

REPOSITIONING INFORMATION TECHNOLOGY IN ZCCM

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1. INTRODUCTION

"The future belongs to people who see possibilities before they become obvious". So says Harvard Business School Professor Ted Levitt. Professor Levitt's statement is as true of organizations as it is of people.

Within ZCCM, from the view of Corporate Management Information Services (CMIS), it is obvious that never before has such a window of opportunity been greater for ZCCM with regard to the application of strategic information technology (IT). The Company's investment in Computers and Communications (C & C), coupled with the integration of these resources, means that it is now possible for ZCCM to use information technology for competitive advantage.

However, the translation of this potential into reality demands early appreciation and exploitation of the possibilities that IT has to offer. Hence the strategy for repositioning IT in the company. This important exercise is already under way.

CMIS are at the center of this exercise. The main projects covered are the provision of divisional mini computers,

introduction of local area networks, rehabilitation of all mine telephone exchanges, and the upgrading of the divisional data entry facilities, together with the development of new computer applications and enhancement of older applications.

In the following section, we look at the Computers and Communications network in detail. The facilities offered by the distributed computing facilities are covered in Section 3, while Section 4 contains a brief note on the deployment of micro computers. Section 5 highlights some of the major applications currently running and those planned for the future.

2. COMPUTERS AND COMMUNICATIONS NETWORK

2.1 Introduction

Specifically this environment will include a Computers and Communications (C & C) network for integrated information services. The scope of integration is more global and will link up, apart from core business sectors, the agents and partners as well. In this brief section, the concept of the intended C & C network, the current status in terms of implementation, and the future plans - the intended application of Network Technology - are presented.

2.2 Conceptual C & C Network

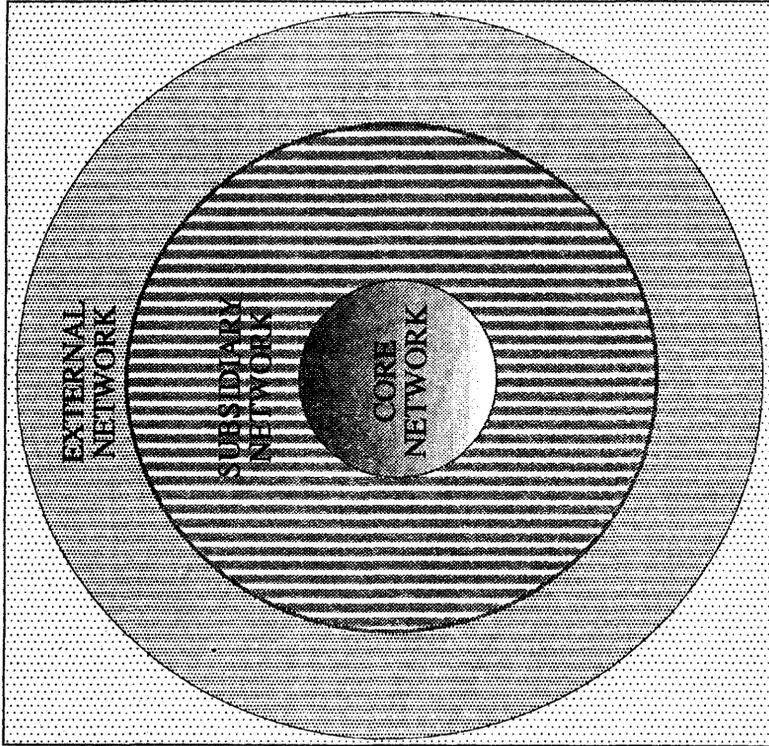
The intended ZCCM C & C Network is an integrated three-layered network (see Fig. 1.) providing facilities for voice, data, facsimile, electronic mail and other communications. The three sub-networks are: Core, Subsidiary and External. The Core Network (shown in Fig. 2.) connects all core business units that constitute ZCCM. The Subsidiary Network (see Fig. 3.) links ZCCM units with all its subsidiary companies in Zambia. The External Network provides (shown in Fig. 4.) provides communication between ZCCM and its business partners, suppliers and financial institutions both locally and overseas.

The above conceptual network is provisional and has two main objectives. It sets the direction for integrating the communication (data and voice) services in the core sector and to prompt increased system based communication with the subsidiary and external sectors.

The scope of the C & C network is driven by communication demands of the core sector and limited by the available public communication infrastructure. The demands in the core sector being high, a fully digital network has been considered for the Core Network. The subsidiary network will be served using available public infrastructure.

ZAMBIA CONSOLIDATED COPPER MINES LIMITED

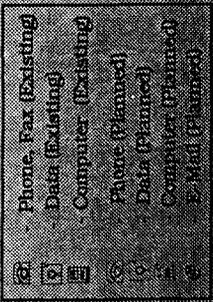
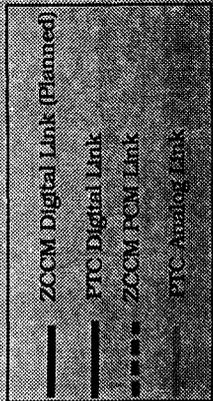
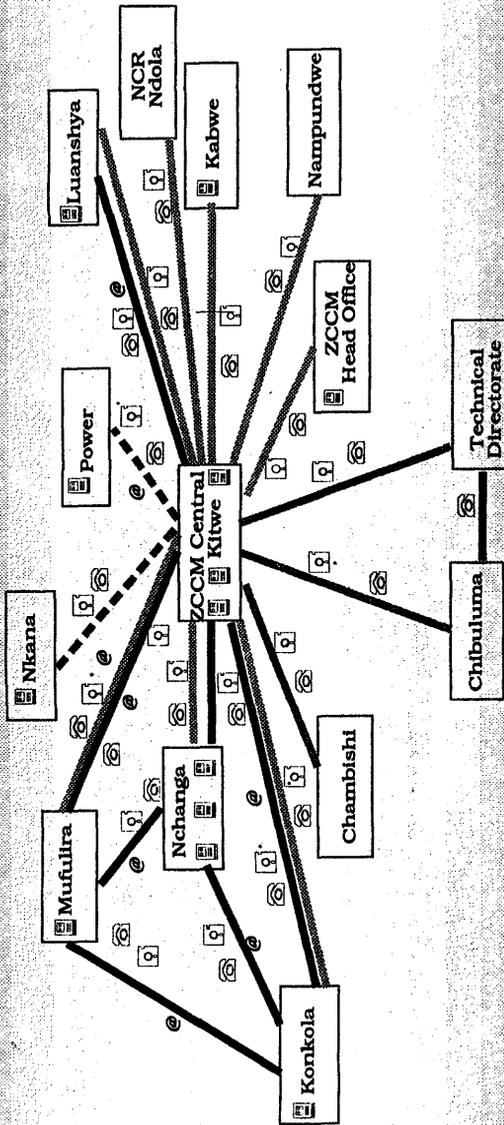
ZCCM INTEGRATED SERVICES COMPUTERS AND COMMUNICATIONS NETWORK



Corporate Management Information Services
April 1993

ZCCM INTEGRATED SERVICES COMPUTERS AND COMMUNICATIONS NETWORK

Core Network



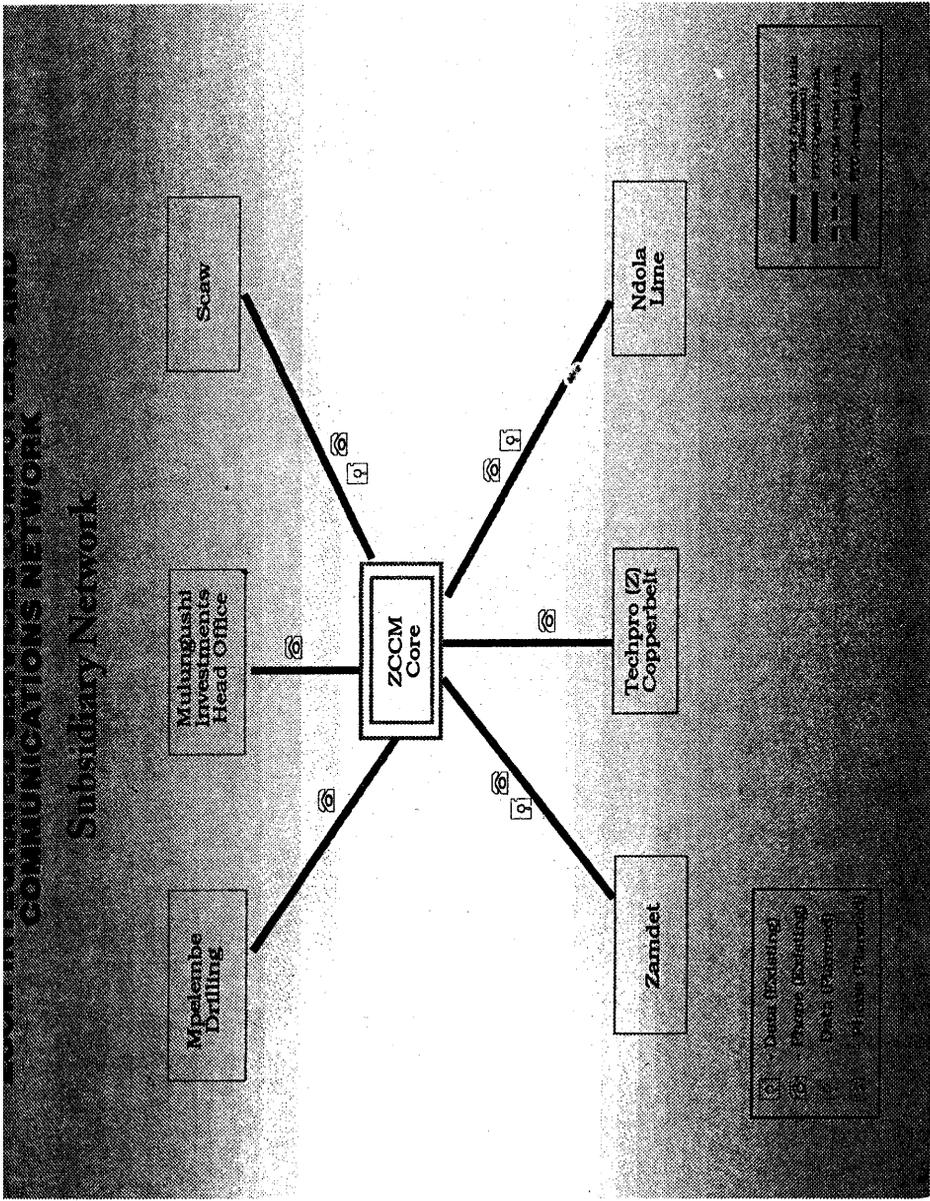
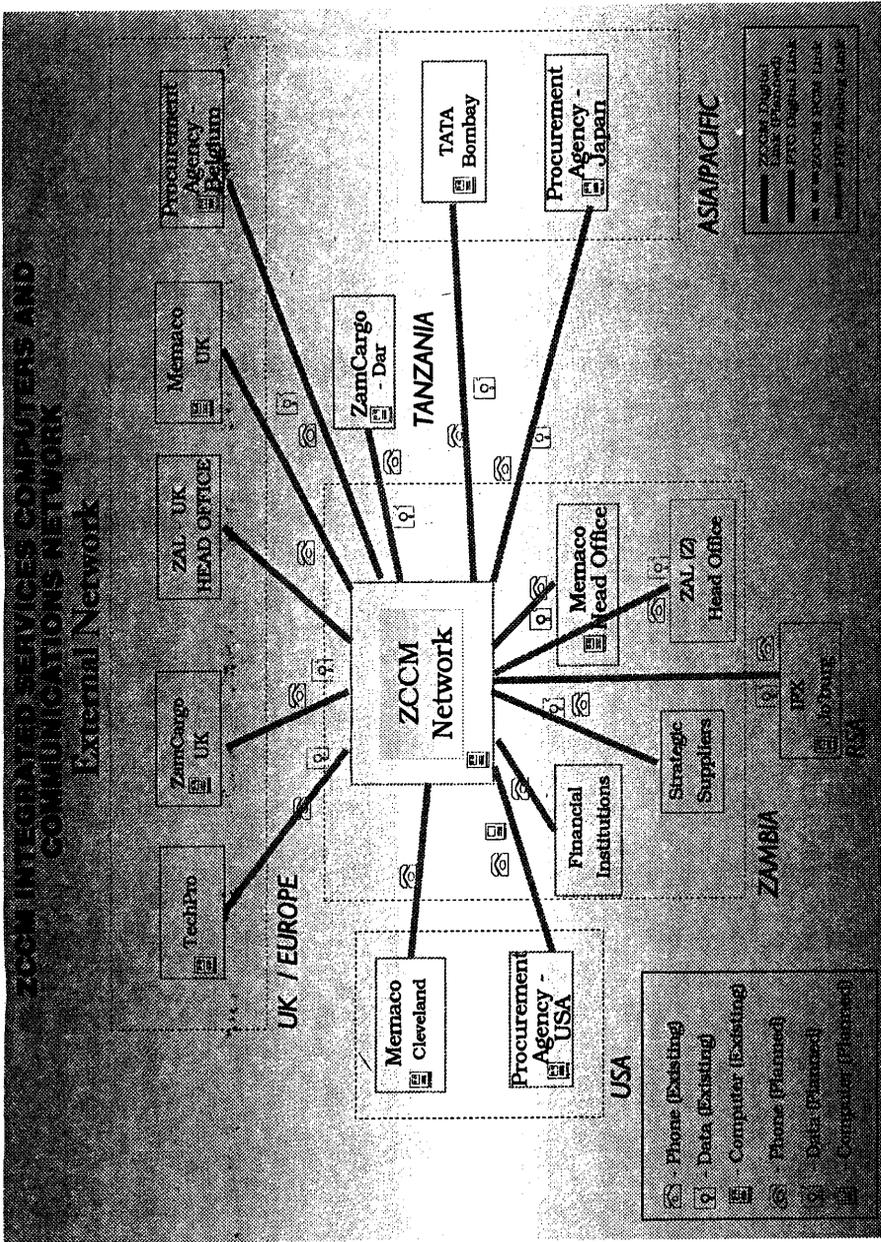


FIG 3 SUBSIDIARY NETWORK



While the same philosophy applies for External Network, the overseas requirements will be addressed using an intermediary UK-based node to ensure reliable network operation.

2.3 Current Status

The implementation of Core and Subsidiary Networks are addressed together due to logistic reasons. The External Network requires a flexible approach due to the variety of customer equipment and options available.

While all nodes in the External Network are important, the critical ones, in terms of volume and current business practice, are the UK and RSA Agents for procurement. A plan is in hand for linking the computers in ZCCM (a mini in Kitwe) and IPX (Jo'burg, RSA) with the mini in Techpro (UK) using leased data circuits from British Telecom. The success of these links will determine the future growth of the network.

On the domestic scene, link with Memaco, the exporters of ZCCM metal, has been planned. Negotiations are yet to start on the links with the local suppliers and financial institutions.

Currently the major emphasis is on the Core Network. At present, VAX mini computers have been installed at all major

operating divisions. The existing Wide Area Network centered around the present Main Frame is shown in Fig 5. The minis intended for Konkola and Power are not indicated as they are still on order. Not included in the WAN are also the HP work Stations that are still under implementation: HP work stations have been installed at three locations; two locations have IBM RT work stations which will be replaced with HP stations during this year.

These UNIX work stations offer complete interactive graphics facilities and run DATAMINE (UK) and LYNX (Canada) packages for Geological and Mine Planning applications. More than fifty micros in each division are in use to cater for sectional requirements. Most of these are stand alone but may be linked to the mini as need arises. The majority of the corporate processing that are handled by the Main Frame (HDS 8053) in Kitwe will be off loaded to the divisional mini computers retaining only the consolidation segments.

A suitable LAN with necessary segments will be put in place in each division to link the various computing equipment. The implementation of such a network will be phased in line with the replacement of mainframe, a project that has just been initiated.

On the voice communication front, ZCCM has just gone through a total revamp. At present there are Alcatel BCN (Business

DDP OVERVIEW -- ZCCM Ltd WIDE AREA NETWORK
 (Updated 04/05/93)

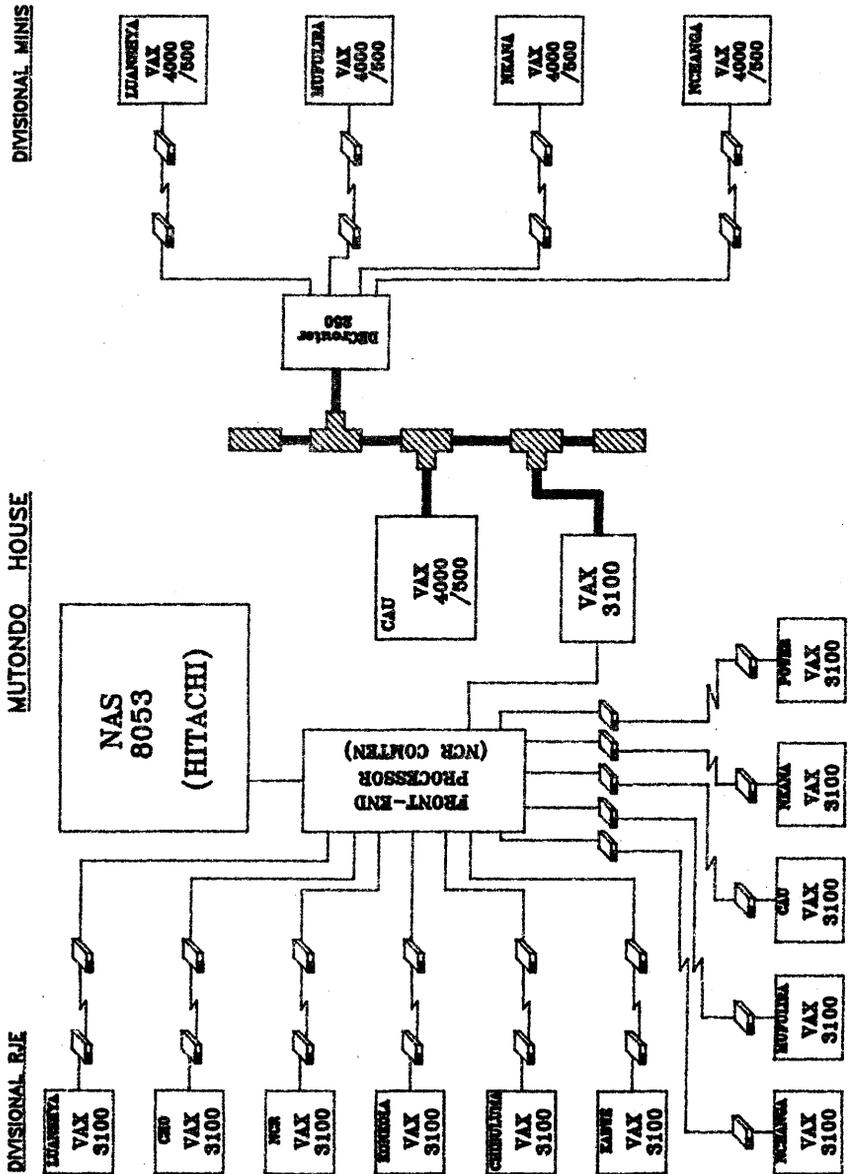
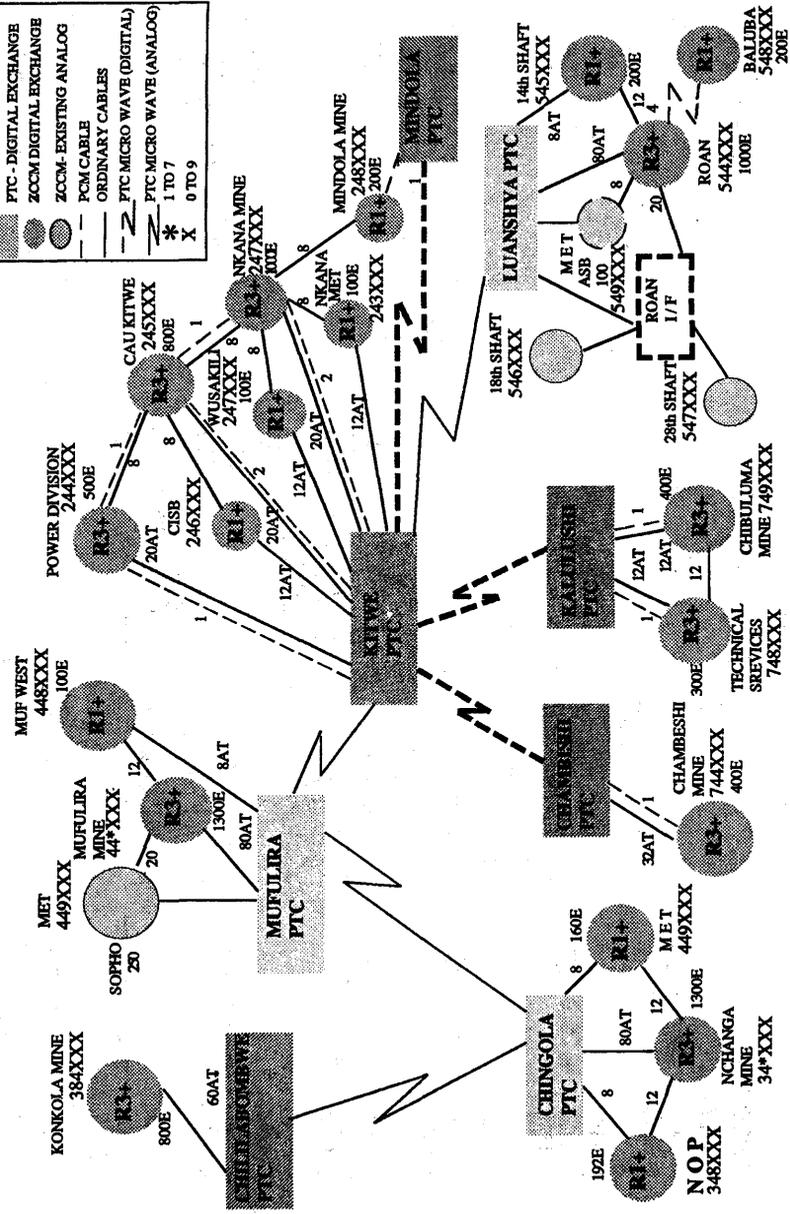


FIG 5 EXISTING WIDE AREA NETWORK

LEGEND

	PTC - ANALOG EXCHANGE
	PTC - DIGITAL EXCHANGE
	ZCCM-DIGITAL EXCHANGE
	ZCCM- EXISTING ANALOG
	PCM CABLE
	ORDINARY CABLES
	PTC MICRO WAVE (DIGITAL)
	PTC MICRO WAVE (ANALOG)
	1 TO 7
	0 TO 9

FIGURE 6:ZCCM TELECOMMUNICATION NETWORK CONFIGURATION



Communication Network) 5200 digital switches at all Copper-belt locations in ZCCM as shown in Fig 6. These 19 PBXs have ISDN features to integrate voice and data communication. The facilities offered include conference, direct-in-dial, data module to connect PC to multi-line phone. A complete digital voice network is in place within Kitwe. Equipment needed for linking two other locations into the digital network and all the rest using analog network are on order.

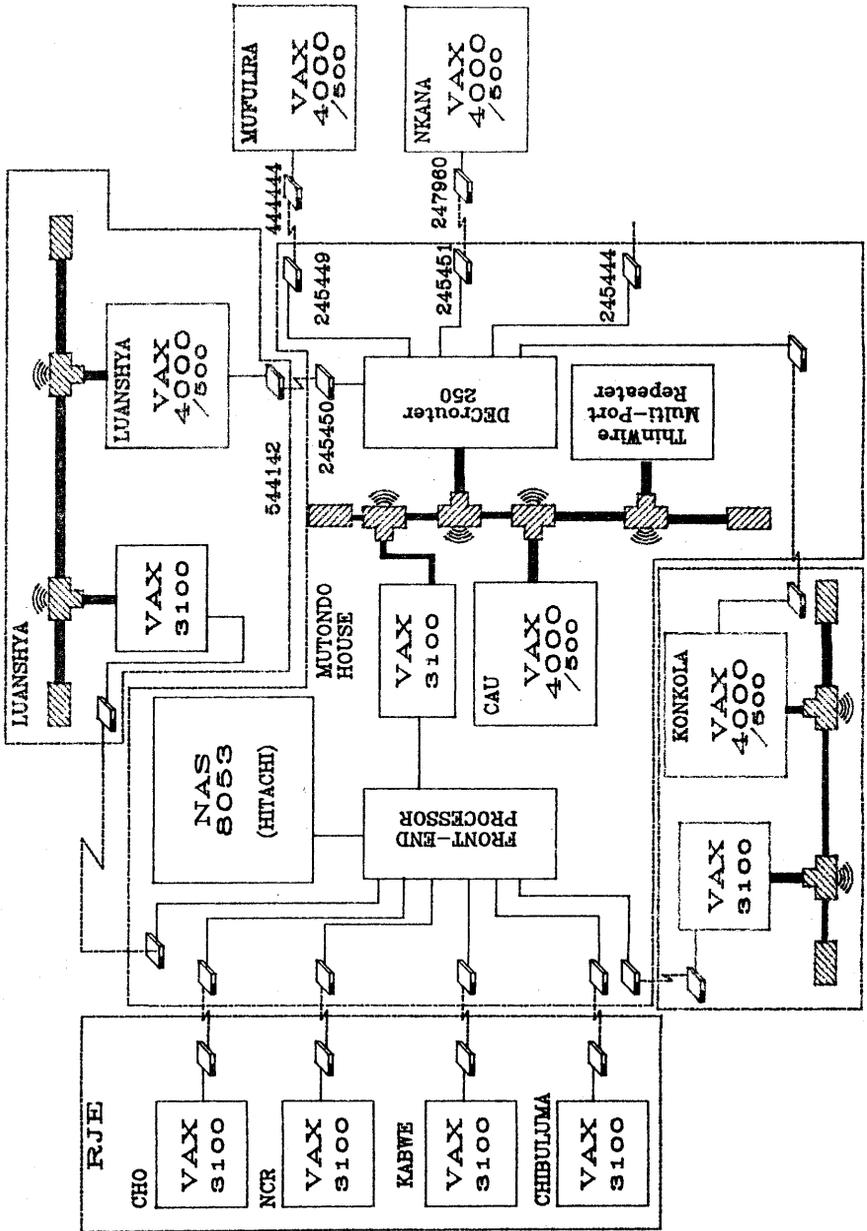
In the next phase, there are plans to install digital micro wave radio links (Fig. 7) to the four locations which are currently served by old analog radios. These micro-wave links will not only integrate all the main switches on a digital network but also to serve as the 'physical layer' needed in the Wide Area Network that will link all the divisional LANs.

2.4 Future Plans

Two plans for divisional LANs and ZCCM WAN are presented. In view of the various constraints (financial, infrastructural), it has become necessary to put in place less integrated low speed WAN (Fig. 8) and LANs (Fig 9.a and 9.b show the LAN for Nchanga). These use the existing analog micro-wave links and available cable plant in the divisions. However, if funding for improving the LAN infrastructure is made available, it is possible to put in place a more integrated and high speed

FIG 8 REVISED WAN UNDER DDP

DDP OVERVIEW -- ZCCM Ltd WIDE AREA NETWORK (Updated 07/07/93)



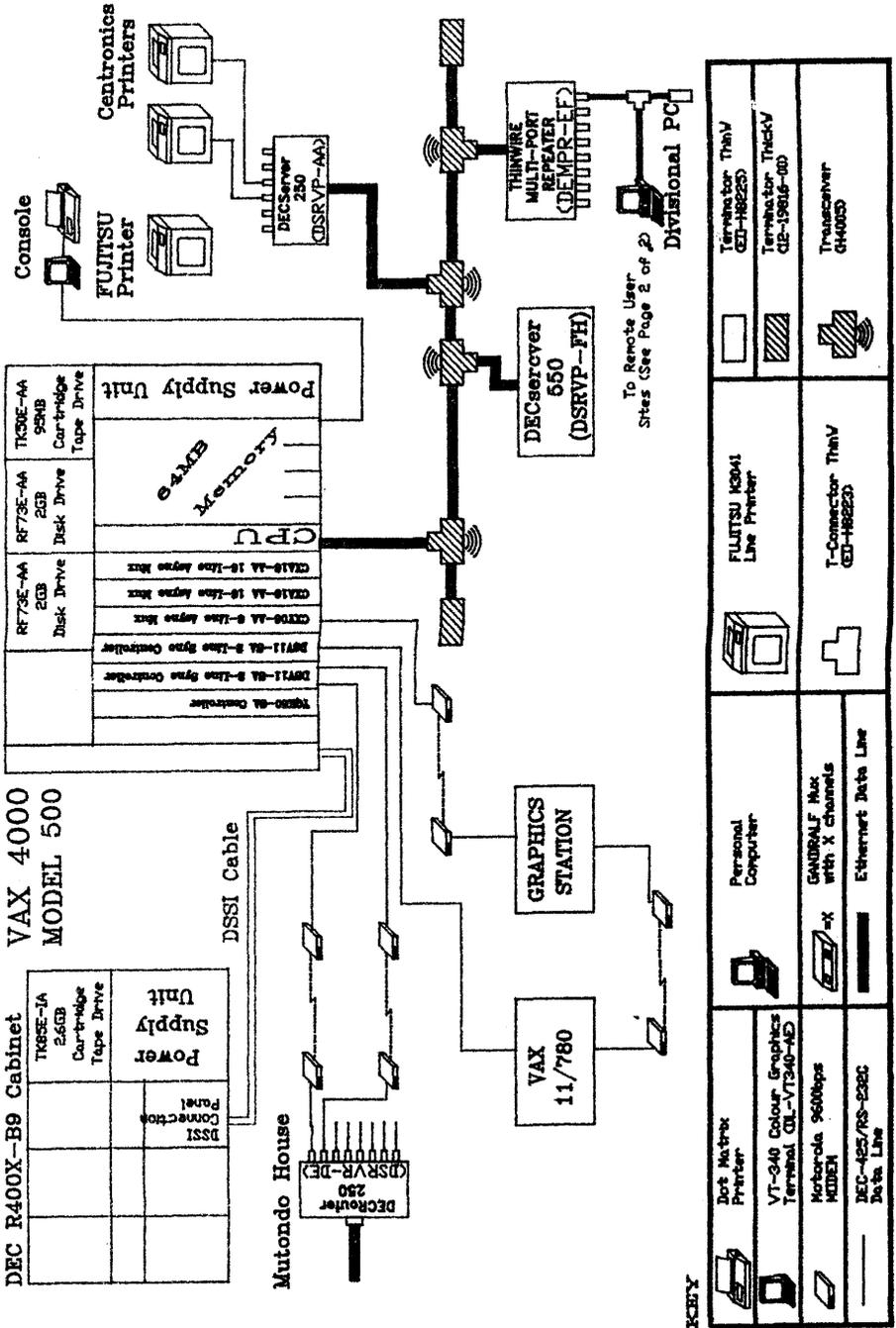


FIG 9A CURRENT LAN SUMMARY

Updated 24/03/1993

DDP PROJECT - NCHANGA DIVISION TERMINALS CONFIGURATION

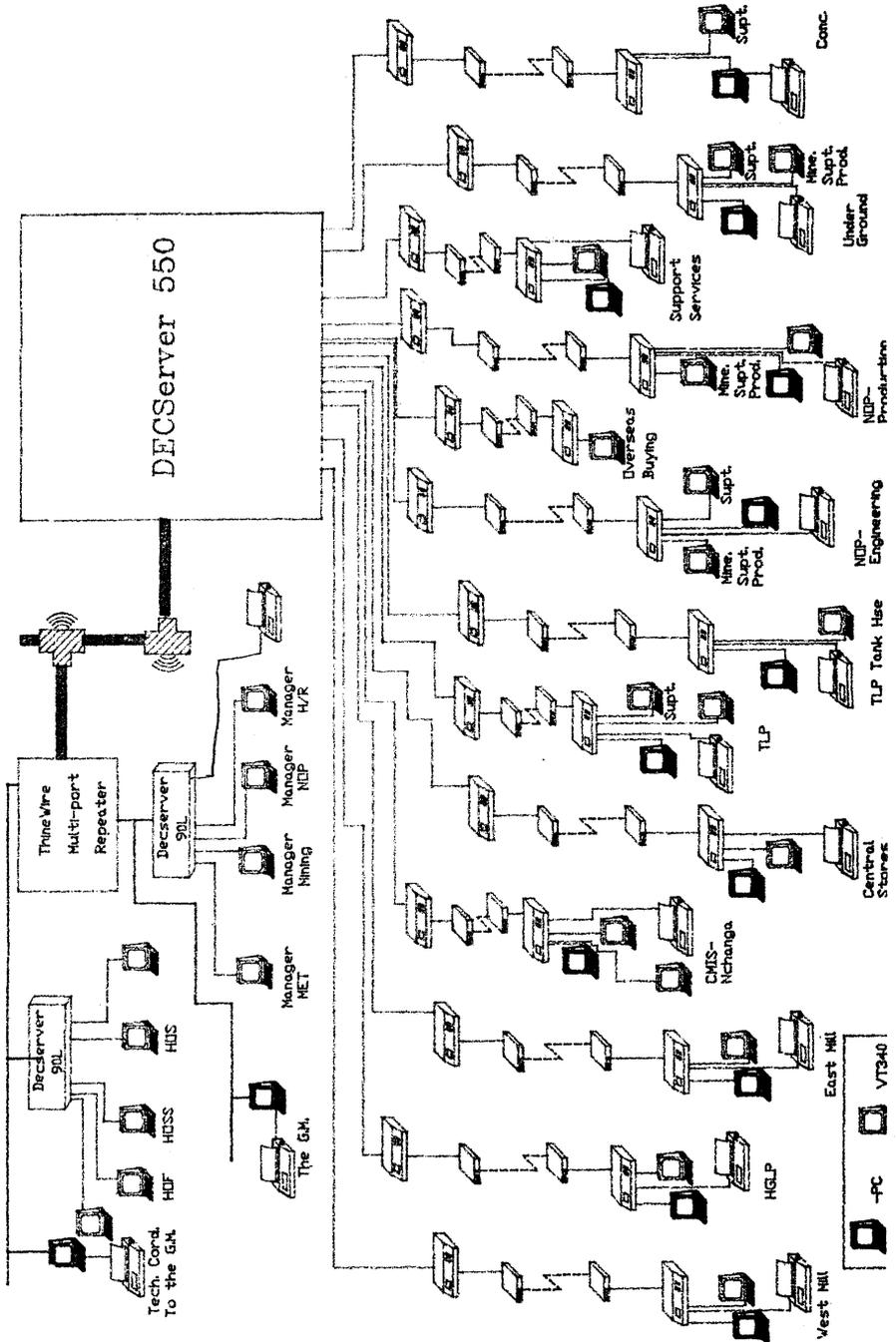


FIG 9B CURRENT LAN - DETAIL

LANs. An example future LAN is given in Fig. 10. Since project for putting in micro-wave links has been approved, it is possible to put in place an integrated high speed WAN that can even allow access to remote graphics station with reasonable response.

In evaluating the Network Technologies, the lack of public X.25 and the planned (private) high speed noise free digital links, prompt the consideration of Frame Relay (a more modern packet switching than X.25 with less over-heads). The other contending technology is the ISDN (offered through the switches). One option is to limit the use of ISDN for back up and exploit the Frame Relay for WAN. A conceptual level WAN using intelligent network products to manage bandwidth and to integrate PBX and main segments of divisional Ethernet is shown in Fig 11.

3. DIVISIONAL MINI COMPUTERS

ZCCM has always operated computers centrally from Mutondc House. While this was good practice in the past, recent developments in the IT field have convinced the company that time for change has now come.

In line with the devolution of authority and decision making to the divisions from the center, CMIS is now implementing

FUTURE LAN
(Nchanga Division)

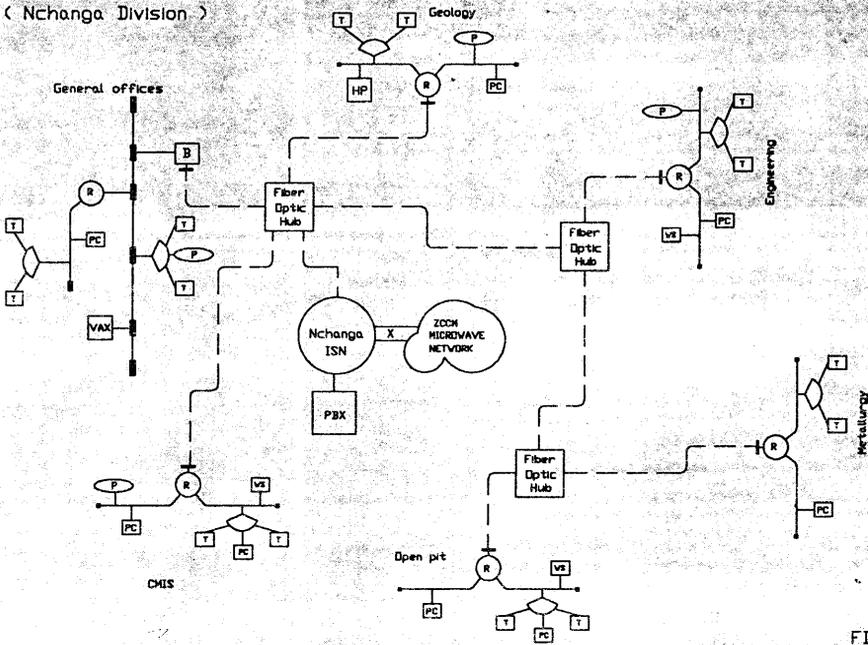


FIG 10

KEY

	Terminal server (LAT, TCP/IP, Telnet, SLIP)		Workstation (UNIX, DOS, Windows, OS/2)
	Multiport Repeater (DEMPR)		Fiber optic cable
	LANbridge		Copper to Fiber Transiever Or Copper to Copper Transiever
	ASCII terminal		Printer or plotter
	Personal computer or macintosh		Integrated services node

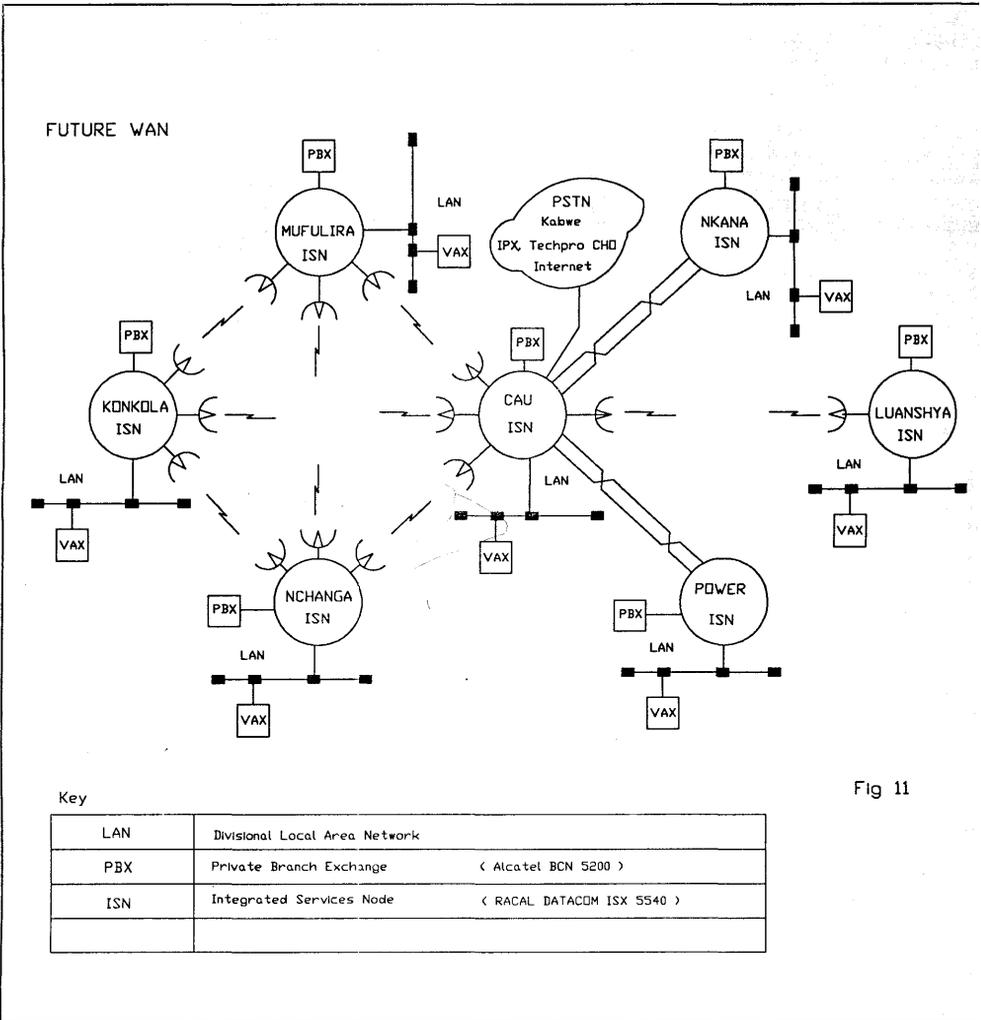


Fig 11

the distribution of processing power by installing mini computers at the divisions. This will allow divisions to have total control over the use of their computing resources, in line with the priorities set by divisional management.

As at now, computers have been installed at Nchanga, Mufulira, Nkana, Luanshya and Central Administration Unit. Within the next year, additional computers will be installed at Konkola, Kabwe, Power and Corporate Head Office.

The equipment at the divisions is supplied by Digital Equipment Corporation of the USA. The VAX 4000 computers are very modern and extremely powerful. They are capable of supporting 300 user terminals concurrently.

Coupled with this high performance machine is very flexible software supplied by Oracle Corporation of the USA. This allows even non-computer personnel to quickly and accurately develop computer systems.

The first applications to be installed on these machines will be Executive Information Systems, that will assist divisional management to manage better by having timely access to information about divisional activities and relevant business information from outside the division.

In addition, an office automation system (ALL-IN-1) has been installed. This allows users access to a word processing system and electronic mail for sending documents to other users. This cuts down on the amount of paper being sent around offices.

At a later stage, further applications will be developed to cater for the divisional requirements. These will include technical systems for support of geology, mining and metallurgical processes and general administration.

ZCCM believes that the full implementation of these systems will provide for reduced costs, increased availability and utilization of equipment and plant, increased efficiency and increased production. These new computers will play a very crucial key role in assisting divisions to meet their goals by providing timely, accurate access to information needed for both day to day operations and for decision making and planning.

4. MICRO COMPUTERS

ZCCM introduced micro computers in 1984, and the extreme success of this project is well known. It is now time for ZCCM to move on to the next step in this area.

Local area networks (LANs) are being set up to allow micro computers to talk to each other. This allows micro computer users to share information, applications and specialized devices such as laser printers and plotters. The micro computers are also being put into the divisional mini computer network so that data on the divisional and central computers is also accessible to micro computer users.

All along, ZCCM has been using IBM-compatible micro computers for basic word processing, spreadsheets, database and technical applications. CMIS has now introduced Apple computers. Initially these are to be used for desk top publishing (DTP) and will eventually be used for general purpose computing. To support this CMIS has created a new Apple computer laboratory to research and implement DTP.

CMIS has also made investments in laptop computers. These are powerful portable versions of the desk top micro computers normally in use. Built-in communications support mean that staff away from their normal base can be in contact with other computers on their network. The benefits of this are enormous. ZCCM expects that as prices drop and laptop technology develops, there shall be widespread use of laptops within the company.

5. APPLICATION SOFTWARE

Vax 11/780 installed at Nchanga, OPTIMA, a maintenance management system for Open Pit engineering is being used. The three platforms are connected in most cases just for file transfers.

In addition to geological modelling and mine planning, hydrological modelling has been actively pursued, mainly at Konkola, which is regarded as one of the wettest mines in the world. Accurate estimation of the water sources and draw points is a critical aspect of the overall mining process at Konkola. Modelling of underground water flow has been done using MODFLOW. This has yielded important results needed for mine extensions. MODFLOW is installed on both of our HP(()) graphics work stations in Chingola and the Everex super micro computers at Konkola.

Apart from applications on graphics work stations, many other stand alone applications are run on a wide base of micro computers. Application software that range from ventilation network design and surveying to blasting coefficients of various blasting patterns are being used in various departments in the Company.

5.3 The Future

The focus on the application of IT in ZCCM is to shift from the current supportive nature to strategic if the competitive

advantage through IT has to be reality. Applications to be developed on the divisional minis will be geared to provide critical management and operational information to enable divisions operate in a SMART manner. Development strategy will be top down starting with the EIS which will provide management information with the ability to manoeuvre through details. Both technical and commercial systems will feed into the EIS so that the division's performance can be strategically planned.

6. FUTURE OUTLOOK

The future for IT in ZCCM is indeed very bright. ZCCM believes that the key to achieving world class performance and reaping the benefits of IT lies in successfully re-engineering current processes so as to take advantage of the new technology. Just transferring current work habits and methods to the new environment will not produce the dramatic improvements in productivity that ZCCM is looking for.

The emphasis is on the need to shift the applications portfolio from low yield, high cost support systems to high yield, low cost strategic systems.

ZCCM is aware that to survive and compete effectively, ZCCM has to get into more partnerships with vendors of IT services. This will allow ZCCM to have access to the latest

