissions). This service is not generally recommended for mobile telephone service due to the large size of the terminal.
- **INMARSAT "B"**, scheduled to be available by the first quarter of 1994, will provide an advanced digital service, offering high quality voice and high speed data communications. This service is intended as a high quality maritime communications service, but some land-based uses and land transportable terminal equipment are anticipated.
- **INMARSAT "C"** is a two-way message store and forward system using small terminals. INMARSAT C is intended for electronic mail and data package transmission, and would not substitute well for a mobile phone system.
- **INMARSAT "M"** is the only currently operational service available to provide land mobile service in Zambia. This service will support a relatively light weight (29.5 pound) mobile terminal the size of a briefcase, providing telephone, low speed data,

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and fax service. The portable version of the terminal has a battery which is only good for one hour of operation before recharging.

Of these services, only INMARSAT B and INMARSAT M are appropriate for the type of land mobile service under consideration in Zambia. The following table compares key components of these services:

	INMARSAT B	INMARSAT M
Availability	Q1, 1994	since March, 1993
Terminal Size	suitcase	briefcase
Terminal Cost (US \$)	\$50,000	\$25,000
Space Segment Usage Charge (US \$ per minute)	\$6 to \$10 for voice \$18 to \$20 for data	\$5.50

Space segment usage charges are applied to the portion of a call transmitted by satellite and only represents the total usage charge for the unlikely event of a call originating in one INMARSAT terminal and terminating in another. For calls carried via INMARSAT to a termination point on the public switched network, a Land Earth Station (LES) must be used. LES capacity can be accessed either through building a new one (requiring INMARSAT membership, US \$13 million, and 18 months) or using an existing LES in another country. There are currently five LESs operational throughout the world, with 26 more under construction (anticipated to be operational by the end of 1994), none of which are in Southern Africa. To complete a call using the public switched network, therefore, the cost (in foreign exchange) of an international call would be incurred in addition to the space segment usage charge.

The minimum cost to the user of a call using INMARSAT M for land mobile service is approximately US \$9.30 per minute (assuming the LES at Perth, Australia was used -- use of a LES in the US raises the price to US \$11.00), not including the cost of the terminal. By comparison, cellular mobile service in Kenya costs users \$0.19 per minute (with no annual fee).

B. Recommendations Regarding Use of INMARSAT, Membership in INMARSAT, and Other Options

In light of the unit prices and the high foreign exchange cost for the space segment and the international public switched network portion, INMARSAT does not appear to be a viable option for use in Zambia until further developments have reduced costs substantially. Although some level of demand has been expressed for reliable emergency mobile

communications services, such demand would be more efficiently served by development of a mobile telephone (e.g., cellular or radio) system than by the more costly INMARSAT service. INMARSAT mobile services, because of their high costs, are suitable only for situations where the value of the communication far outweighs the cost of the call, such as ships at sea or oil platforms beyond reach of land.

As a signatory to INMARSAT, Zambia could build a LES, enabling Zambia to become a regional hub for INMARSAT communications. Regional demand for INMARSAT services is unlikely to be high, however, for several reasons. First, other countries in Southern Africa are likely to focus on developing national mobile communications systems rather than using INMARSAT due to the cost of INMARSAT equipment and service. Second, other mobile service options, such as Globestar, Iridium, and RASCOM (Regional African Satellite Communications System) are likely to be in place by the time INMARSAT costs are reduced to competitive levels. Finally, INMARSAT would be more cost-justified for countries with substantial maritime needs, such as Mozambique or Tanzania. It is more efficient for Zambia to purchase INMARSAT services from another country than to assume the financial risk and use scarce foreign exchange resources to develop direct INMARSAT access.

C. Revenue Implications of Non-Zambian Registered Use of INMARSAT Services

While it is theoretically possible for large users to bypass national telecommunications services and use INMARSAT for private applications (or even resell INMARSAT communications services), this option has not been largely pursued in Zambia. The private sector in Zambia has been extremely resourceful in exploiting alternatives for service delivery where national infrastructure is inadequate for their needs. These alternatives have included development of extensive private networks (e.g., ZCCM, ZESCO), utilizing the national terrestrial transmission system to access international data transmission facilities elsewhere in Africa (e.g., Reuters, Barclays Bank) or using other international facilities (e.g., Healthnet).

INMARSAT has been generally avoided by the private sector because of the high cost of usage, in addition to the high cost of equipment. In view of the historical reluctance to use INMARSAT and the limited equipment infrastructure in place in Zambia, INMARSAT poses very little threat to the revenues of future land mobile service providers.

V. Analysis of Immediate Options to Provide Increased Service to Rural Areas, Both in Areas of Commercial Development as Well as in Peasant Farming Areas

Due to the sparse populations and difficulty of maintaining service, rural areas have historically lacked adequate phone service. In order to meet this need, wireless solutions

should be considered where more traditional service is infeasible. In both instances, involvement of the private sector would provide supplementary capital and expertise, especially when considering a cellular network. Additionally, the re-introduction of public phones could ease some of the immediate demand for rural service. Long-term sector development goals must be well defined before significant action is taken to avoid crippling future plans.

A. Need for Integrated Long-term Planning

The issue of increasing service to rural areas is linked to the first issue discussed in this paper. Rural service deficiencies exist within Zambia for the same reasons they exist in other developing countries: the lack of economies of scale in serving sparsely populated areas, difficulty of maintenance and security in rural areas, poor access to subscribers and equipment off of the main roads, low consumer incomes associated with rural areas, and distortion of transmission quality based on excessive line distances. Zambia has several unusual advantages in serving these population groups, however, including an extensive microwave transmission system covering most of the country, impressive exchange equipment and capacity, established public phone service in rural areas, and pockets of economic activity, such as safari camps, mines, and commercial farms.

While this section is intended to address immediate options for increasing rural service, the importance of long-term planning for rural network development must not be overlooked. Historical dependence on donor and supplier finance has resulted in ad hoc network development rather than a coordinated, well managed investment program. A better approach to network development is to include rural service in long-term development programs, and solicit funding for projects that have been identified (rather than establishing projects that conform to available funding). One critical issue to be determined in the context of long-term planning is an objective for rural service (i.e., service to the home vs. public telephone service vs. service to rural population centers). This should be incorporated in the telecommunications sector policy.

B. Immediate Options for Increasing Rural Service

Several technology options appropriate for rural service exist which may be implemented by the private sector, PTC or a joint venture between the two. The most feasible of these technology options are:

- **Digital Radio Concentrator System (DRCS)** is a digital point to multi-point radio transmission system. This technically advanced system provides extensive channel capacity at reasonable cost per channel. Therefore, it can be introduced to serve scattered and small cluster rural areas as well, especially where greater channel capacity is needed.

- **Cellular Mobile Systems** should be introduced as soon as possible to provide mobile telephone service in urban and inter-urban areas, especially along the roads connecting Lusaka, Kitwe, and Ndola. The fixed cellular infrastructure, which comprises the major components used in the cellular mobile system can also be used to provide a wireless local loop to provide service to rural areas. Because of the possible twofold use of the cellular system (i.e., mobile and fixed loop services), it could provide scale economies not offered by DRCS.
- **Remote Line Units** can be used to increase the capacity and reach of an exchange. The remote line unit serves as a mini-exchange (similar to a PABX), whereby a large number of subscribers share a smaller number of lines into the local exchange. For instance, five hundred subscribers could be connected to a remote unit, which would, in turn have maybe thirty to fifty lines into the exchange. This type of service reduces line distances and utilizes cheaper wired technology to access large numbers of subscribers.
- **Cellular Public Phones** are another option for serving communities which are not feasible for wired service. Installation of fixed cellular public phones could be a cellular license requirement, further utilizing economies of scale.

The private sector should be relied on to the greatest extent possible in developing rural communications services. Since rural service is typically not profitable and therefore not attractive to private investors, the rural development strategy should seek to implement mechanisms to make rural service more attractive rather than perpetuate the inadequate level of investment that could be made by PTC. These mechanisms may include the following:

- Using tax incentives and legislative reform to encourage current private network operators (e.g., ZCCM, ZESCO) to carry traffic via their lines serving rural communities or to encourage large users or user groups to establish rural service networks
- Licensing private operators to provide high margin services such as cellular with rural service obligations stated as a condition of the license agreement
- Expanding public telephone service through private sector licensing with rural service obligations embedded in the license agreement

In view of the magnitude of private sector interest in implementing a cellular mobile system and the generally accepted view that rural service will require implementation of some wireless technology, the second option appears to have the greatest appeal for immediate implementation. The next steps in developing a cellular system include:

- National needs (including rural service needs) must be assessed and quantified to enable the ministry to determine what conditions are acceptable (e.g., what type of technology to be used, how many licenses to award).
- The process for license application must be determined and communicated to potential investors. We recommend a process by which the government makes all decisions (e.g., technology, ownership of the cellular service provider, timing for implementation, regulatory requirements) and requests bids from potential investors, since this type of process best avoids the appearance of favoritism.
- The final steps are to solicit bids, evaluate proposals, grant the license, and establish appropriate regulatory/license enforcement systems.

C. Public Phones

Public telephones tend to be very popular in rural communities, as they are frequently the only telephone link to the rest of the world. Although Zambia has approximately 400 coin-operated telephones scattered throughout the country, limited availability of coins (due to currency devaluation) has crippled the public phone system. This, in turn, has resulted in inadequate maintenance and repair of public phones damaged by vandalism.

The PTC is currently at the beginning of a program to transform public coin-operated telephones to accept tokens instead of coins. Repair, refitting, and reinstallation of public phones should ease the capacity shortage in rural areas. The PTC should, to the greatest extent possible, accelerate the public phones project and prioritize rural areas for reintroduction of public phone service.

VI. Conclusion

The following summarize our findings on the specific issues addressed in this paper:

- External plant investment projects have to be evaluated in keeping with long-term plans, but there are several interim measures such as vehicle allocation or staff training that can ease capacity constraints and should be employed immediately. Contracting is an option for civil works construction projects, but strict screening procedures should be in place to ensure that contractors are qualified and will not disrupt existing service. Contractors should not be used for actual cable installation.
- Draft legislation is premature in view of the magnitude of policy issues still to be resolved. Policy issues to be embodied in the policy document should be agreed to before any legislation is passed. Critiques of documents already drafted focus on the

composition, responsibilities, and organizational relationships of the proposed regulatory entity (the Controller).

- INMARSAT is not a cost effective option for providing land mobile service in Zambia at this time. In addition to the high cost of terminal equipment and space segment usage, interconnection between INMARSAT and the public switched network would use foreign exchange to either build a Land Earth Station or to pay a foreign administration for using their LES. These resources would be more productively expended on development of a domestic land mobile service, such as cellular.
- As with the external plant issue, options for increasing rural service should be part of a long-term network development plan. Specific options for serving rural areas include improved wireline service to growing communities and wireless service to more remote areas. For both types of service private sector entities should be encouraged to participate either independently or in a joint venture with PTC through the use of various programs (i.e., tax incentives or inclusive licensing agreements). Finally, rural communities should be prioritized for reinstallation of public telephones.

In more general terms, a word of warning against short-sightedness is in order.

Restructuring the telecommunications sector is an ambitious project enabling the sector to respond quickly and appropriately to technological and business environment developments in the long term. This process is complicated by needs of the user community that cannot be delayed until restructuring is complete, explaining the urgency of these four issues.

Activities that are generic in scope (i.e., improved PTC management) should be implemented immediately, but those activities associated with new investment should be carefully reviewed to ensure their cost-effectiveness and productivity.

Critical issues for long-term sector planning will be addressed in the final report of this study. These issues include development of a comprehensive telecommunications policy, separation of PTC into postal and telecommunications operating entities, formulation of a regulatory structure, cellular operator licensing, and options for increasing private sector participation.