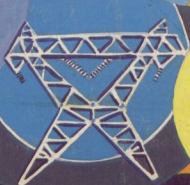


The  
Association of  
Municipal Electricity Undertakings  
of South Africa

FORTY EIGHTH  
CONVENTION PROCEEDINGS  
11 - 13 OCTOBER 1983

**JOHANNESBURG**



Die  
Vereniging  
van Munisipale  
Elektrisiteitsondernemings  
van Suid-Afrika

AGT-EN-VEERTIGSTE  
KONVENSIË VERRIGTINGE  
11 - 13 OKTOBER 1983

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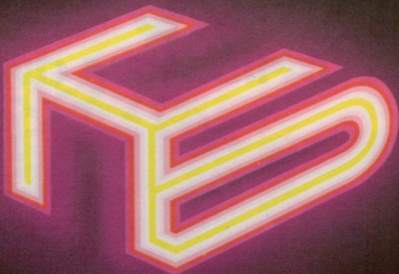
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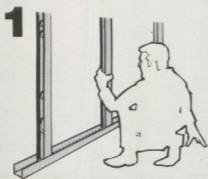
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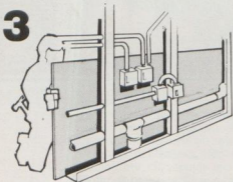
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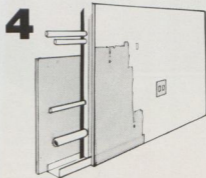
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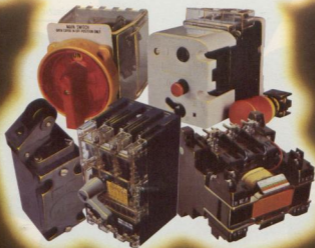
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# THE ASSOCIATION OF MUNICIPAL ELECTRICITY UNDERTAKINGS OF SOUTH AFRICA

## DIE VERENIGING VAN ELEKTRISITEITSONDERNEMINGS VAN SUID-AFRIKA

OFFICIAL PROCEEDINGS  
48TH CONVENTION  
OCTOBER 1983



AMPTELIKE VERRIGTINGE  
48e KONVENSIË  
OKTOBER 1983

### SECRETARY/SEKRETARIS

Bennie van der Walt

### HEAD OFFICE/HOOFKANTOOR

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The AMEU is the body to bring together municipal councillors, electrical engineers and all persons interested in the advancement and the development of undertakings and to promote wider contact and the exchange of views.

Die VME0 is die organisasie om munisipale raadslede, elektrotegniese ingenieurs en alle persone met belang in die bevordering en ontwikkeling van ondernemings bymekaar te bring en om wyer kennismaking en die wisseling van sienswyses te bevorder.

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**MR. BENNIE VAN DER WALT OPENED THE PROCEEDINGS WITH PRAYER.  
MNR. BENNIE VAN DER WALT HET DIE VERRIGTINGE GEOPEN MET GEBED.**

**TABLE OF ATTENDANCE / TABEL VAN BYWONING**

Honorary Members	13	Erelede	
Guests	45	Gaste	
Local Authorities	67	Plaaslike Besture	
Engineers	116	Ingenieurs	
Associates	24	Assosiaatlede	
Affiliates	197	Geaffilieerdelede	
Ladies	238	Dames	
Staff	25	Personel	
	<u>725</u>		
Apologies	27	Verskonings	

**OFFICIAL OPENING / AMPTELIKE OPENING**

**MR D.H. FRASER: PRESIDENT**

Your Worship the Mayor of Johannesburg Cnr. Alan Gadd, Mr Bornman, distinguished guests, ladies and gentlemen, it gives me very great pleasure to welcome you to this 48th Convention of the Association of Municipal Electricity Undertakings of South Africa. The record attendance here this morning is evidence that the Association is going from strength to strength in this its 68th year, (or perhaps it is just confirmation of the charisma of our incoming President!).

The passing years take their toll however and it is with regret that we record the deaths of some of our former friends and colleagues.

Mr Percy A. Giles, Hon. Member, Past President and former CEE of East London.

Mr Clarence Kinsman, Hon. Member, Past President and former CEE of Durban.

Mr H.G. Kipling, Hon. Member.

Mr C. Borchard - Councillor.

Mr C. de Kock - Councillor.

Mr A. Pangsley - Councillor.

Mr K. Cloete - Ceres.

May I ask you to stand in remembrance of them.

Dit is vir ons 'n groot voorreg om 'n aantal belangrike besoekers en verteenwoordigers van ander verenigings as gaste by hierdie Kongres te hê en ons heet u hartlik welkom. Ons vertrou dat u self hier sal tuismaak en gedurende die volgende drie dae u volle deelname aan die verrigtinge op sowel formele as informele vlak sal gee. Mnr Gerrit Forman wat netou die vergadering sal open, is 'n ou vriend van die VMEQ en sal later formeel aan u bekendgestel word.

From the United Kingdom we are privileged to have Sir Austin Bunch who is our keynote speaker and Lady Bunch.

We welcome to this Convention the Chairman of the recently appointed Commission of Inquiry into the supply of electricity in the Republic of S.A., Dr Wim de Villiers.

It is very pleasing to have with us representatives of neighbouring and independent states including -

Lesotho  
Mocambique  
Transkei and  
Ciskei

A warm welcome too to the representatives of the State Departments of Community Development, Manpower, S.A. Transport Services and Local Government and also the various Provincial Administrations.

Escom and the SABS are old friends of the AMEU and we are glad to see them represented in force today. We miss particularly Johan Smit of the Bureau of Standards who sends his greetings and apologies. A special welcome to Mr Jan Smit, Chairman of Escom.

Other sister institutions including - The Institute of Municipal Treasurers and Accountants and The Institute of Municipal Engineers, are represented here and we welcome their delegates.

Special greetings to Mr Bob Leishman and Mr Dereck Plowden, former City Electrical Engineers of Johannesburg who have left their work on the AMEU and will be proud to see their successor inducted today.

Mr Jim Levy today represents the Electricity Control Board and we are pleased to have an old friend of the AMEU in that coup.

Welcome to Dr Johan Meyer, University of Pretoria and Victor Horne R.A.U.

Finally to Mr A.P. Burger, Town Clerk & Dr John Mortimer, Director of Technical Services of Johannesburg, who will deliver a paper, a special welcome to you.

We are proud to have in our midst a number of Honorary Members and Past Presidents and I ask them to stand up so that we may see who they are and extend a special welcome to them:-

Dr Reinhardt Straszacker

Dr Ralph Andersson

Mr Hennie Hugo

Mr Chris Lombard

Mr Pat Middlecote

Mr Dereck Plowden

Mr John Morrison

Mr Ronald Simpson

Mr William Reesley

Mr Gawie Theron

Mr Naude van Wyk

Mr Bob Leishman

Mr Bob Barton

We have noted the apology of Mr Jan van der Walt.

Mr Mayor, Mr Bornman, ladies and gentlemen - due to the change in the date of the Convention this year from May to October, I have had the privilege of holding office as President for nearly two and a half years. It has been a most rewarding experience and I am grateful for the opportunities which this has provided for wider contact with people in various fields of endeavour related directly to Municipal Electrical engineering.

Perhaps more important has been the opportunity of getting to know my fellow Town and City Electrical Engineers a little better and of gaining a better understanding of the important role which the AMEU has to fulfil in the South African scene.

Interesting challenges lie ahead with the need for the Association to participate in decisions which will have to be taken in regard to electricity supply under the contemplated new Constitutional dispensation.

Die verslae van die verskeie komitees van die Uitvoerende Raad wat later in die program bespreek sal word, sal u so 'n blikkie gee van die sake wat Munisipale Elektriesiteitsondernemings raak en waaraan daar reeds die afgelope 2½ jaar aandag gegee word. Hierdie komitees verrig 'n groot hoeveelheid harde werk en ek spreek my innige dank uit teenoor almal wat soveel van hul kosbare tyd afgestaan het om in komitees te dien of om die VMEO in buitenslandse te verteenwoordig.

Die vyf takke van die Vereniging floreer steeds en hou gereeld vergaderings. Die belangrikheid van sulke vergaderings kan nie oorbeklemtoon word nie. Hulle bied 'n forum vir bespreking en die hou van 'n debat oor sake van streeks en nasionale belang en gee lede 'n baie groter geleentheid om aan samesprekings deel te neem as wat die geval is by kongresse en tegnieke vergaderings. Ek het die lonende ondervinding gehad van 'n

besoek by elke tak gedurende my ampstermyn af te lê en wil graag hier melding maak van my opregte dankbaarheid vir die hartlike en vriendelike wyse waarop ek met elke besoek verwelkom is.

To the Councillor and Engineer members of the Executive Council and Standing Members I would say thank you for your co-operation in getting through the rather full agendas which seem to be the order of the day. It has been a privilege to work with you.

I think we only really appreciated the important role played by our Secretary, Bennie van der Walt when ill health put him out of action for a short while last year. Bennie we are delighted to see you now fully recovered and I extend to you and your wife Annatjie my sincere thanks for your friendship and support.

One of the unique features of the AMEU is the active participation of the Affiliates and I extend to them a special welcome today and my thanks for their valued support.

The wife of the President has an important supportive role to fulfil – thank you Val for your enthusiasm and encouragement always.

Finally to my own City Council and colleagues in my Department my sincere thanks for having made it possible for me to hold this high office.

## INDUCTION OF PRESIDENT / INHULDIGING VAN PRESIDENT



Mr. Denis Fraser (right) – Outgoing President  
with Wessel Barnard (left) – Incoming President

### MR D.H. FRASER: OUTGOING PRESIDENT

Mr Mayor, – my last official duty is one which gives me great pleasure and which I am sure will be pleasing to you and your Council. After an interval of twenty four years the head of the Johannesburg electricity undertaking will take up the Presidential reigns of the AMEU.

It will be a fitting culmination of an illustrious career. The talents which he possesses and the resources which he commands can only result in the AMEU reaching greater levels of achievement under the capable hands of Wessel Barnard in the next two years. During his eight year apprenticeship of the Executive Council, Wessel had demonstrated his versatility and skill as an organiser and leader. As Ken Robson said in proposing him as President Elect in 1981 he is a 'man of many parts' and many of those parts are important components in the make up of a leader.

Wessel it is my privilege to ask you to come forward now to receive the chain of office of President of the AMEU and in so doing, I extend to you and your wife Iona from Val and myself, and all your friends present today every good wish for a successful two year term.

### MR W. BARNARD: INCOMING PRESIDENT

Mr Mayor, distinguished guests, ladies and gentlemen, it is a great honour for me to have been elected to the office of President.

Aan my kollegas en al die lede van die VMEO wil ek my dank en waardering uitspreek, en die onderneming gee om tot die beste van my vermoë my toe te wy aan die VMEO se belang.

I am indebted to my Council and more particularly to the Chairman of the Management Committee Alderman Francois Oberholzer en ook die Voorsitter van die Nutsdiens- en Behuiskomitee Raadsheer Carel Venter vir hulle ondersteuning wat dit vir my moontlik gemaak het om die pligte en verantwoordelikhede van die Presidents amp te aanvaar.

It is not only I who have been honoured here today, but also my City which is hosting this Convention.

The last time Johannesburg hosted an AMEU Convention was in 1959 when the late Mr Bobby Kane was General Manager of the Electricity Department.

I am particularly pleased that Messes Bob Leishman and Derek Plowden are here today, both previous General Managers of the Electricity Department and honorary members of the AMEU. When I tell you that I started my career as an apprentice under them you will realise the extent to which I am indebted to them for their counselling, forbearance and assistance throughout my career in the Johannesburg City Council.

It is now my duty and singular pleasure to thank Denis Fraser for two years of unstinting service and outstanding achievements as President of the AMEU. He has certainly brought a new status and lustre to the office of President. Those of us who will follow can only try to emulate him in a small measure. On your behalf I wish Denis many happy memories and also many years of further service to the AMEU and to him and Val, good health and good fortune for the future.

On behalf of the AMEU I would like you Denis to accept this illuminated address as a token of our esteem and appreciation for your services rendered.

It reads –

“THE ASSOCIATION OF MUNICIPAL ELECTRICITY UNDERTAKINGS OF SOUTH AFRICA – BE IT KNOWN HEREBY THAT THIS ADDRESS HAS BEEN PRESENTED ON BEHALF OF ALL THE MEMBERS OF THE ASSOCIATION TO DENIS FRASER.

MR D.H. FRASER WAS PRESIDENT OF THE ASSOCIATION OF MUNICIPAL ELECTRICITY UNDERTAKING OF SOUTH AFRICA FOR THE PERIOD 1981-1983, AND THIS ADDRESS IS A TOKEN OF APPRECIATION OF HIS PARTICULAR AND LOYAL SERVICES DURING THAT PERIOD IN FURTHERING THE OBJECTS OF THE ASSOCIATION”.

Denis, I am sure that this address will remind you of two years of considerable achievement and the cementing of many friendships.

## MAYORAL WELCOME / BURGEMEESTERLIKE VERWELKOMING

### MR W. BARNARD: PRESIDENT

It is now my privilege to introduce his Worship the Mayor of Johannesburg Councillor Alan Gadd.

The Mayor and I have quite a lot in common - for one thing we matriculated at the same school.

Secondly, we both attended the University of the Witwatersrand to read for an Engineering Degree but from there on our paths parted.

Councillor Gadd switched to Accountancy and qualified as a chartered accountant. I don't know if he changed because he quite rightly realised that there is no money in engineering, or because he found it too difficult.

The Mayor entered the Johannesburg City Council in February 1968 through the back-door when the North-Eastern areas were incorporated into Johannesburg.

He has served on the Housing and Utilities Committee and therefore has a close association with the Electricity Department.

It is with much pleasure that I now ask his Worship the Mayor Councillor Alan Gadd to address you.

### HIS WORSHIP, THE MAYOR, CLR. ALAN GADD, MPC.

The President of the Association of Municipal Electricity Undertakings in South Africa, Mr Barnard and Mr Fraser, Mr Gerrit Borman, member of the President's Council, the Chairman of the Electricity Council, London, Sir Austin and Lady Bunch. Delegates to the Convention. Ladies and Gentlemen.

I deem it both an honour and a privilege on being able to address you this morning at the opening of your conference.

The Convention of the Association of Municipal Electricity Undertakings in South Africa was last held in Johannesburg some 24 years ago, and it is indeed a pleasure for Johannesburg to once again act as the host city to this most important body.

I would at the outset like to take this opportunity of welcoming all the delegates to this City. You will find Johannesburg not only the biggest city in South Africa, but certainly the most vibrant. It is not for me today to boast of our own Electricity Department, which I have no doubt is the largest of any Local Authority in South Africa, but I know that you will receive the hospitality for which Johannesburg is renowned.

I would particularly like to welcome, not only to Johannesburg, but to the Republic of South Africa, Sir Austin Bunch, who is visiting us from the United Kingdom and he is here to deliver the keynote address to this Conference, and to Mr McDerber also from the United Kingdom. I trust that you will both have a happy stay in our City.

Having been elected as President of the AMEU, and this must certainly be a milestone in the life of Mr Barnard, and for this, I would like to offer my very own personal congratulations and tell him how proud we in the City are of this particular achievement.

When I speak of Mr Barnard, I believe I am obliged to disclose my interest. Mr Barnard has always been a very close personal friend of mine. We, in fact, went to the same school, we both chose careers in Engineering, he in Electrical Engineering and I in Mechanical Engineering. Mr Barnard went on and qualified as an Electrical Engineer whilst I changed careers after my first vacation at the University when I came to work for the Johannesburg City Council and worked in the electricity workshops on the mechanical side. Unfortunately one of the first assignments that I was given was to repair the Snake House at the Zoo where one of the heaters had broken down. When we arrived there, the journeyman told me to go into the snake house and to remove the heater so that we could take it back to the workshops to be repaired. I looked at the journeyman with a smile on my face and said: "do you realise that there are snakes in the cage?". He replied: "yes, and you get in there, I will send in one of the other men with a stick to hold off the snakes while you take off that heater". I just looked at the journeyman and shook my head and told him that there was no way that I was going into that snake cage. It was very interesting to note that he didn't go in either, but sent one of the other men in to do it. I made up my mind at that time that engineering, or that type of engineering wasn't for a nice Jewish boy, and I then changed to accountancy.



*His Worship the Mayor - Clr. Alan Gadd*

I am so very grateful, though, that Mr Barnard did not have the same experience otherwise this City may not have had the highly qualified Electrical Engineer which we have today, who heads our Electricity Department.

Your Association meets at the time when energy and the crises in energy is certainly one of the topics in the world today. I do not look upon myself as an expert in this field, but I do know that our natural resources will not last forever, be they coal, or the like. We need to create a new and efficient means of generating electricity, which is so vital to the economy of any country, is of paramount importance in the world today, and I want to submit that if one has the will to succeed and the will to win, then these problems shall and will be overcome.

I recall a very recent visit to Taiwan where we were shown their third Nuclear Power Plant which is being built. If one realises that there you have a Country with no oil, no coal and no large rivers or waterfalls to create hydro generated electricity, then you realise that if that Country was to survive as an industrial Country, the generation of electricity on a large scale was a vital factor in the development of that Country.

The third nuclear power station which we visited and which was near completion was being built to generate 2 200 mega watts of electricity at a cost of 2.3 billion USA Dollars. They knew in the Republic of China that they had to do this in order to ensure that they had the vital commodity of electricity available to keep their industries and their development on the move. They planned, they were determined, and they built.

I know that we in South Africa will not falter in our duties when it comes to providing this Country with its energy resources, despite any difficulties which may stand in our way.

May I on behalf of the City of Johannesburg and all its citizens, in bidding you a very warm welcome to our City, extend to you our best wishes for a successful Convention.

To those delegates who are visiting our City, I sincerely hope that you will all return home safely with fond memories of this, our City of Gold.

# OPENING ADDRESS / OPENINGSREDE

Mr W. Barnard: President

It gives me great pleasure to introduce Mr Gerrit Bornman, member of the President's Council.

It is particularly appropriate that Mr Bornman should deliver the opening address as his links with this city and the AMEU have been very close. He was a member of the Johannesburg City Council for 10 years from 1972 until 1982 and as a member of the Management Committee responsible for utilities, served on the AMEU Executive Council in which capacity he attended the 45th Convention in 1977.

Mnr Bornman bekleë die graad BA (Diplomatiese Diens) en BA Honneurs (Ekonomie) en sy loopbaan en rekord van publieke diens het 'n verskeidenheid en diepte wat beteken dat sy loopbaan moeilik kortliks opgesom kan word.

One wonders if in reading for degrees in economics and diplomacy he had in mind a government career as an Economical Diplomat in Cape Town or a Diplomatic Economist in Pretoria.

Alhoewel hy hom oorspronklik toegespits het op 'n loopbaan in die publieke diens, het hy later 'n ekonomiese rigting ingeslaan en 'n groot verskeidenheid van poste bekleë insluitend Direkteur van die Afrikaanse Handelsinstituut, Besturende Direkteur van Finansore Beleggings en Eiendomskonsultant en Direkteur van ander maatskappye.

Hy was ook hoofbestuurslid van die Afrikaanse Handelsinstituut, voorsitter van die Johannesburgse Afrikaanse Sakekamer. Is lid van die Suid-Afrikaanse Nasionale Raad van die Internasionale Kamer van Koophandel, lid van die Ekonomiese Vereniging van Suid-Afrika en someer.

And in addition, he is a member of the President's Council.

We in this country, particularly those involved with local government are aware of the fact that changes are proposed which will affect all tiers of Government and certainly the AMEU can expect to be caught up in such change and Mr Bornman is undoubtedly one of the best qualified persons to address this convention today.



Mr. Gerrit Bornman

BY G.B. BORNMAN  
(Member of the President's Council)

## 1. INTRODUCTION

Mr President, ladies and gentlemen, I regard it as an honour to have been asked to deliver the opening address at your Convention this year, and I would like to avail myself of this opportunity to address you on the very topical and crucial subject of the role of local government in the future constitutional, economic and social development of our country and in doing so I would like to lay special emphasis on the importance of the infrastructural services that are provided by local government, and more particularly, the services rendered by the municipal undertakings represented by you at this convention.

## 2. CONSTITUTIONAL DEVELOPMENT AND LOCAL AUTHORITIES:

In the new constitutional dispensation the Government has set itself the goal of granting the various communities, population groups and nations the greatest possible degree of freedom and right to self-determination. Self-governing local government institutions for the various population groups with maximum devolution of power and the decentralisation of administration at local government level is an important mechanism to ensure this self-determination within each community, also at the local and most intimate level of government.

Local government structure and development is therefore regarded as a basic and integral element of constitutional reform and the future development of government structure at this level in South Africa will therefore be characterised, inter alia, by the greater devolution of power to local authorities. This will be achieved by the extension of the functional responsibilities and decision making authority of local government and the granting to them of a greater degree of autonomy generally, with less administrative controls by higher government institutions.

This development will not only increase the importance of local authorities but will no doubt also place greater responsibilities on them and make greater demands of them, financially and otherwise.

## 3. ECONOMIC POLICY AND LOCAL AUTHORITIES

Economic growth at an annual rate in excess of 4,5 percent is required in South Africa to provide employment to the growing population and to raise the general standard of living of all the peoples in our country.

Under South African conditions the maintenance of a relatively high rate of economic growth is a prerequisite for the advancement of the developing peoples of this country and also for continued political stability which in turn is vital to continued economic progress. Politics and economics are therefore closely inter-related in our country.

It is generally accepted today that the State has a very important role to play in achieving continued economic growth and development, and it is the policy of the State to maintain the highest growth rate consistent with economic stability. In fact South Africa has a very enviable record in this regard and over the period from 1948 to 1981 has achieved an average annual growth rate of about 4,7 percent.

However, the South African economy and its population distribution is characterised by an over concentration in four highly industrialised metropolitan areas. In these four areas no less than 75 percent of the industrial production of the whole country and 60 percent of the GNP, is brought forth and 30 percent of the total population lives in these metropolitan areas, representing 68% of Whites, 55% of Coloureds, 89% of Asians and about 43% of Blacks.

The maintenance of a relatively high economic growth rate alone is not sufficient under these and other South African circumstances, and there is an urgent need to achieve more balanced economic development across the country, and also across the spectrum of the various population groups.

With a view to this it is also among the prime objectives of Government economic policy to strive towards a better geographical spread of economic development; a more equitable distribution of



income between the various population groups; greater participation by the less developed population groups in the economic development of the country generally, and of their own people particularly, at the entrepreneurial and higher skilled levels; the encouragement of small business development; and the promotion of economic co-operation, including the better utilisation of resources and services across national boundaries.

Various measures are being employed by the Government to achieve these policy aims and considerable success has already been achieved as far as the decentralisation of industrial development is concerned, especially with the new approach and incentives that have been applied since April 1982, but one of the basic requirements of this policy is that the required infrastructural services will be available to support decentralisation of economic activity and the development of the less economically advanced geographical areas and their peoples.

The provision of these infrastructural services is one of the most important economic functions of the State and it is a burden which falls heavily upon local government, especially the smaller local authorities and the newly developing local authorities who are in many cases not financially strong enough, and well enough equipped to shoulder this burden without some assistance.

The Browne Committee of Inquiry into the Finances of Local Authorities in SA found that "in 1976-78 local authorities accounted for no less than 23.7 percent of gross fixed investment of general government services plus enterprises, and 7.5 percent of (total) gross domestic fixed investment".

In respect of gross fixed investment of general government services, excluding government enterprises, the 32.1 percent contribution of local government was even more impressive.

The Browne report went on to say - "The high capital requirements of local authorities are of particular importance to government policy in South Africa, because on the one hand, the development requirements of the country call for large investment in local government services, and on the other hand, non-White communities in the cities, particularly the Blacks, have a large backlog in local government facilities".

The report could have added that similarly considerable financial and other demands are going to be made of existing and new local authorities in the less developed regions, and also in respect of the less developed decentralisation policy will be focused.

The ability of local government to cope with these demands, and the measures taken to assist them in this regard are going to be crucial to economic development.

#### 4. POPULATION GROWTH, URBANISATION AND LOCAL AUTHORITIES:

The Science Committee of the President's Council said in its recent report on Demographic Trends in South Africa at the beginning of this year (PR1 1983), that it is practically impossible to make predictions of population growth trends and magnitudes over a period of a decade or more with any accuracy, because the development variables and government actions on which such projection are based, are practically unpredictable.

Based on research done by the Human Sciences Research Council, the Science Committee of the President's Council nevertheless made the following projection for the various population groups between the years 1980 (last census) and the year 2020: While population increase from 4,528 million to 6,652 million; Coloured population from 2,613 million to 4,443 million; Asian population 821 000 to 1 345 million; and Black population from 16 300 million to between 46,125 and 55 700 million (depending on assumptions regarding fertility rate).

In 1980 53.4% of the total population of the Republic were urbanised as against 48% in 1970 and 45% in 1960. The level of urbanisation of the Black population is still relatively low and changed little between 1960 and 1980 i.e. from 29% to 38%.

This is in contrast to the non-Black population which has already reached a high degree of urbanisation, with Whites at 89%, Asians at 91% and Coloureds at 78% in 1980.

According to projections made in the already mentioned President's Council report on Demographic Trends, it is expected that no less than 75% of the Black population will be urbanised by the year 2 000, which implies 23,34 million Blacks - almost four times the present urban Black population.

Professor A.J.G. Oosthuizen of the Rand Afrikaans University in a recent paper projected a more moderate picture, and predicted a 65% urbanisation of the Black population by the year 2 000.

Whatever the actual future Black urban population will be, the

picture that emerges is that future urbanisation basically means Black urbanisation - an increase of from 12 to 18 million urban Blacks over the next two decades - three to four times the present Black urban population.

The future pattern of urbanisation, especially as far as the Blacks are concerned, will be influenced by Government policy and factors such as decentralisation and regional development, employment opportunities, political and social conditions, and urban development in the National States.

Whether this increased urbanisation takes place in the already highly urbanised areas (as was pointed out previously, the major proportion of the RSA population is concentrated in the four metropolitan areas) or in newly developing decentralised areas, it will entail the development of new local authorities for the Black population and considerable demands will be made on those authorities, other existing authorities in the same region and the government for the provision of infrastructural and other services to the developing communities.

To quote again from the Browne report:

"Local authorities form an indispensable link in the administrative and economic system of any country. On the one hand, they have to act as administrative authorities which daily have to render a variety of government services to local communities, and on the other hand, they inevitably become involved in the economic development of such communities, to which they have to provide guidance and in which they must necessarily also participate. Their economic importance therefore lies firstly in their participation in the transformation of the economy from a rural to an urban commercial-industrial structure, and secondly in the provision of infrastructural and associated services which have to serve as a basis for the sustained development of the economy".

#### 5. INFRASTRUCTURAL SERVICES, REGIONALISATION AND LOCAL AUTHORITIES:

In view of the importance of local government in the future constitutional and economic development of the country, especially as far as the provision of infrastructural services are concerned, much attention has been devoted to devising the most suitable organisational structures for co-operation and co-ordination between local authorities in the rendering of these services to ensure the optimal utilisation of scarce resource, but with the retention of the self-governing status of the participating local authorities and the entrenchment of the right to self-determination of the various population groups within own community context.

Addressing a meeting of the Durban Metropolitan Consultative Committee in April of this year, the Minister of Constitutional Development and Planning, the Honourable J.C. Heunis, said that in view of the fact that both the constitutional and financial aspects should be looked at, the Department of Constitutional Development and Planning and the Department of Finance would take the lead in investigating this very important matter and would do so in close co-operation with the various interested parties, including the municipal associations.

He said that in searching for effective and acceptable means to coordinate common interest on metropolitan or regional level the applicability of a variety of administrative models would have to be looked at. He recognised that there would be no ideal "universal" model solution equally applicable to all metropolitan areas, but that the solution arrived at would be essentially determined by the social, economic, geographic, technological and political conditions which prevail within specific metropolitan areas and regions.

These alternative techniques range from less formal co-operation and co-ordination (examples of which already exist in certain of the metropolitan areas) to the establishment of formal multi-purpose metropolitan and regional governmental bodies, with executive and taxing powers.

The Browne Committee of Investigation into the Finances of Local Authorities in South Africa first recommended the introduction of what was termed the "Joint Services Committees" and this recommendation was based on pure financial and economic reasoning and was made long before the present constitutional reform initiatives of the Government were undertaken.

The Croeser Working Group whose task it was to re-examine all the Browne Committees' recommendations concerning the finances of local authorities, endorsed the recommendation concerning Joint Service Committees in principle.

Subsequently the President's Council also recommended the introduction of Joint Services Committees as the forerunners of met-

ropolitan/regional bodies that would handle the bulk supply functions, or the so-called "hard functions", such as electricity, water and sewer reticulation; public transport; regional planning and land usage; regional road construction and maintenance; and traffic control, while the individual constituent local authorities would remain responsible for affairs of a more local nature such as the internal reticulation of services, internal road maintenance and traffic control, and the provision of the various local cultural and recreation amenities, including housing.

The President's Council based its recommendation, *inter alia*, on submissions made to it to the effect that technical services could be rendered more efficiently and at lower unit costs on a metropolitan or regional basis, and that better use could also be made in this way of highly trained technical staff. I am sure that this argument would also appeal to the technical representatives to this convention, and in fact it is a matter that needs to be carefully examined.

Most of the existing local authorities, including Johannesburg, and municipal organisations such as the TMA and the OFSMA have however, come out in opposition to JSC'S and instead have favoured less formalised forms of metropolitan and regional co-operation and co-ordination.

They maintain that any system of metropolitan or regional government will of necessity entail a demerger in the status and autonomy of elected local authorities, and may even lead to their considerable impoverishment. The JSC'S they maintain will have at their disposal the most lucrative municipal services and additional sources of revenue (for which the local authorities have been campaigning for many years) and will therefore be bodies with considerable financial strength, while the individual local authorities, by contrast, will have expensive welfare services to provide, but will have little more than assessment rates on domestic properties with which to finance these commitments and possible additional commitments that the new constitutional dispensation might impose on local authorities.

The Transvaal Municipal Association maintains that regional administration, where there is a need at all for it in regard to a particular service, should take place by means of voluntarily constituted regional committees, and that such committees should only be established in cases where no institution of a similar nature is already in existence. Thus the TMA does not foresee the need for a further regional body to concern itself with the supply of electricity or water for example in the Witwatersrand metropolitan region, where these services are being provided by Escom, the Rand Water Board and the larger local authorities.

The whole question of metropolitan and regional government or services institutions, is presently a highly controversial one and I wouldn't like to get involved in this controversy by venturing an opinion as to the outcome of the investigation and the best suited form of co-operation as to the outcome of the investigation and the best suited form of co-operation and co-ordination for any particular area or region, especially in view of the fact that not only technical and financial considerations are involved but that there are political factors to be considered including co-operation between White, Asian and Coloured local authorities on the one hand, and the emerging Black authorities on the other hand, which also includes co-operation across national boundaries in certain cases. Apart from this, there are issues of broader political and economic policy involved, including the upliftment and development of urban communities and other less developed areas.

Many permutations on the various models that have been presented are no doubt possible, but in essence the distinction between the two approaches lies in the role assigned respectively to the regional and the local authorities. But perhaps the most vital principle underlying the concept of a devolution of powers, whether regional or local, is that the authorities involved should not be hesitant about accepting new responsibilities or shedding traditional functions if a realignment of duties can be achieved which will enable the more efficient administration of a particular region to take place. The urbanisation statistics which I quoted earlier indicate that South Africa must plan with an eye towards its immediate future, and to this end the various governmental authorities must show a willingness to leave classifications and divisions which no longer have any functional purpose well behind them and to move forward on the basis of the common national interests of all concerned.

## 6. THE FINANCES OF LOCAL GOVERNMENT AND THE IMPORTANCE OF TRADING UNDERTAKINGS:

A further problem which is closely related to the system of regional administration to be introduced, is that of devolution of powers to the local government level. The extent of the devolution in question

has not yet been clarified, but there too the cardinal consideration must be to ensure that the socio-economic advancement of the region is not thereby placed in jeopardy. Whatever powers do devolve upon local authorities must be those which the local authority can exercise without incurring debilitating financial obligations.

Quite a deal has been said about proposed new sources of revenue, and the President's Council has also referred to these sources in its report on regional systems, but I do not think that it was the intention to use these sources which local authorities have been asking for so long, to finance additional municipal obligations. Irrespective of whether these proposed revenues are assigned to a regional authority, or to the constituent municipalities, one should not lose sight of the fact that they are intended to finance the development and establishment of a basic infrastructure in a region, and are not intended to cover functions which at present are alien to the municipal administration. If local authorities are to assume responsibility for the provision of functions and services beyond their present scope, some additional form, or forms, of finance will have to be created.

The local authorities have been campaigning for many years for additional sources of income, and although some assistance has been provided by the assessment rates contributions now being made to local authorities on government owned property and the subsidisation of fire fighting services, this has not yet solved the financial problems of these local authorities.

Their fear of losing part or all of a very important source of income such as the income from the surpluses on some of their trading undertakings, especially electricity and water, is therefore understandable, and the fear is real that in a particular region the total financial pool, including the proposed additional sources of finance will not be enough to satisfy the needs of all of the local authorities, including the emerging local authorities with their backlog of services on the one hand and their totally undeveloped income base on the other hand.

As my involvement with municipal trading undertakings, including the electricity undertaking, has been largely confined to that operated by the Johannesburg City Council, I will quote from the statistics available to me in this respect. As the Johannesburg electricity undertaking contributes R240 million of the total turnover of R842 million of all municipal electricity undertakings in South Africa, I think my references to Johannesburg may serve as a useful example of general trends in the country.

As a brief perspective I can mention the following few figures: the number of consumers served by the Johannesburg municipal electricity undertaking increased from some 96 000 in 1970 to 112 500 in 1983, and the number of Soweto consumers which at present stands at 36 000 is expected to rise to 103 000 by mid-1984. The full impact of this expansion can only be appreciated if one considers that the number of units sent out by Johannesburg increased from 3 000 million in 1970 to just under 5 000 million in 1983.

It is on the financial side, however, that the most striking advances may be detected. In 1970 Johannesburg's income from its electricity undertaking was R22 million, and in 1983 it is over R221 million, an increase of nearly 890 percent. (The consumer price index over the same period rose by only 310 percent).

If one considers the surplus of this undertaking, the increase is even more staggering: in 1970 the undertaking showed a surplus of R1,4 million and at present its surplus is R24,4 million: an increase of 1690 percent. Nevertheless, Johannesburg probably remains one of the cheapest suppliers of at least domestic current in this country, and its most recent surplus still only represents a return of about 15 percent on the undertaking's income, which at current interest rates is not by any means exorbitant.

Then too, one should bear in mind that this surplus is not a true surplus in a pure accounting sense. If the undertaking's cost structure were to take into account probable capital replacement costs, the surplus may well disappear entirely.

The increases serve mainly to highlight the growing importance to local authorities of the income from trading surpluses, and the element of tax that has been introduced into these surpluses and the pricing policy (tariffs) in respect of municipal trading services. The use of trading profits in relief of rates has been accepted in principle by the Croeser Working Group, but the extent to which this is done is perhaps a different matter. The Croeser report recommends a surplus limit of 10 percent of income, but then presupposes the application of marginal costing principles. Perhaps the problem is placed in its clearest perspective when one considers that in the case of Johannesburg assessment rate income over the period 1970-1983 increased by only 317 percent, and that the ratio of rate income to trading surpluses on electricity changed from 17.2:1 to 4:1 over the period in question.

That this is probably a general trend may be gleaned from figures appearing in the Municipal Year Book. In 1970 of the 140 municipal electricity undertakings listed, 18 (13 percent) were running at a deficit, and these deficits were in some cases as high as R70 000. In 1982 of the 200 undertakings listed, only 13 (6.6 percent) incurred deficits, and in most cases the deficits were minimal. The highest deficit (in 1970 values) amounted to only R18 300. On the other hand 18 of the undertakings listed, showed surpluses in excess of R1 million.

I am not implying that this increased reliance on electricity and other surpluses is necessarily wrong, but it is a factor to be reckoned with when considering the regionalisation of trading services that might adversely affect the income of constituent local authorities from this source. The alternative, in any event, would be to increase assessment rates very much above their present level, and this undoubtedly could have deleterious repercussions on an equivalent scale.

This leads me to the role which the municipal electricity undertaking may have to play in the regional management system of the future. The role of local government as a generator of electricity is clearly on the wane. At present there are only five local authorities left which still generate their own current, and their relative output is clearly decreasing. The role of local government as a distributor of electricity on the other hand is intimately related to the place which local authorities will occupy in the new dispensation. In this regard I must refer you to the various models of regional administration which I mentioned earlier.

The various basic suggestions, together with their advantages and disadvantages, may be briefly put as follows. The bulk supply of electricity could be considered as a "hard service" to be provided by the JSC, and its internal reticulation as a "soft service" falling within the purview of the local authority. The advantage of such an arrangement would be that the local authority retains its present source of revenue, and can fix its own tariffs. Local autonomy as far as the consumption of electricity is concerned is therefore in essence unaffected. The disadvantage, however, is that the introduction of the JSC into the picture represents a further increase in the cost of electricity, as the JSC itself would also be entitled to make a profit on the current which it purchases from Escom and resells to the local authority.

An alternative suggestion is that Escom simply continues to supply current to the local authority, as it is doing at present, but that local government enjoys some representation in the relevant regional Escom management. In essence this proposal will leave the status quo unchanged.

A third alternative, and one which is probably favoured by some members of this Association, is to eliminate local government participation in the supply of current altogether. In other words the regional body, that is to say Escom, supplies electricity direct to the customer. We will therefore have a system analogous to that prevailing in among other places the United Kingdom, where the utility services provided by local authorities have been placed in the hands of non-political institutions. The disadvantage of such an arrangement is primarily that it puts the local authority completely out of the picture. It not only deprives local government of a valuable source of income, but removes the determination of electricity tariffs entirely from the municipal sphere. Whatever say the local consumer may have had in the matter, disappears. The best that local government could hope to gain from such a structure is that it could be employed as a collection agent for the relevant regional body. The advantages of such an approach are that a regional tariff policy could be introduced, which could better regulate the economic development of the area in question; economies of scale will be available to the consumer, who could also benefit from the advantages of standardisation, better organisation and communication; and the removal of artificial boundaries which at present govern the supply of electricity, and which undoubtedly when viewed in the regional context push up the cost of electricity consumption.

A fourth alternative, closely aligned to the above would be the creation of regional utilities that would operate in very much the same way and with the same advantages and disadvantages.

One should guard, however, against viewing the future administration of electricity undertakings too insularly. No doubt from an electrical engineer's point of view there is great merit in the last mentioned two alternatives, but one should be circumspect about upsetting the existing structure of electricity distribution if in doing so one resolves certain problems only by creating many others. One should also bear in mind that surpluses on the sale of current would be a useful source of revenue to the developing local authorities for other population groups, and should therefore hesitate to deprive them of such a potentially lucrative trading undertaking.

From the budgets prepared for the Coloured and Asian areas in Johannesburg the significance of electricity sales is readily evident. In the Coloured areas 35 percent of the projected gross municipal income is in respect of sale of current, and in Lenasia the figure is 56 percent. At present the surpluses on these undertakings are small, mainly because they are based on the prevailing domestic tariff policy in force in Johannesburg, but there is no reason why a judicious increase in these tariffs could not yield a very useful revenue to whatever municipalities may be established in these areas in the future.

## 7. THE ROLE AND PROFESSIONAL RESPONSIBILITY OF THE ASSOCIATION OF MUNICIPAL ELECTRICITY UNDERTAKINGS

The AMEU is a body unique in the sphere of local government in that it contains representatives from a broad spectrum of related operations: municipal engineers, local councillors, representatives of commerce and industry, of Escom and other statutory bodies. It provides a crucial forum for discussing the development and problems of the electricity industry. It moreover has a vital role to play in submitting proposals on standards and codes of practice in regard to the country's electricity undertakings, and in this regard must clearly take a major part in the unfolding of the proposed new constitutional dispensation. Although not all municipal electrical undertakings are members of the AMEU, in fact I believe that only 18% of the 327 undertakings are represented on this Association, the AMEU nevertheless accounts for 98.6 percent of the total municipal electricity load in the country. If one further considers that municipalities take up some 33.6 percent of Escom's total energy sales, the importance of the AMEU and local government as an electricity consumer is clearly established.

One of the major contributions which will be expected of the AMEU in the immediate future is, as I see it, to assist with the training of the corps of manpower which will be required to administer the electricity undertakings of the 21st century. Whether such undertakings will be then be independent institutions, or whether they will fall under the purview of a regional authority, or whether the status quo will remain, it is clear that there will be a vastly expanded demand for the services of electrical engineers and technicians, and other staff associated with the distribution and supply of electricity, and unless a determined and concerted effort is made to recruit, train and educate such staff the socio-economic development of the country will be seriously imperilled. Such training should not merely be left to the professional institute involved, but should, because of its influential position and unique composition, be made the concern of the AMEU itself. It is common cause that there is already at present a severe shortage of trained personnel in the field of electricity undertakings, and the AMEU will therefore not only have to fulfil the future needs in this respect, but will have to overcome the existing backlog as well.

The training of people of other population groups is probably a matter which should enjoy the highest possible priority, and even more so if the provision of electricity is to remain a function of local authorities. In the latter event established undertaking should provide in-service training to the employees of developing local authorities on a contract basis, and should also wherever possible give consideration to sharing staff resources and expertise.

The AMEU will have a major role to play in the Government's regional planning strategy. The policy of decentralisation of industry will have far-reaching and immediate consequences for the electricity undertakings, and the Association will have to consider and advise upon the optimum utilisation of its resources in this context, and including the conservation of these resources.

Another challenge that your Association's members face is to find the balance that is going to be so important between technological development and services to be provided on the one hand, and on the other hand, the financing of those services and the contribution to be made to the incomes of local authorities. I realise that this places the technical man, and most of you, Mr President, are technical people, in a very difficult position, because there must be this constant conflict between what is technically desirable on the one hand, and on the other hand, what is financially and very often politically, expedient. I think it requires a particular kind of man to succeed in that environment and I have the greatest respect for you that have succeeded to survive over such a long period of time.

I think we will in future refer to the times in which we live today as having been the electro-technical revolution, because Mr President, much of what we are busy with today, and especially in the field of communication, depends largely on the availability of electrical current and regardless of how that current is in fact generated,

be it nuclear generation, solar generation, wave generation, conventional generation, the fact is that it has to be distributed to have practical use and that is your function. This is especially of importance to the education of the undeveloped and developing peoples of our country by means of electronic mass communication and education is fundamental to the solving of many of our economic and social development problems.

## 8. SUMMARY

I have painted on a rather wide canvas, possibly too wide a canvas in the limited time at my disposal, in an effort to lay emphasis on the importance of local government, firstly, as vital and integral part of constitutional reform and development, secondly, as a most important factor in the provision of the infrastructural services required for economic and social development, and thirdly, as base for the further urbanisation that will take place, primarily in respect of the Black populations.

Against this background the importance of devising suitable local government and other organisational structures at metropolitan and regional level to meet these challenges has been illustrated, and the vital role that the electricity undertakings, as the providers of one of the most basic of infrastructural services, and the men that manage those services, have to play in all of these developments, have been stressed.

Mr President, I am sure that the AMEU and its members will continue giving good account of themselves in meeting the challenges of our times.

I have pleasure in now declaring this Convention officially opened.

Thank you

# ELECTION OF PRESIDENT ELECT VERKIESING VAN AANGEWES- PRESIDENT

## MNR. P.J. BOTES : ROODEPOORT

Meneer die President, vergun my die geleentheid om u in besonder namens u kollegas van die Hoëveld tak, geluk te wens met u inhuldiging as President van die Vereniging. Ons wens u toe 'n suksesvolle Konvensie, en mag u en u goeie gade 'n aangename paar ampsjare geniet.

Meneer die President, dames en here, dit is vir my aangenaam om my goeie vriend en kollega Jan Loubser voor te stel as Aangewese-President van hierdie Vereniging vir 1983/85. Ek wil u daaraan herinner dat Jan die vierde oud-Matjie sal wees wat hierdie eer te beurt val. Die ander drie is natuurlik Jules, Eugene en myself.

Dit is dan vir my 'n besondere eer en voorreg om Jan aan u bekend te stel. Jan is op 10 Maart 1931, op die geskiedkundige dorpie Koffiefontein in die Vrystaat gebore. Omdat sy vader Inspekteur van Skole was, het hy by verskeie skole skoolgegaan en gematrikuleer aan die Hoërskool Parys. Hy verwerf die graad B. Sc. (Ing.) (Elek.) in 1954 aan die Universiteit van Stellenbosch waarna hy uitgebreide nagraadse onderrinding opdoen as volg:

- Stadsraad van Bloemfontein –  
6 jaar as Toetsingenieur en later as Asst. Opwekkingsing.
- Universiteit van Pretoria –  
2 jaar as lektor.
- Stadsraad van Pretoria –  
3½ jaar as Asst. Opwekkingsing.
- Munisipaliteit van Carletonville –  
3½ jaar as Elektrotegniese Stadsingenieur.
- Stadsraad van Kimberley –  
1½ jaar as Elektrotegniese Stadsingenieur.
- Stadsraad van Benoni –  
13 jaar as Elektrotegniese Stadsingenieur.

Ek ken Jan sedert 1965 en sedert sy deelname aan die verrigtinge van die VMEQ het hy altyd positiewe deelnames gelewer op konvensies, takvergaderings en dien hy sedert 1975 op die Uitvoerende Raad van die Vereniging. Mnr Loubser is die sameroeper van die Aanbevelingskomitee vir nuwe elektriese verbruiksware, waar hy uitstekende werk doen asook op verskillende ander komitees soos tegniese opleidingskomitee en dien hy onder ander ook op die Dagbestuur van die VMEQ.

Jan en sy familie speel graag tennis en put hy daaruit groot vreugde. Hy dien ook op die Kerkrad van Rynfield vir die afgelope 10 jaar, asook op die Burgerkring van Benoni.

Jan en sy goeie gade Martie het vier seuns en is sy eerste kleinkind 'n dogter waarop die oupa baie trots is.

Mr President, honoured guests, ladies and gentlemen, having told you about the man Jan Loubser, the following incident comes to mind. Just after the war when the Royal family visited South Africa, the King inspected a bemedalled guard of honour at Standerton. During the inspection he noticed a peculiar medal and he took particular interest in it and then walked on, but after a few yards he returned to the bearer of the medal and asked him to enlighten him about the merit of the particular medal. The bearer of the medal replied: "Oh that one, it is the medal



Mr. Jan Loubser – Aangewese-President.

my prize bul won at our last championship show".

Mr President, Mr Loubser does not have to prove himself in this way but I can assure you that every task given to him in the past he fulfilled in a real professional-like manner.

Mr President, ladies and gentlemen, it is obvious that in Jan Loubser we have a hard working and dedicated person and suitably qualified to assume the important office of President Elect of our Association and it therefore gives me great pleasure to formally propose Mr Loubser as President Elect for 1983/85.

Mnr Jan Loubser het dankie gesê aan mnr Botes, rid Taljaard en die Stadsraad van Benoni vir die benoeming en ondersteuning wat hy ontvang het.



# PRESIDENTIAL ADDRESS

By W. Barnard

(Pr. Eng., BSc.Eng., Dip. P.A., C.Eng., FIEF, FSAIEE)

## YESTERDAY, TODAY AND TOMORROW

### PART I - THE AMEU YESTERDAY

#### FIRST CONVENTION: 15 NOVEMBER 1915

When a convention of the Association is hosted by the City of Johannesburg, it seems inevitable that thoughts should turn to the early years of this century when the Association of Municipal Electrical Engineers, as it was then known, was formed. For it was in the Large Committee Room of the Johannesburg Town Hall that the inaugural meeting took place at 10h00 on Monday 15 November 1915 and Dr J.H. Dobson, head of Johannesburg Electricity Department at the time, was elected as the first president of the Association. The first "congress" ended 6 days later on Saturday 20 November, having included visits to Rosherville Power Station, Crown Mines and Randfontein Estates Gold Mining Company. Papers were presented on corrosion in condenser tubes, electricity tariffs, diesel engines and liquid fuels, and the distribution system of Johannesburg. A committee was formed to draw up the rules and constitution in which the object of the Association was simply "to promote the interests of Municipal Electricity Undertakings."

This aim does little, however, to highlight the conditions which prevailed at the time, nor does it give any indication of the challenges which lay ahead. The world was at war and, whilst being far removed from the centre of destruction, the electricity supply industry in South Africa was greatly affected by this state of affairs because of shortages of skilled manpower, South Africa's own military camp than a commercial town in those days and that because of acute shortages, even old tram rails were used as poles for overhead lines and as frames in locally manufactured switchboards. The use of electricity at the time was confined largely to lighting applications. Because of their inability to generate electricity at a cost competitive with other sources of energy, suppliers could not promote its use for cooking and heating until many years later. By then more efficient methods and improved system load factors enabled a vigorous marketing campaign to extend the use of electrical energy. Paradoxically the introduction of the more efficient "half-watt" lamp was viewed with concern by some because of the adverse effects it was thought it would have on electricity sales.

Methods of generating electricity included steam driven turbines, diesel engines and gas suction engines. Gas suction engines were popular particularly amongst smaller municipalities in rural areas. They compared very favourably with other forms of generation in terms of energy production costs, but some municipalities experienced extreme operating and maintenance difficulties and the engines also caused a great deal of atmospheric pollution. Coal fired steam driven turbines on the other hand were inefficient by today's standards and railage costs for the transportation of coal were disproportionately high.

As a matter of interest the first generating plant in Johannesburg was installed in 1891 for the Johannesburg Lighting Company, in the form of two gas-engine driven dynamos of 22.4 kW total capacity. From then on additional steam driven plant was installed at various times up until 1904. By this time Johannesburg had become a municipality and, on the advice of its Consultants, purchased eight gas engines with a total rated power output of 8 775 kW. These engines proved unreliable and expensive to operate and maintain. They were never fully commissioned, producing less than 2.4 million kWh of electricity before the Council formally rejected the plant.

Transportation costs in general and the vast distances which had to be covered together with the sparseness of the population were also factors which mitigated against the growth of municipal electricity undertakings. Not unexpectedly the situation in respect of rural undertakings was particularly difficult.

There was also a complete lack of legislation, regulations and standardisation governing the supply and use of electricity. Various consumer supply voltages were used throughout the country and many consumers were supplied with direct current. It was in these circumstances that a group of dedicated municipal electrical engineers came together and formed the Association. They were people of great foresight, since not only were they well aware of the need to introduce improvements and uniformity to the electrical industry, but they also had a remarkably clear perception of the future of electricity in South Africa. Among these engineers were John Roberts, the former City Electrical Engineer



Mr. Wessel Barnard - President

of Durban and Beznard Sankey who was in the first instance Electrical Engineer of Port Elizabeth and then later of Johannesburg. It was as a result of a letter written by John Roberts to Dr J.H. Dobson that the Association came into being but the honour of being the founder of the Association rests with Bernard Sankey. This was clearly underlined by the former City Electrical Engineer of Pretoria, Mr Wolley-Dod, at the eighth Convention in East London, when he said "It was through his efforts, when, I think, he was still at Port Elizabeth, that the idea of having this Association came forward."

#### 2ND CONVENTION: 1917

The inaugural meeting had been attended by 22 members representing 16 municipalities throughout the country. Nine more members were elected before the Second Convention in 1917. Although the larger municipalities dominated proceedings in those early years, the support of the smaller municipalities was vital in making the Association viable.

The Constitution provided for a Council consisting of the President, Vice-President, Hon. Secretary, Hon. Treasurer and three elected members.

It was the Council's responsibility to manage the affairs of the Association and it had the power to incur any expenditure necessary for achieving the objects of the Association. Membership was restricted to Chief Electrical Engineers of an electricity supply or tramway undertaking owned by a local authority, and any duly qualified assistants who may have been recommended.

Although it appears evident that conventions were intended to be held annually, in practice they were only held on a regular basis from 1939 onwards. Subcommittees were a feature of the Association from the beginning, when one was appointed to investigate the Standardisation of the General Conditions of Supply and Wiring Regulations. The Association was also represented on the SA Standards Committee, the question of standardisation of electrical equipment being one which was to hold foremost place in the deliberations. Subcommittees on the licensing of electricians and the registration of wiring contractors were also



among those appointed. Their effectiveness was limited however, because of their inability to meet regularly and the difficulties encountered in persuading the government to provide the necessary legislation based on their recommendations. From its inception the Association recognised the tendency towards "super" power stations under a more catholic control and support was expressed for more adequate government supervision and control. However, the Electricity Act of 1922 was not well received by the Association even though it provided for the establishment of an Electricity Control Board and the Electricity Supply Commission. The Association objected to the haste with which the Act had been introduced, in not providing the Association with an opportunity to present its views, as well as to the power that had been given to ESCOM, and the likelihood of ESCOM becoming both monopolistic and inflexible. Fears were also expressed about the possibility, in terms of the Act, of electricity production falling into the hands of a private company.

In retrospect these fears were unfounded. Close ties have always existed between ESCOM and the Association and this is borne out by the fact that from the start ESCOM was invited to the Convention and that the first Hon. Member of the Association was former Chairman of ESCOM, Dr H.J. van der Bijl. ESCOM in turn reciprocated by inviting a representative from the Association to attend the first World Power Conference (now the World Energy Conference) in 1924. From then on the Association was to be represented on the World Power Conference Committee, which together with the SA Standards, SA Safety Precautions and SA Wiremen's Registration Committees, formed the nucleus of the committee work.

In the eight year period from 1916 to 1924, energy sales for all undertakings increased from 74.4 Gigawatt-hours to 133.2 Gigawatt-hours, and the number of consumers from 52,5 thousand to almost 91 thousand. This represents an average annual growth rate of 7.5% in electricity sales.

#### 6TH CONVENTION: 1924

At the 6th Convention held in 1924, the necessity of encouraging domestic consumers to use more electricity, particularly for cooking and heating, was strongly emphasised. Among the topics discussed were municipal showrooms, assisted wiring schemes and the gaining of consumer confidence through better public relations and consumer education. This convention was also the first attended by Councillors, albeit in a passive role.

#### 7TH CONVENTION: 1926

In 1926 the Association celebrated its first 10 years of existence. The convention was held at the Association's birth place and included two notable events that were in keeping with the celebration. The first was the admission of Rhodesia to the Association and the second the publishing in the Union Gazette of the Standard supply voltage of 220 V for AC and DC and standard supply frequency of 50 Hz. The latter event marked the end of negotiations and discussions which had been in progress for many years, and represented a significant step forward in the quest for standardisation.

#### 13TH CONVENTION : 1935

The invitation extended to Councillors from 1924 onwards finally led to the admission of Councillor members with full voting rights at the Annual Convention in 1935. The Rules and Constitution were amended accordingly and the name of the Association, which was no longer appropriate, was changed to the Association of Municipal Electricity Undertakings of South Africa and Rhodesia. Certain other amendments were made, including provision for the Council to meet as often as may be required. This was necessary in order to be able to attend to matters as they arose instead of only at Annual Conventions as had been the practice. The Council was enlarged to ten members comprising a President, Vice-president, two immediate Past Presidents and six other members, two of whom could be Councillor Members. Sectional voting was also introduced as an option to give Councillor and Engineer members separate group voting rights, any motion being carried only if both sections had a majority.

#### 14TH CONVENTION: 1936

The following year the Association celebrated its 21st Anniversary at the 14th Annual Convention held in Johannesburg, at which Mr A.T. Rodwell was elected President. By this time membership had risen to a total of one hundred and thirty-seven, of whom fifty-one were Councillor Members. Dr Dobson and John Roberts were amongst the distinguished guests at the convention and it must have been very gratifying for them to see the way in which the Association and the whole of the electricity supply industry had developed since 1915. Disappointingly, perhaps, three of the subjects dealt with were first raised at the earliest conventions and had still not been finalised. These were the Licensing of Electricians, Supply Regulations and the question of whether contribu-

tions by electricity undertakings towards the relief of rates were justified, and if so, what the limit should be.

It appears that of the founder members only four of the original twenty-two were still actively engaged in municipal service at that time. They were Messrs Horrell, Swinger, Jagger, and Ross. Messrs Horrell and Swinger were past presidents of the Association whilst Mr Jagger had served on the Council on a number of occasions.

#### 15TH CONVENTION: 1939

By 1939 the shadow of war once again cast itself upon the affairs of the Association and this was the last time that the Annual Convention was held until 1944. Just as the Association had been born in this shadow, so its reappearance signified the end of an era in which much had been achieved. It was the first time that the chain denoting the office of the President was worn, and more appropriate perhaps, was the news that after some 18 years the Electrical Wiremen and Contractors Act No. 20 of 1939 had at least been promulgated.

In the interval between 1939 and 1944 the first edition of the Standard Regulations for the Wiring of Premises was published under the auspices of the South African Institute of Electrical Engineers. In addition the Factories, Machinery and Building Work Act of 1941 came into force, bringing, amongst others, Electricity Undertakings under its direct legislative control.

The South African Standards Institution, established in 1909 to promote standardisation, was in financial difficulty and unable to keep pace with the demands made on it. A standardisation committee was set up to investigate, resulting in the Standards Act No. 24 of 1945, in terms of which the Standards Council and the South African Bureau of Standards were established.

In the post-war years the character of the Association altered quite substantially, with less emphasis on the reading and discussion of formal papers than in the pre-war era.

#### 18TH CONVENTION: 1944

In 1944 the eighteenth Convention was held entirely in the form of a business conference because of the very pressing problems that had arisen in the intervening four and a half year period. But at the same time this was seen as the way in which the affairs of the Association, if they were to be effective, would be conducted in the future. The need to involve more of the members in active participation in the Association's affairs became more and more evident whereas previously much had been left in the hands of the Executive Council. In view of the wide geographic dispersion of municipalities in South Africa, consideration was given to the establishment of regional subcommittees to provide for more frequent and effective action, but in fact this concept was only really put into practice eleven years later in 1955 when agreement was reached on the establishment of Branches of the Association.

The period after the war until the end of the decade was one of consolidation. Shortages of materials and skilled manpower on the one hand and unprecedented growth of industry and technical development on the other were among the major challenges confronting the Association.

In 1958 the Constitution was once again amended to give effect to a number of important changes. Among these was the official standing granted to manufacturers, consulting engineers and others associated with the electrical industry as affiliates of the Association. Under the legal guidance of the Association's Honorary Legal Adviser, Mr A.P. Burger, who is today Town Clerk of Johannesburg, amendments were also made to place the Constitution on a sound legal footing.

By this time the Engineers' Forum, later to become the Members' Forum, had been in operation at Conventions for a number of years, and the move towards holding Conventions every second year instead of annually, was gaining momentum, much to the dismay of the Association. The golden Jubilee celebrating the 50th Anniversary of the Association, held in Port Elizabeth, was also the last of the annual conventions. The first Technical Meeting was held in 1966, thereby establishing the principle as we know it today, of conventions and technical meetings being held on alternate years.

## PART II - THE AMEU TODAY

The AMEU has now been in existence for 67 years and is this year holding its 48th Convention. Since it was first established the number of municipalities that are members has grown from 16 to approximately 200. Municipal Electricity Undertakings on the other hand today number more than 350, and it is evident therefore that over 150 are not members of the AMEU. Only 29 of these however, have published maximum demands greater than 1 MVA, with the largest being about 9 MVA.

In 1982 the Municipal Electricity Undertakings as a group was ESCOM's largest customer, constituting 33.6% of ESCOM's total energy sales of just over ninety-six thousand GW.h, and by so doing ex-

ceeded the individual sales to the industrial and mining sectors. In terms of maximum demand this proportion is likely to be much greater because of the comparatively poor load factors associated with municipal loads.

The AMEU has certainly also grown in stature and importance and, although it has for many years worked in close liaison with organisations such as The Electricity Supply Commission (ESCOM), The Council for Scientific and Industrial Research (CSIR), and The South African Bureau of Standards (SABS), it only recently received support and recognition from The United Municipal Executive (UME). Now it is hoped that this support will result in all municipal electricity undertakings joining the AMEU, in order that co-ordination and standardisation on a national basis can be achieved.

The growth of the AMEU's membership and activities has been substantial, particularly during the last decade. The detailed on-going work of the AMEU is undertaken almost exclusively by the Engineer Members on the Executive Council. It will be appreciated however, that their prime commitment is to manage their respective undertakings, so the growing burden of serving on Committees and Working Groups will, in the future, have to be spread more widely. When it is realised that the City Electrical Engineer of Johannesburg, for instance, manages an organization consisting of a staff of over 3 000, operating three power stations and an extensive electrical network distributing energy with a maximum system demand of approximately 1 250 MW and an estimated income of R240 million for 1983, the difficulty of accepting AMEU commitments in addition will be appreciated.

The activities of the Association today fall generally into three categories:

### 1. THE PRESENTATION OF PAPERS

This aspect of the Association's activities is probably its most important function, and members, particularly from the smaller Undertakings, invariably derive the most benefit from this exchange of information and viewpoints. Because of the Association's unique membership of Engineers, Councillors and Manufacturers, the papers presented at Conventions cover a wide field of subject matter ranging from technical to financial, legal and administrative issues.

The presentation of papers has always been considered important in the AMEU and this was especially true of the early years when, because of the lack of communications and transport facilities, these presentations provided a rare opportunity for members to gain knowledge from discussion of mutual problems. Progress in our modern world has eliminated these obstacles to some extent, but unprecedented technological advances and the increasing complexity of supplying densely populated urban areas, have focused more and more attention on the application of advanced technology, management techniques and economic principles in Municipal Undertakings. This is reflected in the nature of the papers presented at conventions these days. It should also be recognised that the cost and availability of electricity can have a major influence on both industrial and residential development.

### 2. COMMITTEES AND SUBCOMMITTEES

During the course of this Convention reports from as many as twenty-four different committees will be considered. These committees, in general, examine two aspects of the electricity supply industry, namely Codes of Practice dealing with development of practices and equipment, and the preparation and introduction of Standards.

In a number of cases Engineer members also serve on International Committees, for instance at The World Energy Conference (WEC), The International Conference on Large Electrical Networks (CIGRE), and The International Electrotechnical Commission (IEC). The South African National Council for the world Energy Conference (SANWEC), chaired by the Chairman of ESCOM, is concerned with the complete spectrum of energy matters on a national basis.

CIGRE meets half yearly to exchange information and compare experience with regard to large electrical networks. The smaller municipalities in South Africa have not participated to any extent in the past, but with the growth in the demand for electricity and the continuing development of higher operating voltages, AMEU membership of CIGRE is becoming increasingly important.

The IEC is an organization dealing with the international standardisation of electrical equipment and installations. Its work is of particular importance to industry manufacturing for export. Apart from the papers presented, these international conferences are important not only for establishing contact with leading overseas authorities, manufacturers and suppliers, but also for projecting a favourable image of South Africa. The exchange of ideas resulting from these contacts and from attendances at conferences has been of considerable benefit to South Africa. South African delegates have also made significant contributions at many of these conferences.

In the local context, members of the Association serve on various com-

mittees. Fields of activity, in broad terms, include participation in the drafting of standards and codes of practice in conjunction with the SABS, and participation in applied research with statutory bodies such as The Council for Scientific and Industrial Research (CSIR), The National Electrical Engineering Research Institute (NEERI) and The National Building Research Institute.

A typical local committee is the High Voltage Co-ordinating Committee of the CSIR. This committee meets twice a year and its main purpose is to review, co-ordinate and publicize research in all fields of electrical engineering. Much of the work covered has international significance and a number of members attended the 1982 Session of CIGRE as delegates or as members of the Working Groups. Among the topics currently being dealt with by Working Groups are:

- (a) Earthing
- (b) System Disturbances
- (c) Insulation
- (d) Lightning

A committee that has become particularly prominent is the South African Telecommunication and Electrical Power Supply Authority (SATEPSA) which was formed in 1976. The important task of co-ordinating functions and the availability of equipment, in order to ensure the continuity of essential electrical supplies during emergencies, has been assigned to this committee.

The Association has appointed representatives from its ranks to serve on all Regional Committees. This has imposed a tremendous burden on the Supply Authorities' manpower resources.

Committees have also been established to deal with technical training registration of Technologists and Engineers. We are very much concerned with and committed to the training of technical personnel in South Africa. Bursaries are awarded to students at Universities and Technicons, and financial awards made on merit to trainees at various Apprentice Training Centres. An active role is also played in determining the requirements for the registration of Professional Engineers, and the Association has co-operated with the UME in investigations into the training of technical staff and the problem of staff shortages.

### 3. MEMBERS' FORUM

The third category constituting the present activities of the Association is the Members' Forum.

The Members' Forum was first introduced at the Convention held in Johannesburg in 1953. It was originally known as the Engineers' Forum and was introduced by the Executive Council to provide an opportunity for "discussions on topics which, while being of everyday interest to Municipal Electricity Undertakings, might not justify formal papers."

At the current Convention the Members' Forum will be dealt with under the heading "TOPICS FOR DISCUSSIONS." A determined attempt will be made to resolve or at least reach some consensus on some of the issues that have been raised for discussion repeatedly over the years.

The following have been selected for discussion:

- (1) The Protection of Low Voltage Overhead Lines.
- (2) A Code of Practice for Neutral Earthing.
- (3) Experience with Solid Insulated Cables.
- (4) The Use of Aerial Cables.
- (5) The Developments in Vacuum and SF<sub>6</sub> Switchgear.
- (6) The Code of Practice for Wiring or Premises.
- (7) The Standardisation of Voltages.
- (8) The Reticulation of New Townships.
- (9) The Standard Electricity Tariffs.

These topics are considered in conjunction with statutory bodies such as SABS, The Department of Manpower Utilisation, ESCOM, and others, in order to arrive at a co-ordinated and generally acceptable and viable solution. The progress made towards finalising these issues is laboriously slow because of the difficulty of convening meetings at frequent and regular intervals. Frequent meetings are essential, particularly when dealing with complex technical and statutory requirements. Because of the present situation it is now virtually impossible to ascertain the general viewpoint of members on a sufficiently regular basis and consequently the Association's Committees may not represent the full spectrum of members' views.

## PART III - THE FUTURE OF THE AMEU

### 1. INTRODUCTION

The AMEU operates in a dynamic environment where conditions are constantly changing, both in the technology available and used in the electricity supply industry, and, generally in the labour market in South Africa as a result of the implementation of some of the recommendations of the Riekert and Wiehahn Commissions.

## 2. LABOUR LEGISLATION

Briefly, the Rieckert Commission's<sup>(1)</sup> terms of reference were to enquire into, report and make recommendations in connection with all legislation (excluding only the legislation administered by the Departments of Labour and Mines) relating directly or indirectly to any economic aspects of the utilization of manpower.

The Wiehahn Commission's<sup>(2)</sup> terms of reference were to enquire and report on and make recommendations in connection with existing labour legislation with specific reference to the adjustment of the existing labour needs, preventing and settling disputes, eliminating bottlenecks and creating and expanding sound labour relations. The statutes considered were:

- Industrial Conciliation Act
- Bantu Labour Relations Regulation Act
- Wages Act
- Factories, Machinery and Building Work Act
- Shops & Offices Act
- Apprenticeship Act
- Training of Artisans Act
- Bantu Building Workers Act
- Electrical Wiremen & Contractors Act
- Workmen's Compensation Act
- Unemployment Insurance Act
- Registration for Employment Act

Of specific interest to the supply industry was the repeal of the Electrical Wireman's and Contractors Act and its replacement by new regulations of the Factories Act. The new regulations include the following more important provisions:

- All electrical installations must comply with a Code of Practice approved by the Chief Inspector of Factories.
- All electrical installation work must be done by, or under the supervision of, a registered installation electrician.
- Electrical Contractors must appoint a responsible person to be in general charge of installation work, who is required to test completed work and certify that it has been tested and complies in all respects with the Code of Practice approved by the Chief Inspector of Factories.

Important departures from previous legislation were thus:

- The compulsory use of an approved Code for electrical installations. This is the South African Bureau of Standards Code of Practice for the Wiring of Premises Code 0142 - 1981.

This code replaced the Standard Regulations for the Wiring of Premises prepared and issued by the South African Institute of Electrical Engineers.

- Wiring work can now be undertaken by persons not registered provided their work is supervised, and certified by an installation electrician as complying with the requirements of the Code.
- The supplier need not inspect all installations.
- Industrial users of electricity, employing suitably qualified staff, can be exempted from having their electrical installations inspected by the supplier.

The net result of this legislation has been the legalization of installation work by non-registered workers and, of importance to suppliers, a considerable relief to the burden on their electrical inspectors without in any way compromising safety.

## 3. ANOTHER IMPLICATION OF THE CHANGES IN LABOUR LEGISLATION

The changes in labour legislation, opening up new avenues of employment for Blacks in South Africa, have come at a time when attitudes of employees in many parts of the world are undergoing change.

Whereas<sup>(3)</sup> previously many workers were prepared to apply themselves over long periods of time to sometimes repetitive work in order to obtain the rewards offered, these attitudes are now changing. Particularly in industrialised countries, with younger workers the trend is to demand job satisfaction and short term rewards rather than long term fringe benefits.

A new interest must therefore be taken in matching the expectations of the labour force with the technology applied to the job. In less developed countries, the technology for each industry must be adjusted to the financial limitations on the one hand and the supply and skill of labour on the other. Advanced technology should not be introduced faster than the labour skills available.

AMEU members are fully conscious of the need for trained employees. In recent years bursaries and awards have been made available to the youth of the country to encourage them to make careers in the electricity supply industry. More could and must be done. Existing training

facilities will have to be expanded to meet the growing numbers of workers requiring training and to cater for their varying backgrounds. Only by such action can the future supply of employees with the required level of training be assured.

## 4. LOCAL AND REGIONAL MANAGEMENT SYSTEMS

There can be no doubt that the stage has now been reached where rationalisation of the electricity supply industry is necessary. South Africa is on the brink of introducing major changes to the Constitution of the Republic involving all three tiers of government. A joint report of the<sup>(4)</sup> Committee for Economic Affairs and the Constitutional Committee of the President's Council, on Local and Regional Management Systems in the Republic of South Africa has been published. This puts forward proposals which, if implemented, could have far-reaching implications for electricity undertakings and the AMEU.

The Report recognises the need for more efficient and more economical engineering services in South Africa and makes recommendations accordingly. The essence of the proposals lies in the separation of services into large-scale services ("soft" services). "Hard" services include fire prevention, drainage, electricity, highways, streets, water supply, town planning, abattoirs, computer services, and professional staff services. The report recommends that the "hard" functions be dealt with on a regional basis by a nominated board (rural or urban), utility company, or metropolitan authority whose constituents are, amongst others, representatives nominated by each of the local authorities concerned.

The Report also refers to the assistance given to the Committees by "experts" (para 6.22). It is unfortunate that the Committees did not take up the AMEU's offer to assist in determining a new management system, more particularly for the provision of "hard" services, as the Association, with its large pool of experts on electricity supply in South Africa, could make a meaningful contribution. Comments in the report are not always clear and are therefore open to different interpretations which has created an unsettling and confused climate amongst municipal engineers.

Whatever interpretations were intended by the terms hard/soft, large/small, sensitive and bulk services, I feel that any new basis for the handling of electricity supply should be on a simple two tier system similar to that which exists in Britain. This could be:

- Generation and Bulk Transmission Authority (ESCOM), and
- Regional Supply Authorities as proposed in the abovementioned Report, directly supplying to individual consumers without the intervention of another tier of management.

A Regional Authority would have responsibility for providing services for a conglomerate of local authorities as visualised in the President's Council recommendations, thus realising economies of scale where possible. This would not preclude operating on a smaller territorial basis in those operations where the advantages of a compact organizational structure are paramount. An organizational chart might look like this:

## REGIONAL AUTHORITY (HEAD OFFICE) (INCORPORATING ELECTRICITY SUPPLY)



## Maintenance Operating and Construction (Area Offices)

One can see potential advantages over our present parochial arrangement.

- Planning would embrace several present areas of supply giving more flexibility to planners such as the siting of bulk intake points and substations and the greater possibility of putting mixed loads (industrial, commercial and domestic) on the same substation, thereby improving plant utilization.
- A central workshops could be equipped with sophisticated machinery which individual local authorities could not justify.
- There could be more uniformity of types of equipment used, reducing the carrying of spares and the economies of buying and using in greater bulk could be realised - with benefit to our affiliates as well as the supply authority.
- At present only the larger local authorities are able to employ any sort of specialists in their Electricity Departments. A metropolitan board could gainfully employ teams of specialists.

- On the micro side of the organization, many of the functions requiring detailed local knowledge, or where the reduction of logistic problems through operating over a confined area are the overriding consideration, the Board would operate in distinct regional divisions.
- Breakdown maintenance is clearly one of the facets where proximity to the problem makes it advantageous to operate locally. This need not prevent a back-up being available from an adjacent region in times of stress, such as a local storm causing intense but not widespread disruption to power supply. This back-up arrangement could be automatic and invoked at low managerial level as opposed to the present delays in providing inter-local authority assistance.

The AMEU is sufficiently flexible, I believe, to adjust to any form of a new Local/Regional management system. As it is a major non-statutory national organization, with voluntary commitments that are ever increasing in volume and complexity, a review of its structure and future functioning should be undertaken. However, if it becomes necessary that it play any form of statutory role, its administrative structure will have to be strengthened. Greater devolution of functions and powers to Branches/Regions with a full-time Secretariat appears essential, and the role of the AMEU's Executive Council will, as I see it, have more of a policy forming and co-ordinating function.

#### 5. CONCLUSION

The AMEU is a unique organization with a long history of dedicated service given voluntarily to it by many eminent people. It brings together Councillor, Engineer, Commerce and Industry and many statutory organizations, providing an invaluable service to the country's electricity supply industry. After a lifetime of Municipal service and a long association with the AMEU, I consider that this Association will continue to provide a valuable service to the country. As in the past, this will be done by collaborating amongst ourselves and with all who would work towards a more effective electricity supply industry with its not inconsiderable contribution to the prosperity of South Africa.

The President closed his address by saying:

"I do not believe that it is feasible to establish regional boards without municipalities giving up their local autonomy. As far as electricity supply is concerned, the advantages of regional boards, in terms of planning, decision-making, financing and better utilisation of financial and labour resources, can only be derived when applied to a consolidated region having no artificial barriers.

The AMEU sub-committee that considered this matter has taken account of the financial implications. If it is accepted that regionalisation will result in financial savings then surely there is no reason for any municipality to be worse off than before insofar as surpluses from the sale of electricity are concerned.

Although the President's Council's recommendations have not yet been formally considered by the AMEU, the following comments are generally in accordance with the consensus reached by sub-committees of the

AMEU and the Institute of Municipal Treasurers and Accountants (AMTA):

- There does not appear to be any need for new bodies to be established for the control of electrical services other than those necessary for combining certain electricity undertakings on a regional basis where advantage can be taken of economies of scale and the consequent rationalisation in the use of resources and facilities.
- The modus operandi for combining a number of electricity undertakings on a regional basis should be decided by working groups drawn from the individual local authorities in each region. The AMEU should be represented on such working groups in an advisory capacity to assist in dealing with problems arising from transfer of functions to the regional authority.
- No immediate physical changes to existing electricity supply networks are necessary in order to operate on a regional basis and, in general, the present arrangements for routine operation, maintenance and extension of these networks should remain. The regional authority should mainly be concerned with the rational planning of the distribution system based on engineering criteria and economic principles together with the establishment and use of central facilities such as workshops and the standardisation of equipment and practices.
- The regional authority should also be responsible for ensuring that a common financial policy is adopted throughout the region, including uniform tariffs and charges for services, provision of capital and allocation of surpluses."

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## PRESIDENTSREDE

Deur W. Barnard

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## GISTER, VANDAG EN MÔRE

### DEEL I - DIE VMEO GISTER

1STE KONFERENSIE: 15 NOVEMBER 1915

Wanneer die Stad Johannesburg as gasheer by 'n konferensie van die Vereniging optree, is dit blykbaar onvermydelik dat gedagtes na die vroeë jare van die eeu sal terugval toe die Vereniging van Munisipale Elektrotegniese Ingenieurs, soos dit toe bekend gestaan het, gestig is. Want die stigtingsvergadering het om 10h00 op Maandag 15 November 1915 in die Groot Komiteekamer van die Johannesburgse Stadhuis plaasgevind, en dr J.H. Dobson, die destydse hoof van die Johannesburgse Elektriesiteitsafdeling, is as die eerste president van die Vereniging verkies. Die eerste "kongres" het ses dae later op Saterdag, 20 November geëindig en het besoeke aan die Rosherville-kragsentrale, Crown Mines en die Randfontein Estate Gold Mining Company behels. Referate is aangebied oor korrosie in kondensatorbuise, elektriesiteits-tariewe, dieselenjins en vloeibare brandstof en die distribusiestelsel van Johannesburg. 'n Komitee is gestig om die reëls en grondwet op te stel. Die doelstelling van die Vereniging was eenvoudig "om die belange van munisipale elektriesiteitsondernemings te bevorder".

Dié doelstelling doen egter weinig om die toenmalig heersende toestande te belig, en dit gee ook geen aanduiding van die uitdaging wat voorgelê het nie. Die wêreld was in 'n oorlog gewikkel, en hoewel Suid-Afrika ver van die eintlike vernietiging verwyder was, is die elektriesiteitsvoeringsbedryf in Suid-Afrika aansienlik geraak deur dié toedrag van sake vanweë tekorte aan geskoolde mannekrag, Suid-Afrika se militêre betrokkeheid en sy afhanklikheid van ingevoerde toerusting, masjinerie en voorrade. Dit staan opgeteken dat Durban in daardie dae eerder soos 'n militêre kamp as 'n handelstad gelyk het, en vanweë die ernstige tekorte is selfs ou trespore as pale vir oorhoofse drade gebruik en as rame in plaaslike vervaardigde skakelborde. Die gebruik van elektrisiteit in daardie tyd was hoofsaaklik vir verligting aangewend. Vanweë die onvermoë om elektrisiteit teen 'n mededingende prys te ontwikkel, kon verskaffers die gebruik daarvan vir kook- en verhitingsdoelendes eers baie jare later bevorder. As gevolg van doeltreffende metodes en beter stelselafkorte kon die gebruik van elektriese energie toe met behulp van 'n energieke bemarkingsveldtog uitgebrei word. Paradoksaal is die ingebruikneming van die doeltreffende "half-watt"-lamp deur sommige met besorgheid betrag vanweë die



vermeende skadelike uitwerking wat dit op elektrisiteitsverkope sou hê. Metodes van elektrisiteitontwikkeling het stoomaangedrewe turbines, dieselenjins en gasuigenjins behels. Gasuigenjins was veral gewild onder die kleiner munisipaliteite op die platteland. Wat energieverkoopsekte betref, het dit baie gunstig met ander ontwikkelingsmetodes vergelyk, maar sommige munisipaliteite het groot bedryfs- en instandhoudingsprobleme ondervind, en die enjins het ook heelwat atmosferiese besoedeling veroorsaak. Steenkoolbrandende stoomaangedrewe turbines, aan die ander kant, was ondoeltreffend, gemeet aan hedendaagse standaarde, en spoorkoste vir die vervoer van steenkool was buite verhouding hoog.

Interessante ontwikkelings kan vermeld word dat die eerste ontwikkelingsaanleg in Johannesburg in 1891 vir die Johannesburg Lighting Company geïnstalleer is in die vorm van twee gasenjin-aangedrewe dinamoe met 'n totale kapasiteit van 22,5 kW. Van toe af tot 1904 is bykomende stoomaangedrewe generators van tyd tot tyd geïnstalleer. Teen die tyd het Johannesburg 'n munisipaliteit geword, en op advies van 'n konsultant is agt gasenjins met 'n totale aanslag van 8 775 kW gekoop. Dié enjins het ontbroubaar gebly te wees asook duur om te bedryf en in stand te hou. Hulle is nooit ten volle in bedryf gestel nie en het minder as 2,4 miljoen kW h elektrisiteit ontwikkel voordat die Raad die aanleg formeel afgekeur het.

Die algemene vervoerkoste en die groot afstande wat afgeleë moes word tesame met die yf bevolking was ook faktore wat die vooruitgang van munisipale elektrisiteitsondernemings in die wiede gery het. Dit is nie verband nie dat die posisie ten opsigte van plattelandse ondernemings veral moeilik was.

Daar was ook 'n volslae gebrek aan wetgewing, regulasies en standaardisering in verband met die voorsiening en gebruik van elektrisiteit. Verskeie verbruikertoevoerspannings was dwarsoor die land in gebruik, en baie verbruikers het gelykstromtoevoer ontvang.

Dit was van die agtergrond toe 'n groep toegewyde munisipale elektriese ingenieurs saamgekóm het en die Vereniging gestig het. Hulle was mense met groot visie want hulle was nie alleen tereë bewus van die behoefte om verbeterings en eenvormigheid in die elektrisiteitsbedryf te bring nie, maar hulle het ook 'n merkwaardig duidelike begrip van die toekoms van elektrisiteit in Suid-Afrika gehad. Onder dié ingenieurs was John Roberts, die voormalige Elektrotegniese Stadsingenieur van Durban, en Bernard Sankey wat eers die Elektrotegniese Ingenieur van Port Elizabeth en later van Johannesburg was. Die Vereniging het tot stand gekóm as gevolg van 'n brief wat deur John Roberts aan dr J. H. Dobson geskryf is, maar die eer om stigter van die Vereniging te wees berus by Bernard Sankey. Dit is duidelik onderstreep deur die voormalige Elektrotegniese Stadsingenieur van Pretoria, mnr Wolley-Dod, op die agste konferensie in Londen toe hy gesê het: "Dit was deur sy pogings, dink ek, toe hy nog op Port Elizabeth was, dat die idee van die Vereniging geboore is".

## 2DE KONFERENSIE: 1917

Die stigtingsvergadering is deur 22 lede wat 16 munisipaliteite in dwarsoor die land verteenwoordig het, bygewoon. Nog nege lede het voor die tweede konferensie in 1917 toegetree. Hoewel die groter munisipaliteite die vrigtings in daardie vroeë jare oorheers het, was die ondersteuning van die kleiner munisipaliteite 'n belangrike faktor in die lewenskragtigheid van die Vereniging.

In die grondwet is daar voorsiening gemaak vir 'n Raad wat bestaan uit die President, die Vise-president, 'n Ere-sekretaris, 'n Ere-tessourier en drie gekose lede.

Die Raad was verantwoordelik vir die bestuur van die Vereniging se sake en het gesag gehad om enige uitgawe wat nodig is om die doelstellings van die Vereniging te verwesenlik, aan te gaan. Lidmaatskap is beperk tot hoof-elektrotegniese ingenieurs van 'n elektrisiteitsvoervoer of tremonderneming in die besit van 'n plaaslike owerheid en enige behoorlik gekwalifiseerde assistente wat aanbeveel word.

Hoewel dit voorkom asof dit die voorneme was om jaarliks 'n konferensie te hou, het dit eers van 1939 af gereeld plaasgevind. Onderkomitees was vanuit die staanspoor 'n faktor in die Vereniging toe een aangestel is om die standaardisering van die algemene voorsieningsvoorwaardes en bedravingsregulasies te ondersoek. Die Vereniging was ook verteenwoordig in die Suid-Afrikaanse Standaardkomitee want die kwessie van standaardisering van elektriese toerusting het steeds 'n voorste plek ingeneem in die besprekings. Daar is onder meer ook onderkomitees vir die lisensiering van elektrisiteits- en die registrasie van bedravingskontraakte aangestel. Hul doeltreffendheid was egter beperk deur hul onvermoë om gereeld byeen te kom en die moeilikheid wat ondervind is om die Regering te oordeel om die nodige wetgewing op grond van hulle aanbevelings te verskaf.

Vanuit die staanspoor het die Vereniging die tendens tot "super" grafsentrales onder ruimer beheer raakgesien, en daar is steun verleen vir toekennende regeringstoetsing en -beheer. Die Elektrisiteitswet van 1922 is egter nie gunstig deur die Vereniging ontvang nie hoewel dit voorsien-

ing gemaak het vir die stigting van 'n Elektrisiteitsbeheerraad en die Elektrisiteitsvoorsieningskommissie. Die Vereniging het beswaar geopper teen die haas waarmee die wetsontwerp ingedien is waarby daar nie aan hom die geleentheid gegee is om sy standpunt te stel nie, en ook teen die mag wat aan EVKOM verleen is, en die moontlikheid dat EVKOM monopolisties en onbuigsam kon word. Daar is ook gevees dat elektrisiteitsprosedure ingevolge die Wet in die hande van 'n privaat maatskappy kon val.

In terugblik blyk dit dat die vrese ongegrond was. Daar het altyd hegte bande tussen EVKOM en die Vereniging bestaan, en dit word onderstreep deur die feit dat EVKOM van die begin af na die konferensies uitgenooi is, en dat die eerste Erelid van die Vereniging die voormalige Voorsitter van EVKOM, dr H. J. van der Bijl, was. EVKOM het op sy beurt 'n verteenwoordiger van die Vereniging uitgenooi om die eerste Wêreldkragkonferensie (tans die Wêreldenergiekonferensie) in 1924 by te woon. Van toe af was die Vereniging in die Wêreldkragkonferensiekomitee verteenwoordig wat tesame met die Komitees vir Suid-Afrikaanse Standaarde, Suid-Afrikaanse Veiligheidsmaatreëls en Suid-Afrikaanse Draadwerkersregistrasie die kern van die komiteewerk uitgemaak het.

In die loop van die agt jaar van 1916 tot 1924 het energieverkope vir alle ondernemings van 74,4 Gigawatt-uur tot 133,2 Gigawatt-uur vermeerder en die aantal verbruikers van 52,5 duisend tot amper 91 duisend. Dit verteenwoordig 'n gemiddelde jaarlikse groei koers van 7,5% in elektrisiteitsverkope.

## 6DE KONFERENSIE: 1924

By die 6de konferensie in 1924 is die noodsaaklikheid om huishoudelike verbruikers aan te moedig om meer elektrisiteit te verbruik, veral vir kook en verwarming, sterk beklemtoon. Onder die onderwerpe wat bespreek is, was munisipale toelokale, bedravingsstandkemas en hoe om verbruikersvertroue te wen deur beter openbare betrekkinge en verbruikersopvoeding. Die konferensie was ook die eerste een wat deur raadslede bygewoon is, al was dit dan ook in 'n passiewe rol.

## 7DE KONFERENSIE: 1926

In 1926 het die Vereniging sy tiende verjaardag gevier. Die konferensie is in die Vereniging se geboorteplek gehou en het twee noemenswaardige gebeurtenisse in die geses van die feesviering behels. Die eerste was die toelating van Rhodesië tot die Vereniging en die tweede die promulgering in die Staatskoerant van 'n standaardtoevoerspanning van 220 V vir wisselstroom en gelykstrom en standaardtoevoerfrekwensie van 50 Hz. Dié gebeurtenis het gekóm na onderhandelings en besprekings wat baie jare geduur het en het 'n betekenisvolle voorwaarte stap in die strewe na standaardisering verteenwoordig.

## 13DE KONFERENSIE: 1935

Die uitnodiging wat van 1924 af aan raadslede gerig is, het daartoe geleid dat raadslede met volle stemme in 1935 tot die Jaarkonferensie toegelaat is. Die reëls en grondwet is dienoreenkomstig gewysig, en die naam van die Vereniging wat nie meer toepaslik was nie, is verander na die Vereniging van Munisipale Elektrisiteitsondernemings van Suid-Afrika en Rhodesië. Sekere ander wysigings is ook gedoen, met inbegrip van voorsiening vir die Raad om so dikwels as wat nodig blyk, byeen te kom. Dit was nodig ten einde sake in elk behartig na gelang hulle opduik in plaas van eers op die Jaarkonferensie soos die gebruik was. Die Raad is uitgereik na tien lede naamlik 'n President, 'n Vise-president, die twee vorige presidente en ses ander lede waarvan twee raadslede kon wees. Afsonderlike stemming is ook ingestel as 'n alternatief om raadslid- en ingenieurslede afsonderlike groepstemme te gee waarby enige mosie slegs aaneenem is met 'n meerderheid in albei seksies.

## 14DE KONFERENSIE: 1936

Die volgende jaar het die Vereniging sy 21ste verjaardag gevier op die 14de Jaarkonferensie wat in 1936 in Johannesburg gehou is, en waar mnr A. T. Rodwell as President gekies is. Teen dié tyd het die ledetal tot 137 gestyg waarvan 51 raadslede was. Dr Dobson en John Roberts was onder die hooggeplaastes by die konferensie, en dit moes baie genoeëlik vir hulle gewees het om te sien hoe die Vereniging en die hele elektrisiteitsvoorsieningsbedryf sedert 1915 ontwikkel het. Ietwat teleurstellend miskien was die feit dat drie van die onderwerpe wat behandel is, reeds by die vroeëste konferensies geopper is en nog nie afgehandel was nie. Dit was die kwessie van lisensiering van elektrisiteitsvoorsieningsregulasies en of bydraes deur elektrisiteits ondernemings tot die verligting van belasting geregverdig is en indien wel, watter perk gestel behoort te word.

Dit blyk dat slegs vier van die oorspronklike 22 stigterslede op daardie stydtyd nog aktief in munisipale diens bedrywig is. Hulle was mnr Horrell, Swinger, Jagger en Ross. Mnr Horrell en Swinger was vroeëre presidente van die Vereniging, en mnr Jagger het verskeie kere op die Raad gedien.



## 17DE KONFERENSIE: 1939

Teen 1939 het oorlogsweser weer eens 'n skaduweweer oor die Vereniging se sake gewerp, en dit was die laaste jaarferensie tot 1944. Die Vereniging is onder die wolk gebore, en die herskrywing van die wolk het die einde van 'n era waarin daar veel bereik is, aangedui. Dit was die eerste keer dat die President die ampsetting gedra het, en miskien nog pasliker was die nius dat, na sowat 13 jaar, die Wet op Elektrotegniese Draadwerkers en Aannemers, 20 van 1939, eendek gepromuleer is.

In die tyd tussen 1939 en 1944 het die eerste uitgawe van die Standaardregulasies vir die Bedrading van Persele onder beskerming van die Suid-Afrikaanse Instituut van Elektrotegniese Ingenieurs verskyn. Daarbenewens het die Wet op Fabriek, Masjinerie en Bouwerk van 1941 van krag geword en is elektrisiteitsondernemings ondermeer geregistreer onder wetsbeheer geplaas.

Die Suid-Afrikaanse Standaard-instituut wat in 1909 gestig is om standaardisering te bevorder, was in geldelike moeilikheid en kon nie tred hou met die eis wat aan hom gestel is nie. 'n Standaardiseringskomitee is gestig om ondersoek in te stel, en die gevolg was die Standaardwet, 24 van 1945, ingevolge waarvan die Standaardeeraad en die Suid-Afrikaanse Buro vir Standaarde tot stand gekom het.

In die na-oorlogjare het die karakter van die Vereniging aansienlik verander met minder nadruk op die lewering en bespreking van formele referate as in die vooroorlogse tydperk.

## 18DE KONFERENSIE: 1944

In 1944 is die agtiende konferensie heeltemal as 'n sakekonferensie gehou want baie dringende probleme het in die voorafgaande tydperk van vier en 'n half jaar opgedui. Terselfdertyd is dit beskou as die wysgewende op die Vereniging se sake voortaan behartig sou word indien dit doeltreffend gedoen moes word. Die noodsaaklikheid om meer lede in aktiewe deelname in die Vereniging se sake te betrek, het al hoe duideliker geword waar baie digte tevore in die hande van die Bestuur gelaat is. Met die oog op die wye geografiese verspreiding van munisipaliteite in Suid-Afrika is daar oorweging geskenk aan die totstandkoming van streeksonderkomitees wat meer dikwels en later in 1955 ten uitvoer gebring toe daar akkoord bereik is oor die totstandkoming van takke van die Vereniging.

Die tydperk vanaf die oorlog tot aan die einde van die dekade was 'n tydperk van konsolidasie. Tekorte aan materiaal en geskoolde mannekrag aan die een kant en 'n ongeëwenaarde nywerheidsgroei en tegniese ontwikkeling aan die ander kant was onder die belangrikste uitdagings waarmee die Vereniging te doen gekry het.

In 1945 is die Grondwet weer eens gewysig om uitvoering te gee aan 'n paar belangrike ontwikkelings. Hieronder was die toekennings van amptelike status as geaffilieerdes van die Vereniging aan vervaardigers, raadgevende ingenieurs en ander wat aan die elektrotegniese bedryf verbonde is. Met die regsleiding van die Vereniging se Ere-regisadviser, mnr A.P. Burger, wat tans Stadsklerk van Johannesburg is, is daar ook wysigings aangebring om die grondwet op 'n gesonde grondslag te plaas.

Teen hierdie tyd was die Ingenieursforum wat later die Ledeforum geword het, al 'n paar jaar by konferensies in werking, en die beweging om konferensies op 'n tweejaargrondslag in plaas van jaarliks te hou, het veld gewen tot die ontsteltnis van die Vereniging.

Die Goue Jubileum van die Vereniging wat in Port Elizabeth gehou is, was ook die laaste van die jaarlikse konferensies. Die eerste tegniese byeenkoms is in 1966 gehou waardeur die beginsel van tweejaarlikse konferensies met tegniese byeenkomste tussendertig jaar na 'n soos ons dit vandag ken.

## DEEL II - DIE VME0 VANDAG

Die VME0 bestaan nou 67 jaar en hou hierdie jaar sy 48ste kongres. Sedert dit gestig is, het die aantal munisipaliteite wat lede is, vanaf 16 tot sowat 200 gegroei. Aan die anderkant is daar vandag meer as 350 Munisipale Elektrisiteitsondernemings en dit is derhalwe duidelik dat meer as 150 nie lede van die VME0 is nie. Slegs 29 van hierdie ondernemings het egter 'n maksimum vraag van meer as 1 MVA bekend gemaak en die grootste sowat 9 MVA.

In 1982 was die Munisipale Elektrisiteitsondernemings as 'n groep, EVKOM se grootste klient en het 33,6% van EVKOM se totale energieverkope van net meer as 96 000 GW.h opgeneem en het sodoende die individuele verkope aan die nywerheid en mynskroter verby gestuur. Ooreenkomstig die maksimum vraag sal hierdie verhouding waarskynlik veel groter wees vanweë die relatief swak laasfaktore wat met 'n munisipale las geassosieer word.

Die VME0 het beslis ook in statuering en belangrikheid gegroei, en hoewel vir baie jare in noue samewerking met organisasies soos die Elektrisiteitsvoorsieningskommissie (EVKOM), die Wetenskaplike en Nywerheidsnavorsingsraad (WNNR) en die Suid-Afrikaanse Buro vir

Standaarde (SABS) gewerk het, het by slegs onlangs die steun en erkenning van die Verenigde Munisipale Bestuur (VMB) ontvang. Daar word nou gehoop dat hy die steun sal mebring dat alle munisipale elektrisiteitsondernemings by die VME0 aansluit sodat koördinerende standaardisering op nasionale grondslag bereik kan word.

Die groei in die VME0 se lidmaatskap en bedryfwyde was aansienlik, veral gedurende die jongste dekade. Die noukeurig voortgaande werk van die VME0 word feitlik uitsluitlik gedoen deur die ingenieurslede van die Uitvoerende Raad. Daar word egter besef dat dit hul belangrikste verpligting is om hulle onderskeie ondernemings te bestuur en die toenemende las om in komitees en werkgroepe te dien, sal in die toekoms wyer versprei moet word. Wanneer daar besef word dat die Elektrotegniese Stadsingenieur van Johannesburg byvoorbeeld 'n organisasie bestuur wat bestaan uit 'n personeel van meer as 3 000 wat drie kragtentrales bedryf en 'n uitgebreide elektrisiteitsnet wat hierdie versprei teen 'n maksimum vraag van sowat 1 250 MW met 'n beaamde inkomste van R240-miljoen vir 1983, sal die probleme om nog, afgesien hiervan, VME0-verpligtinge na te kom, besef word. Die bedryfwyde van die Vereniging word tans in drie kategorieë verdeel:

### 1. DIE AANBIEDING VAN REFERATE

Hierdie aspek van die Vereniging se bedryfwyde is waarskynlik die belangrikste taak en lede, veral diegene van die kleiner ondernemings, baat altyd die meeste by hierdie uitruiling van inligting en standpunte. Vanweë die Vereniging se unieke lidmaatskap van ingenieurs, raadslede en vervaardigers dek die referate wat by kongresse aangebied word 'n wye veld van onderwerpe wat wissel van tegnies tot finansiële, regsaspekte en administratiewe kwessies.

Die VME0 het nog altyd die aanbieding van referate as belangrik beskou en dit was veral altyd in die jare voor toe hierdie referate, vanweë die gebrek aan kommunikasie- en vervoergeriewe, seldsame geleenthede aan lede gebied het om kennis op te doen uit die bespreking van gemeenskaplike probleme. Die vordering in ons moderne wêreld het hierdie struikelblokke in 'n mate uitgeskakel, maar omgekende tegnologiese vordering en die steeds toenemende kompleksiteit van die voorsiening van krag aan digbewoonde stedelike gebiede, het die aandag meer en meer gefokus op die toepassing van gevorderde tegnologiese, bestuurstechnieke en ekonomiese beginsels in munisipale onder-

nemings. Dit word weergegee in die aard van die referate wat desdaad by kongresse aangebied word. Daar moet ook besef word dat die koste en die beskikbaarheid van elektrisiteit 'n belangrike invloed kan uitoefen op nywerheids- en residiensieontwikkeling.

### 1. KOMITEES EN ONDERKOMITEES

Daar sal gedurende hierdie kongres verslae van sowat 24 verskillende komitees oorweeg word. Hierdie komitees ondersoek in die algemeen twee aspekte van die elektrisiteitsvoeroerneming, naamlik Gebruikskodes, wat handel oor ontwikkeling van gebruike en toerusting, en die voorbereiding en daarstelling van standaarde.

In 'n aantal gevalle dien ingenieurslede ook in internasionale komitees, byvoorbeeld die World Energy Conference (WEC), die International Conference on Large Electrical Networks (CIGRE), en die International Electrotechnical Commission (IEC). Die Suid-Afrikaanse Nasionale Raad vir die World Energy Conference (SANWEC), waarvan die Voorsitter van EVKOM as Voorsitter optree, handel met die volledige spektrum van energiesake op 'n nasionale grondslag.

CIGRE vergader halfjaarlik om ligting uit te ruil en ervaring met groot elektrisiteitsnet te vergelyk. Die kleiner munisipaliteite in Suid-Afrika het nie in die verlede enigins deelgeneem nie, maar met die toename in die vraag na elektrisiteit en die voortdurende ontwikkeling van hoër bedryfspannings word die VME0-lidmaatskap van CIGRE steeds meer belangrik.

Die IEC is 'n organisasie wat handel met die nasionale standaardisering van elektriese toerusting en installasies. Sy werk is van besondere belang vir die nywerheid wat die oog op uitvoering rig.

Afgesien van die referate wat aangebied word, is hierdie internasionale kongresse nie slegs belangrik vir die daarstelling van kontak met toonaangewende oerseese owerhede, vervaardigers en verskaffers nie, maar ook vir die uitbouing van 'n gunstige beeld van Suid-Afrika. Die uitbouing van idees wat voortspruit uit hierdie kontakte en uit die bywoning van kongresse was tot heelwat voordeel vir Suid-Afrika. Suid-Afrikaanse afgevaardigdes het ook besondere bydraes by baie van hierdie kongresse gelewer. Wat die plaaslike konteks betref, dien die Vereniging in verskeie komitees. Die terreine waarop daar in die breek bin bedryfwig is, sluit deelname in aan die opstelling van standaarde en gebruikskodes saam met die SABS, en deelname aan toegespaste navorsing met statuêre liggame soos die Wetenskaplike en Nywerheidsnavorsingsraad (WNNR), die Nasionale Elektrotegniese Ingenieursnavorsingsinstituut (NEIN) en die Nasionale Bounavorsingsinstituut.

'n Tipiese plaaslike komitee is die Hoogspanningskoördineringskomitee van die WNNR. Hierdie komitee vergader twee keer per jaar

en sy hoofdoel is om openbare navorsing op alle gebiede van die elektrotegniese ingenieurswese te hersien en te koördineer. Heelwat van die werk wat gedek word is van internasionale belang en 'n aantal lede het die 1982-sessie van CIGRE as afgevaardigdes of as lede van die werkgroepe bygewoon. Die volgende onderwerpe is onder andere deur die werkgroepe behandel:

- Aarding
- Stelselsteurings
- Isolering
- Verligting

'n Komitee wat besonder prominent geword het, is die Suid-Afrikaanse Telekommunikasie en Elektriese Kragvoorsieningsgesag (SATEKG) wat in 1976 gestig is. Die belangrike taak van koördinering en die beskikbaarstelling van toerusting ten einde toe te sien dat noodsaaklike elektriese krag gedurende noodtoestande ononderbroke voorsien word, is aan hierdie Komitee opgedra.

Die Vereniging het verteenwoordigers uit sy gelede benoem om in alle streekkomitees te dien. Dit het 'n gewelinge las op die Kragvoorsieningsgesag se mannekragbronne geplaas.

Daar is ook komitees gestig om te handel met tegniese opleiding en die registrasie van Tegnoloe en Ingenieurs. Ons is baie betrokke by die opleiding van Tegniese personeel in Suid-Afrika. Beurse word toegeken aan studente aan universiteite en techniciens en finansiële toekennings word op meriete gemaak aan kweklinge by die verskillende ambagsmanopleiding sentrums. Die Vereniging speel ook 'n aktiewe rol in die bepaling van die vereistes vir die registrasie van Professionele Ingenieurs en het met die VMB saamgewerk in ondersoek na die opleiding van tegniese personeel en die probleem van personeeltekorte.

### 3. LEDEFORUM

Die derde kategorie waaruit die huidige bedrywigheede van die Vereniging bestaan, is die Ledeforum.

Die Ledeforum is die eerste keer tydens die kongres wat in 1953 in Johannesburg gehou is, ingestel. Dit het oorspronklik as die Ingenieursforum bekend gestaan en is deur die Uitvoerende Raad ingestel om 'n geleentheid te bied vir samesprekings oor onderwerpe wat, hoewel dit van alledaagse belang vir Munisipale Elektriesiteitsondernemings is, moontlik nie 'n formele referaat regverdig is.

Tydens die huidige Kongres sal die Ledeforum onder die opskrif "ONDERWERPE VIR BESPREKING" behandel word. Daar sal 'n baie sisteem poging aangewend word om die kwessie wat oor die jare herhaaldelik vir bespreking geopper is, op te los of minstens konsensus te bereik oor sommige daarvan. Die volgende sal bespreek word:

- Die beskerming van oorhoofse laagspanningslyne.
- 'n Gebruikskode vir neutrale aarding.
- Ervaring met soliede geïsoleerde kables.
- Die gebruik van lugkables.
- Die ontwikkeling in vakuum- en SF<sub>6</sub>-skakelting.
- Die gebruikskode vir bedrading van persele.
- Die standaardisering van spanning.
- Die netwerk in nuwe dorpe.
- Die standaard-elektrisiteitsariewe.

Hierdie onderwerpe sal saam met statutêre liggame soos die SABS, die Departement van Mannekragbenutting, EVKOM en andere oorweg word ten einde 'n gekoördineerde en algemene aanvaarbare en lewensvatbare oplossing te verkry.

Die vordering wat gemaak is met die finalisering van hierdie kwessies is uiters stadig vanweë die probleme om dikwels, met gereelde tussenposse, vergaderings te belê. Dit is noodsaaklik dat daar dikwels vergader word, veral wanneer daar ingewikkelde tegniese en statutêre vereistes is. Vanweë hierdie situasie is dit tans ook feitlik onmoontlik om op 'n gereelde grondslag te bepaal wat die algemene standpunt van lede is en gevolglik is dit moontlik dat die Vereniging se komitees nie noodwendig die hele spektrum van lede se menings weergee nie.

## DEEL III – DIE VMEO VAN MÔRE

### 1. INLEIDING

Die VMEO is bedrywig in 'n dinamiese omgewing, waar toestande aanhoudend verander, wat betref die beskikbare tegnologie in die elektrisiteitsvoorsieningsnywerheid, en onder andere in die arbeidsmark in Suid-Afrika, as gevolg van die implementering van sommige van die aanbevelings van die Riekert- en Wiehahn-kommissies.

### 2. ARBEIDSWETGEWING

Die Riekert-kommissie<sup>(1)</sup> se opdrag was kortliks om ondersoek in te stel na, verslag te doen oor en aanbevelings te maak in verband met alle wetgewing (met met uitsondering van die wetgewing wat deur die Departemente van Arbeid en Mynwese geadmistreer word) vir soverre dit direk of indirek betrekking het op enige ekonomiese aspekte van die benutting van mannekrag.

Die Wiehahn-kommissie<sup>(2)</sup> se opdrag was om ondersoek in te stel na, verslag te doen oor en aanbevelings te maak in verband met bestaande arbeidswetgewing, naamlik:

- Die Wet op Nywerheidsversoening
- Die Wysigingswet op die Reëling van Bantoe-arbeidsverhoudings
- Die Loonwet
- Die Wet op Fabriek, Masjinerie en Bouwerk
- Die Wet op Winkels en Kantore
- Die Wet op Vakleerlinge
- Die Wet op Opleiding van Ambagsmanne
- Die Wet op Bantoebouwerkers
- Die Wet op Elektrotegniese Draadwerkers en Aannemers
- Die Ongevalwet
- Die Werkloosheidsversekeringswet
- Die Wet op Registrasie vir Werk

met besondere verwysing na aanpassing van die bestaande arbeidsbehoefte, die voorkoming en skikking van geskille, die uitskakeling van knelpunte en die skep en uitbreiding van gesonde arbeidsverhoudings.

Vir die voorsieningsnywerheid was die herroeping van die Wet op Elektrotegniese Draadwerkers en Aannemers en die vervanging daarvan deur nuwe regulasies by die Wet op Fabriek veral van belang. Die nuwe regulasies bevat die volgende belangrike bepalings:

- Alle elektriese installerings moet voldoen aan 'n Gebruikskode wat deur die Hoofinspekteur van Fabriek goedgekeur moet word.
- Alle elektriese installeringswerk moet deur 'n geregistreerde installeringelektreisiën self, of onder sy toesig, gedoen word.
- Elektriese Aannemers moet 'n verantwoordelike persoon benoem om in algemene beheer van installeringswerk te wees, wat dan die voltooiende werk moet toets en moet sertifiseer dat dit getoets is en in alle opsigte aan die Gebruikskode voldoen wat deur die Hoofinspekteur van Fabriek goedgekeur is.

Belangrike afwykings van vorige wetgewing was dus:

- Die verpligte gebruik van 'n goedgekeurde Kode vir elektriese installerings. Hierdie is die Gebruikskode van die Suid-Afrikaanse Buro vir Standaard vir die Bedrading van Persele – Kode 0142 – 1981. Hierdie Kode het die Standaardregulasies vir die Bedrading van Persele wat deur die Suid-Afrikaanse Instituut van Elektrotegniese Ingenieurs opgestel en uitgereik is, vervang.
- Bedradingwerk kan nou deur ongeregistreeerde persone gedoen word, mits daar toesig oor hulle werk gehou word en daar deur 'n installeringelektreisiën gesertifiseer word dat dit aan die vereistes van die Kode voldoen.
- Die verskaffer hoef nie alle installerings te inspekteer nie.
- Elektriese verbruikers in die nywerheid wat behoorlik gekwalifiseerde personeel in diens het, kan daarvan kwytgeskeld word om hulle elektriese installerings deur die verskaffer te laat inspekteer.

Die wesenlike resultaat van hierdie wetgewing was dat installeringswerk wat deur ongeregistreeerde werkers gedoen is, wettig gemaak is en, iets wat vir verskaffers van belang is, dat daar aansienlike verligting gekom het wat betref die las op die skouers van hulle elektriese inspekteurs sonder dat daar hoegenaamd enige gevaar daardeur geskep is.

### 3. NOG 'N IMPLIKASIE VAN DIE VERANDERING VAN ARBEIDSWETGEWING

Die veranderinge in arbeidswetgewing wat nuwe arbeidskanale vir Swartes in Suid-Afrika oopgemaak het, het gekom op 'n tydstrip juis toe die houdings van werkers in talle dele van die wêreld besig was om te verander.

Waar<sup>(3)</sup> baie werkers vroeër bereid was om oor lang tydperke heen dieselfde soort werk te bly herhaal, bloot net vir die vergoeding wat daaraan verbode was, is hierdie houding nou besig om te verander. In veral die geïndustrialiseerde lande waar die werkers veel jonger is bestaan die neiging om op arbeidstredeneheid en beloning oor die kort termyn, eerder as byvoordele oor die lang termyn, aan te bring.

Daar moet dus 'n nuwe belangstelling ontstaan om die verwagtinge van die arbeidskragte met die tegnologie wat op die taak toegepas word, te laat ry. In onderontwikkelde lande, moet die tegnologie vir elke nywerheid by die finansiële beperkings aan die een kant, en die beskikbaarheid en vaardigheid van arbeid aan die ander kant, aangepas word. Gevorderde tegnologie moet nie vinniger ingevoer word as die beskikbare arbeidsvaardigheid nie.

Lede van die VMEO is ten volle bewus van die behoefte aan opgeleide werkers. In die jongste tyd word beurse en toekennings aan die jongmense van die land beskikbaar gestel om hulle aan te toedig om loopbane in die elektrisiteitsvoorsieningsnywerheid te volg. Nog meer kan en moet gedoen word. Die bestaande opleidingsgeriewe sal uitgebrei moet word om vir die toenemende getalle werkers wat opleiding moet ontvang, en vir hulle verskillende agtergrondvoorsiening te maak. Net hierdie soort optrede sal verseker dat daar in die toekoms genoeg werkers met die verlangde opleidingspeil beskikbaar sal wees.

#### 4. PLAASLIKE EN STREEKSBESTUURSTELSELS

Dit ly geen twyfel dat die stadium nou bereik is waar dit noodsaaklik geword het dat elektrisiteitsvoorsieningsnywerheid gerasionaliseer moet word. Suid-Afrika staan op die punt om ingrypende veranderinge van die Grondwet van die Republiek in te voer wat alreeds die regeringsvlakke gaan raak. 'n Gesamentlike verslag van die "Komitee vir Ekonomiese Sake en die Grondwetkomitee van die Presidentsraad oor Plaaslike en Streekbestuurstelsels in die Republiek van Suid-Afrika het reeds verskyn. Hierin word voorstelle aan die hand gedoen wat, indien hulle deurgevoer sou word, verreikende implikasies vir elektrisiteitsvoorsienings- en die VMEQ kan hê.

Die Verslag gaan akkoord dat daar 'n behoefte bestaan aan 'n doeltreffender en ekonomiese ingenieursdiens in Suid-Afrika en beveel dienereenkomstig aan. Die voorstelle gaan hoofsaaklik om 'n skedeling van dienste in grootmaatsdiens ("harde" dienste) en kleinmaat- of gemeenskapsgesogte dienste ("sagte" dienste). Grootmaatsdiens sluit in brandstofsnyding, fiolering, slagplase, rekenaar dienste en beroeps- personeeldienste. Die verslag beveel aan dat die grootmaatsfunksies op streekgrondslag deur 'n genomineerde raad (stedelik of plattelands), nut-maatskappij of metropolitaanse owerheid hanteer word wat onder andere saamgestel is uit genomineerdes van elk van die betrokke plaaslike owerhede.

Die Verslag verwys ook na die bystand wat deur "deskundiges" aan die Komitees verleen word, (para 6.22). Dit is jammer dat die Komitees nie die VMEQ se aanbod om hulp by die bepaling van 'n nuwe bestuurstelsel, in die besonder vir die verskaffing van grootmaatsdiens, aanvaar het nie, aangesien die Vereniging met sy groot bron van deskundiges oor elektrisiteitsvoorsiening in Suid-Afrika 'n betekenisvolle bydrae kon gelewer het. Die kommentaar in die verslag is nie altyd duidelik nie en is dus aan verskillende vertolkings blootgestel, wat 'n verwarrende en verontrustende klimaat onder munisipale ingenieurs veroorsaak het.

Welke vertolking ook al deur die benamings harde-/sagte-, groot-/klein-, sensitiewe- en grootmaatsdiens bedoel is, voel ek dat enige nuwe grondslag waarvolgens elektrisiteitsvoorsiening hanteer kan word, op 'n eenvoudige tweevlakstelsel moet geskied wat soortgelyk aan die een in Brittanje is.

Dit kan wees -

- (1) "n Opwerkings- en grootmaattransmissie-liggaam (EVKOM); en
- (2) Streekvoorsieningsowerhede soos in bogenoemde Verslag aan die hand gedoen, wat direk aan individuele verbruikers lewer sonder inmenging van 'n ander bestuursvlak.

'n Streekowerheid sou dan die verantwoordelikheid dra om dienste te lewer aan 'n konglomeraat van plaaslike besture soos wat daar in die aanbevelings van die Presidentsraad beoog word, om sodoen, waar moontlik, kapasiteitsbesparings te bewerkstellig. Dit sluit gemeenskaplikheid daarin dat die voordele van 'n kompakte organisasiestruktuur van die allergrootste belang is. 'n Organisasie tabel kan miskien soos volg lyk:

#### STREEKOWERHEID (HOOFKANTOOR) (WAARBY ELEKTRISITEITSVOORSIENING INGESLUIT IS)

Hoof- planning	Hoof- waarde- toets	Regeer- deling	Oppas- maatskappij	Sentrale rekening	Sentrale personeel	Personel- advies- spesialiste
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### Onderhoud : Bedryf en konstruksie (Gebiedskantore)

Mens kan moontlike voordele bo ons huidige parogiale reeling bespeur.

1. Beplanning sal verskeie van die huidige voorsieningsgebiede behels en sodoen die groter reikbaarheid aan beplanners verleen, soos die ligging van massatoevoerpunte en substasies, en die groter moontlikheid dat gemengde lading (nywerheid, handel en huishoudelik) op dieselfde substasie geplaas sal kan word om sodoen groter benutting van die inrigting te verseker.
2. 'n Sentrale werkwinkel kan met gesofistikeerde masjinerie uitgerus word, wat nie vir individuele plaaslike besture geregverdig sou wees nie.
3. Daar kan groter eenvormigheid wees wat betref die soorte toerusting wat gebruik word, wat die aanhou van reserweerde sal vermind, en die voordele van meer grootmaatsaankope en -verbruik kan ekonomies benut word - tot voordeel van ons geaffilieerdes sowel as die massavoorsieningsowerheid.
4. Op die oomblik is net die groter plaaslike owerhede in 'n posisie om spesialiste van die een of ander aard in hulle Elektrisiteitsafdeling in

diens te neem. 'n Metropolitaanse raad sou met goeie gevolg spanne spesialiste in diens kan neem.

5. Aan die mikro-nywerheid die organisasie sou die Raad wat betref baie van die pligte wat plaaslike besonderheidskennis verg, of waar dit van oorheersende belang is dat logistiese probleme vermind moet word deur 'n ingeperkte gebied te werk, in definitiewe streeksonderverdelings werk.
6. Onderhoudwerk tydens defekte is duidelik een van die fasette wat dit voordelig word om plaaslik te werk, omdat die probleem daar naby geleë is. Dit hoef nie te betel dat daar 'n dekstelsel deur 'n naasliggende streek beskikbaar kan wees in druktye nie, soos wanneer 'n plaaslike storm intem, maar nie wydersprekende kragonderbrekings veroorsaak nie. Hierdie dekretelling kan outomaties wees en op lae bestuurvlak in werking gestel word, gesien teenoor die huidige verdragings wat veroorsaak word deur die verskaffing van onderlinge hulp tussen plaaslike besture.

Die VMEQ is rekbaar genoeg, glo ek, om by enige vorm van 'n nuwe plaaslike/streekbestuurstelsel te kan aanpas. As 'n vernieuwde nie-statutêre nasionale organisasie met vrywillige verbindees wat steeds aan die toekoms is wat die volume en kompleksiteit daarvan betref, behoort sy struktuur en toekomstige werkinge onder of geneem te word. As dit egter nodig sou word dat by enige soort statutêre rol moet speel, sal sy administratiewe struktuur verstewig moet word. Groter delegering van pligte en bevoegdhede na Takke-Streke met 'n voltydse Sekretarisat blyk noodsaaklik te wees en die rol van die VMEQ se Uitvoerende Bestuur sal, na my mening, meer een van beleidsvorming en koördinasie moet word.

#### 5. SLOOT

Die VMEQ is 'n unieke organisasie met 'n lang geskiedenis van toegewyde diens wat vrywillig deur talle vooraanstaande mense aan hom gelewer word. Dit bring raadslid, ingenieur, die handel en die nywerheid en talle statutêre organisasies byeen en lewer 'n onskatbare diens aan die land se elektrisiteitsvoorsieningsnywerheid. Na 'n leeftyd van munisipale diens en 'n lang verbintenis met die VMEQ is ek van mening dat hierdie Vereniging steeds sal voortgaan om 'n waardevolle diens aan die land te lewer. Net soos in die verlede sal dit geskied deur onderlinge samewerking, en ook samewerking met almal wat streef na 'n doeltreffender elektrisiteitsvoorsieningsnywerheid met sy gesleedte bydrae tot die welvaart van Suid-Afrika.

Die President het ten besluete gesê:

"Ek glo nie dit is prakties om streekreëde te stig sonder dat munisipale hulle plaaslike outonomie pryseer nie. Wat elektrisiteitsvoerder betref, kan die voordele van streekreëde met betrekking tot beplanning, besluitneming, finansiering en beter benutting van finansiële en arbeidsbronne slegs verkry word as dit op 'n gekonsolideerde streek sonder kunsmatige grense toegepas word.

Die VMEQ-subkomitee wat hierdie saak oorweeg het, het die finansiële implikasies in gedagte gehou. As aanvaar word dat regionalisering finansiële besparing sal meebring, dan is daar sekerlik geen rede dat enige munisipale slegter daaraan toe sal wees as voorheen vir sover dit die oorskotte uit die verkoop van elektrisiteit betref nie.

Hoewel die VMEQ nog nie die Presidentsraad se aanbevelings formeel oorweeg het nie, strook die volgende kommentaar oor die algemeen met die konsensus wat deur die subkomitee van die VMEQ en die Instituut van Munisipale Tesouriers en Rekenmeesters bereik is:

- (a) Daar is skynbaar geen noodsaaklikheid om nuwe beheerliggame te skep vir die beheer van elektriese dienste nie, behalwe die wat nodig is om sekere elektrisiteitssondernemings op 'n streekbasis saam te bind waar voordel getrek kan word uit kapasiteitsbesparing en die gevolglike rasionalisasie in die gebruik van bronne en fasiliteite.
- (b) Die modus operandi vir die samesmelting van 'n aantal elektrisiteits-ondernemings op 'n streekgrondslag moet deur werkgroepe wat uit die individuele plaaslike owerhede in elke streek getrek word, bepaal word. Die VMEQ moet in sodanige werkgroepe in 'n raadgevende hoedanigheid verteenwoordig wees om behulpsaam te wees met probleme wat vanweë die oorplasing van funksies na die streekowerheid ontstaan.
- (c) Daar is geen onmiddellike fisiese veranderings aan die bestaande elektrisiteitsvoernetwerke nodig om dit op 'n streekgrondslag te bedryf nie en in die algemeen moet die reellings vir die roetine-bedryf, instandhouding en uitbreiding van hierdie netwerke onveranderd bly. Die streekowerheid moet hoofsaaklik gemeoed wees met die rasionele beplanning van die distribusiestelsel wat op ingenieursmaatsstawe en ekonomiese beginsels gegrond is tesame met die daarstelling en gebruik van sentrale geriewe soos werkwinkels en die standaardisasie van toerusting en praktieke.
- (d) Die streekowerheid moet ook toesien dat 'n algemene finansiële beleid dwarsdeur die streek aangeneem word, met inbegrip van eenvormige tariewe en gelde vir dienste, die verskaffing van kapitaal en die toekening van oorskotte."

## VERWYSINGS:

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2. Bendix D.W.F. The Commission of Inquiry into Labour Legislation. South African Journal of Labour Relations June 1979.
3. Heller F.A. and Clark A.W. Personnel and Human Resources Development: Annual Review of Psychology Vol. 27, 1976.
4. Gesamentlike Verslag van die Komitee vir Ekonomiese Sake en die Groendwetkomitee van die Presidentsraad oor Plaaslike en Streek-behoefstelsel in die Republiek van Suid-Afrika.
5. Verrigtinge in die Vereniging van Munisipale Elektriese Ingenieurs. (1ste – 12de Konvensie).
6. Verrigtinge in die Vereniging van Munisipale Elektriese-ondernemings (13de – 46ste Konvensie).
7. Johannesburg se munisipaliteit se Geskiedenis van die Elektriese-afdeling, saamgestel 1974, ongepubliseerde departementele naslaanwerk.
8. Elektriese-voorsieningskommissie Jaarverslag 1982.
9. Offisiële Suid-Afrikaanse Munisipale Jaarboek 1981-82.

## EUGENE PRETORIUS – POTCHEFSTROOM

Mnr. die voorsitter, U Ed. Agb. die Burgemeester van Johannesburg, mnr. Gerrit Borman, lid van die Presidentsraad, dames en here:

Ook ek wil my beskeie maar opregte gelukwensing oordra aan mnr. Wessel Barnard met sy Presidentskap wat hy vanoggend aanvaar het. Ons twee kom 'n lang pad saam: ons het in die vroeë 70's saam in 'n ad hoc-komitee van die Transvaalse Prov. Adm. gedien wat belas was met die opstel van Standaardelektrisiteitsverordeninge vir Transvaal en sedertdien was ons groot maats o.a. omdat ons 'n groot liefde vir goeie tafelwyn deel!

Ek beskou dit as 'n groot eer om hom te bedank vir sy, kom ons noem dit maar by sy akademiese naam, inougerde rede. Ek doen dit egter met groot huivering en professionele agting want hy is 'n groot kanon: die hoof van die grootste munisipale elektrisiteitsonderneming in die wêreld – en net na my praat nog 'n groot kanon! In die middel is arme ekke, punt twee-twe!

Dit is vir my baie interessant, en dit skep by my 'n mate van genoegdoening, dat mnr. Barnard se rede feitlik dieselfde veld dek as my eie presiderende in 1975 en ek dink hy was tot nou toe onbewus van hierdie toevalligheid. (In Engels is daar 'n gesegde: Great minds think alike!) Destyds was daar egter nog nie sprake van nuwe bedelings, Presidentsrade e.d.m. nie.

In my eie presiderende het ek dié stelling gemaak: Gevestigde idees sal plek moet maak vir moderne en selfs futuristiese idees. Mnr. Barnard het ondubbelingsinnig hierdie siening beaam en in breë trekke in die derde deel van sy rede bekleemtoon. Die ingrypendste aspek wat hy aanraak, is streeksvoorsieningsowerhede. Hy het ongelukkig net op die groot voordele van so 'n stelsel gewys, waarmee ons seker almal akkoord gaan. Daar moet egter beslis ook nadele wees, as dit vergelyk word met die huidige opset. Ek persoonlik is bang dat Parkinson se Wet hoogty mag vier: 'n te groot organisasie is geneig om lomp en ondoeltreffend te word – daarvan het ons baie sprekende voorbeelde in die sakewêreld. Ek glo, en ek dink dit is wetenskaplik bewys, dat elke tipe organisasie 'n optimum grootte het. Dan is daar etlike praktiese probleme waarvoor my beperkte verstand geen oplossing het nie.

Dit is goed dat mnr. Barnard in besonderhede uitgewei het oor die her-koms, geskiedenis en werksaamhede van die VMEQ. Vir sommige van ons van die ouer garde is dit miskien ou nuss, maar dit by nog altyd interessant en insiggewend. Vir die jongere ingenieurlêde, die raadslid-vertegenwoordigers die oorgrote meerderheid van die geaillustreerde, die dames en, ek hoop, die pers moet dit egter seker 'n openbaring gewees het om dit alles te vernem. Tereg wys die President daarop dat die werklas van die VMEQ so groot geword het dat dit feitlik onmoontlik word vir die lede van die Uitvoerende Raad om dit alleen te dra. Die tyd eek aangebreek dat lede wat buite die UR staan, betrek word en hierdie aspek sal seker hoë prioriteit geniet by beraadslagings van die UR.

Tensypte van al die werk wat die VMEQ doen, word hy nog steeds op baie vlakke misken en selfs geïgnoreer. Een van die jongste gevalle – en ek hoop mnr. Borman knoop dit in die oor om dit ter geleger tyd met die betrokke Minister te bespreek – is die Wet op die Bevordering van Plaaslike Owerheidsaangeleenthede, 1983 (Wet nr. 91 van 1983) waarin die Instituut van Munisipale Tesouriers erkenning geniet (en wel in die betrokke koördinerende raad) en nie die VMEQ nie! Dit skree ten hemele, veral as gelet word op die verreikende oogmerke en werksaamhede van die koördinerende raad; ek noem maar net een: om aanbevelings te doen met betrekking tot die skepping van instellings vir

die verrigting van werksaamhede soortgelyk aan dié wat deur plaaslike owerhede verrig word – dus ook elektrisiteitsvoorsiening. Bonaap dien die verteenwoordiger van die betrokke Instituut in die aksiekomitee van die koördinerende raad. Ek kan maar net hoop dat hierdie miskenning van die VMEQ spruit uit die verwarring wat geskep word met die naam Instituut van Munisipale Ingenieurs. Daar behoort ernstig daaraan gedink te word om dit te laat verander na die Instituut van Munisipale Siviele Ingenieurs Ek wil dit egter net duidelik stel: ek is nie besig met 'n vete teen ons siviele kollegas nie.

Daar is egter wat ek noem 'n sprankie-hoepklousule in hierdie Wet, nl. artikel 14, wat bepaal dat, indien die betrokke Minister van oordeel is dat enige instelling in staat is om 'n wesenslike bydrae te maak ter bevordering van die oogmerke van die koördinerende raad en in die raad verteenwoordig behoort te word, kan die Minister daardie instelling aanwys. Die VMEQ moet tog alles in die werk stel om die Minister te oortuig van die noodsaaklikheid dat die VMEQ as so 'n instelling aangewys behoort te word.

Ek sluit af – my sekondant moet ook 'n kans kry. (Terloops, hy is die persoon wat die 1975-Konvensie, toe ek die eer gehad het om President te word, amptelik geopen het.)

Mnr. die Voorsitter, dit is vir my 'n besondere genoë en 'n groot eer en voorreg om mnr. Barnard eerstens geluk te wens en tweedens te bedank vir sy sprankelende, deeglik voorbereide, weldurgedige en gedagtepriekkelende presiderende wat 'n waardige en waardevolle toevoeging is tot die annale van die VMEQ. Ek wil hom ook komplimenteer met die voortreflike, eg Wesselaanse wyse waarop hy dit aangebied het. Dankie.

## MR NAUDE VAN WYK: CSIR

Mr President –

I listened with great interest to the success story of the growth and evolution of the AMEQ. I am sure that the founders, had they been present today, would have been justifiably proud to learn how their original objectives have been met.

You referred, Mr President, to the heavy burden committee work places on some of your members. Admittedly this is so, but it is in my view the lifeblood which keeps your Association interactive with the world around you. It prevents your Association from technological in-breeding and it assists others to become fully aware of your activities.

You mentioned that "Advanced technology would not be introduced faster than the labour skills available". This is a laudable thought, but with electricity being one of the fastest growing areas of energy supply and distribution, innovation and advances in technology cannot be avoided, nor should it be rejected out of hand.

This is where local research and development is so essential to understand, adapt and exploit these advances for our benefit. We have traditionally led the world in lighting research and its effect on transmission and distribution lines. Information from current projects for example from the 11kv – test line, is not only of importance locally but internationally as well. Similarly the work done on the analysis of system disturbances due to switching transients enabled us to counter the deleterious effects attributed to vacuum switchgear. We introduced vacuum switchgear before it was used in large numbers elsewhere, because it suited our needs for reliability and low maintenance.

We thus often have to innovate to combat local conditions whether they originate from nature or because of a well motivated step into the unknown.

Mr President, I could continue with many more examples, but the point I wish to make is that the representation of your Association on committees such as the High Voltage Co-ordinating Committee and the Advisory Committee of the National Electrical Engineering Research Institute is vital.

It ensures that the research bodies learn about your problems and conversely your Association take note of what can and is being done to investigate the unknown.

Similarly, your presence is needed on Committees of the SABS and others. I am also very pleased to learn of the continued involvement of your members in the activities of international bodies such as CIGRE, the World Energy Conference, etc. These are equally important to provide your members with first hand contact regarding developments internationally.

I would therefore like to stress to you and your members that the many additional hours spent on collaborating with other bodies be it directly or through committees, are important and it is appreciated by those on the receiving end.

It gives me great pleasure to second the vote of thanks to you for your thought provoking and excellent address.



## HONORARY MEMBERSHIP – ERELIDMAATSKAP

### MR KEN ROBSON – EAST LONDON

Mr President, Mr Mayor, distinguished guests, ladies and gentlemen, the conferment of Honorary Membership of the AMEU is the public recognition of and a formal tribute to a person whom the Association wishes to honour for outstanding services.

It is an honour which is not lightly bestowed and down the years the ceremony of conferment has held a very special place in the proceedings of our Conventions.

Honorary Members constitute at present a select group of twenty eight men who in many and varied ways have served the AMEU with distinction.

Mr President, today we salute Terence Cecil Marsh – only the second Affiliate to have been proposed for Honorary Membership in the long history of the AMEU.

Born in 1922, he matriculated at Benoni High School and completed an apprenticeship as an electrician on the Van Ryn Gold Mine.

During the Second World War he served with the South African Navy and the Royal Navy on corvettes and frigates. After a few years with Head Wrightson he joined Reunert and Lentz – ASEA Department in 1950 becoming a Sectional Head in 1955, responsible for tenders, placing of orders on the factory, delivery and erection of transformers and final handing over to customers.

In 1974 he was transferred to ASEA Electric South Africa Limited as Regional Manager and since 1979 has held the position of Business Development Manager.

He is a Senior Member of the South African Institute of Electrical Technician Engineers.

It is the established custom for Affiliates either to volunteer or to be directed to care for councillors and engineers, the less privileged representatives of their customers! During the 1955 Convention in Pretoria at the request of the President Mr D.J. Hugo, Terence Marsh was assigned to escort two councillors and their wives on a tour of the Union Buildings and other places of interest in Pretoria.

On returning the party to their hotel after the tour, one of the councillors pressed a ten shilling note into his hand as a tip! He pocketed it!

It must surely be the one and only time that an Affiliate has been so generously treated by any such less privileged member!

In 1962 Mr Percy Giles was installed as President at the Convention in East London. After the official function one of the visiting engineer delegates (who shall be nameless) climbed on to the well known equestrian statue in front of the City Hall. Unfortunately for him, he was unable to get off and the Fire Brigade had to be summoned.

The fireman was not amused and only after protracted negotiation was he persuaded not to report the incident to Percy Giles!

A good deal more persuasion was required to prevent the local press photographer for taking the incriminating picture!

The friends and colleagues of Terence Marsh assembled here today are aware of what the AMEU has meant to him throughout his career in the electrical industry in South Africa – and what he has meant to the AMEU.

In the diverse and complex relationships formed along the way of a man's pilgrimage, it is surely the strong bonds of friendship which, to borrow the words of Bernard Berenson, are "life-enhancing".

Because of his capacity for friendship Terence Marsh in his own way has been "life-enhancing" for the AMEU.

Mr President it is singularly fitting that after 30 unbroken years since that other Convention of which I have spoken we are assembled again in this great city with the added privilege of doing him honour.

Mr President, ladies and gentlemen, it is for me a very special pleasure to propose formally that Honorary Membership of The Association of Municipal Electricity Undertakings be conferred this day on Mr Terence Marsh.

Mr Marsh thanked Mr Robson, proposer and Mr Palsler, seconder and the Executive Council for the honour bestowed upon him. He further thanked his wife and his colleagues.



*Mr. Terence Marsh receiving honorary membership  
from Mr. Wessel Barnard, President*



## MNR EUGENE PRETORIUS - POTCHEFSTROOM

Meneer die President, in die VMEO se Grondwet word 'n Erelid omskryf as 'n persoon wat hom ONDERSKEI het en aan wie die Verenging - (dit is die VMEO) - eer wil betoon vir VOORTREFLIKE dienste - (ek onderstreep).

So is daar oor die jare heelwat persone vereer met VMEO-erelidmaatskap. Van hierdie persone is daar tans nog 28 in die lewe waarvan 15 oud-Presidente van die VMEO.

Oor die jare het dit tradisie geword dat oud-Presidente erelidmaatskap toegeken word wanneer hulle aan die einde van hulle loopbaan kom. Mnr J.K. (Jules) von Ahlfen sou beslis ook iewers in die toekoms dienoreenkomsig vereer gewees het. Die Uitvoerende Raad het egter gevoel dat 'n heel **BESONDERE** erelidmaatskap aan hom toegeken word deur aan te beveel dat hy erelid word terwyl hy nog vas staan in die diens van 'n munisipale elektrisiteitsonderneming met nog geen gedagte van uitrede nie. (Later vandeemaand word hy maar 60).

As daar een persoon is wat by uitstek aan die vereistes vir erelidmaatskap voldoen dan is dit Jules von Ahlfen. Hy is die produk van die Universiteit van Stellenbosch waar hy in 1947 die B.Sc. Ing-grad in Elektrotegniese Ingenieurswese verwerf het. Hy sal dan ook die eerste oud-Matie wees om erelid van die VMEO te word wat vir ons vandag hier teenwoordige wat oud-Maties is 'n groot gebeurtenis is.

Hy het hom in 1957 vir die eerste keer begewe op die terrein van 'n munisipale elektrisiteitsonderneming toe hy die Elektrotegniese Stadsingenieur van Sasolburg geword het, 'n pos wat hy beklee het tot 1964 toe hy die Elektrotegniese en Meganiiese Stadsingenieur van Springs geword het en sedertdien nog steeds is.

In 1959 word hy ingenieurlid van die VMEO en woon ook toe sy eerste konvensie by. So gou as 1964 word hy verkies tot lid van die uitvoerende Raad van die VMEO en is sedertdien onafgebreke lid, wat sekere 'n rekord in die geskiedenis van die VMEO is - amper twintig jaar. In 1971 word hy President van die VMEO - die eerste oud-Matie - en moet onder baie moeilike omstandighede sy konvensie in Kaapstad hou desnieteenstaande met vlieënde vaandels. Hy was President tot en met die 1973-konvensie.

Afgesien van tientalle welderdae en waardevolle bydraes tot die verrigtinge van die VMEO het hy in 1961, tydens die Livingstone-konvensie, 'n uitmuntende referaat gelewer oor 'n toe nog iets wat duister onderwerp n. Lasbeheer.

Nog 'n besondere onderskeiding het hom te beurt geval toe hy in 1979 President van die SA Nasionale Komitee vir Verligting geword het en as sodanig SA Afvaardiging na die CIE-wêreldkongres in Japan in dieselfde jaar gelei het.

Hy het die VMEO al op nie minder nie as vier oorsese kongresse, jaarvergaderings en studietoere - in Europa en Engeland - verteenwoordig, die jongste die kongres van die CIE, die internasionale verligtingskommissie, en wel in Augustus vanjaar in Amsterdam.

Mnr Von Ahlfen geniet ook al etlike jare professionele ingenieurstatus.

Wat voortreflike dienste betref, kan daar, wat Jules von Ahlfen betref, ure lank daaroor uitgewy word. Hy sloef hom behoortlik af vir die VMEO-saak, waar hy die tyd vind om al die VMEO-werk te doen, weet hy alleen. Hy dien op verskeie komitees van die VMEO se Uitvoerende Raad, baie daarvan as sameroeper, en op tientalle tegniese komitees van die SABS as VMEO-vertegenwoordiger; ook, as VMEO-vertegenwoordiger, op 'n paar statutêre liggame. Aan hom is te danke die goeie, gesonde verhouding wat daar bestaan tussen die VMEO en die staatsdepartemente waarmee ons heelwat te doen het. In hierdie verband dink ek veral aan die Departement van Mannekrag.

Meneer die President, dit is vir my, as 'n groot en jarelange vriend van Jules en Doris, wat ek so graag vandag hier sou wou gesien het, 'n groot voorreg en eer om, namens die Uitvoerende Raad van die VMEO, voor te stel dat die erelidmaatskap van die VMEO aan mnr Julius Karl von Ahlfen toegeken word.

Mnr Von Ahlfen het mnr Pretorius en die Uitvoerende Raad bedank vir die toekening.

## VENUES OF MEETING : PLEKKE VAN VERGADERINGS

Rid Prof R.G. Kriel het namens die Stadsraad van Bloemfontein die VMEO uitgenooi om die 10de Tegniese Vergadering in Bloemfontein te hou in 1984.

Clr D. Taljaard of Benoni invited the AMEU to hold the 49th Convention in 1985 in Benoni.



*Mnr. Jules von Ahlfen ontvang sy erelidmaatskapsertifikaat van mnr. Wessel Barnard, President*

## ELECTION OF EXECUTIVE COUNCIL VERKIESING VAN UITVOERENDE RAAD

The following engineers were elected to serve on the Executive Council:

J.D. Dawson  
K.J. Murphy  
D.C. Palsler  
M.P.P. Clarke  
A.H.L. Fortmann  
G.J. Nortje  
E.G. Davies  
N.S. Botha

Uitenhage  
Somerset West  
Cape Town  
Randburg  
Boksburg  
Germiston  
Pietermaritzburg  
Bloemfontein

The following Past Presidents and still engineer members were co-opted to serve on the Executive Council:

P.J. Botes  
D.H. Fraser  
E. de C. Pretorius  
K.G. Robson  
J.K. von Ahlfen

Roodepoot  
Durban  
Potchefstroom  
East London  
Springs

The councillor representatives of the respective undertakings as represented by the engineer members will also serve on the Executive Council.



### EXECUTIVE COUNCIL 1983/1985 UITVOERENDE RAAD

#### FIRST ROW/EERSTE RY:

*Denis Fraser, Rld. Danie Tafjaard, Jan Loubser (President Elect/Aangewese President), Wessel Barnard (President), Raadsheer Carel Venter, Bennie van der Walt (Secretary/Sekretaris), Jules von Ahlfen.*

#### SECOND ROW/TWEEDE RY:

*Rld. J.B. Coñradie, Max Clarke, Gordon Davies, Dennis Palsler, Alwin Fortmann, John Dawson, Clr. L. Phillips.*

#### THIRD ROW/DERDE RY:

*Nico Botha, Gawie Nortje, Clr. Frand v.d. Velde, Ken Murphy, Piet Botes, Clr. Dave Trelevan.*

#### FOURTH ROW/VIERDE RY:

*Rld. Theo Buys, Ken Robson, Eugene Pretorius, Rld. J.C. Burger, Rld. Ben Steyn.*

## KEYNOTE ADDRESS : HOOFREDE

### MR W. BARNARD - PRESIDENT

Sir Austin Bunch has been associated with the electricity supply industry for some 34 years.

His services thus date practically from the beginning of the nationalisation of the industry in Britain which took place a few years after the conclusion of World War II. His involvement therefore started at a time when a uniform approach of policy and procedure was evolving in what had previously been a fragmented industry. This included the solving of such problems as the standardisation of frequency, voltages, tariffs and the electrical equipment used.

Sir Austin served with the Southern Area Board and subsequently with the Electrical Council which was formed in 1957. The Council had a consultative capacity in its relationship to the Area Boards, particularly with regard to the Boards investment programme and the evolving of bulk supply and retail tariff structures.

Sir Austin retired as Chairman of the Electricity Council on 31 March 1983. During the period that he occupied this position he was regarded as the main Policy Advisor for the Electrical Industry to the British Secretary of State for Energy. The invaluable services which he rendered to the industry and his country were recognised by his being awarded a knighthood in the latest New Year's Honours list.

In South Africa we appear to be on the brink of a new era of organizational development in the electricity supply industry. We are thus extremely fortunate to have with us today the person best qualified to outline how the British Electrical Supply Industry has developed structurally, what some of their mistakes, setbacks and triumphs have been and how they have evolved to what I believe is today an industry on a very sound footing.

It is therefore with much pleasure that I introduce to you Sir Austin Bunch.



Sir Austin Bunch

## “THE ESTABLISHMENT OF THE NATIONALISED ELECTRICITY SUPPLY INDUSTRY IN GREAT BRITAIN”

by Sir Austin Bunch, CBE

### INTRODUCTION

On 1 April 1948 the 560 electricity supply undertakings in Great Britain, excluding the North of Scotland district, were nationalised under the Electricity Act, 1947. They were made up of 355 municipal undertakings, 195 company undertakings and ten public authorities, namely - the Central Electricity Board, three Joint Electricity Authorities (representative of municipalities and companies) and six Joint Boards (representative of municipalities).

They were merged into 15 statutory bodies - a Central Authority and 14 Area Electricity Boards. The national transmission grid owned by the Central Electricity Board, and 297 power stations vested in the British Electricity Authority, and the distribution systems of 540 electricity undertakings vested in the Area Boards. Of the latter some 200 together accounted for only two per cent of total unit sales and less than 40 accounted for more than half of sales.

### THE BALANCE SHEET OF NATIONALISATION

The national cost of acquiring the supply industry by the nation was £550 million. On the assets side this represented £406 million of written-down fixed assets, £44 million of investments, and £60 million of net current assets, and a balancing item of £40 million to cover assets discarded and intangibles. The takeover was financed by £334 million of compensation stock paid to the holders of securities issued by the company undertakings. It comprised mainly British Electricity 3% stock 1968/73 which was issued at par on 1 April 1948 and carried the Treasury's guarantee. The total compensation due to the municipalities in respect of their nationalised electricity undertakings amounted to £193 million to cover outstanding loans and overdrafts. Payments were made periodically to satisfy the interest and redemption on outstanding loans. In addition, £23 million was needed to cover the outstanding loans of other public authority undertakings, mainly in respect of the Central Electricity Board.

### THE MUNICIPAL UNDERTAKINGS

From the outset the electricity supply industry in Great Britain showed

an emphasis on local municipal control. Since the middle of the 19th Century the municipalities had become involved in utility operations such as water, gas, sewerage and public transport and public opinion accepted this - in fact municipal ownership had often been adopted to correct mismanagement on the part of private companies.

The first Act which set the pattern for the development of electricity supply was the Electric Lighting Act, 1882, which authorised the Board of Trade to grant seven-year licenses, or Provisional Orders requiring a Confirmatory Act of Parliament, for the establishment of an electricity undertaking by a municipality or company. A company license had to be approved by a municipality, and a municipality had the right to purchase after 21 years a company undertaking set up in its area of jurisdiction. The Act prohibited the amalgamation of undertakings. It enabled intending suppliers to regularise local monopoly powers without going to the trouble and expense of promoting a Private Bill\*, while providing safeguards against the dangers of private enterprise building up strong monopolies.

\* A Bill for conferring or benefits on any person or body of persons, as distinct from public general legislation applicable to the general community.

The legislation was unsuccessful because both municipalities and companies were discouraged by the speculative and experimental nature of the early public supply systems, and some investors were concerned at the compulsory purchase feature. An Act of 1888 extended the company franchise period to 42 years.

By about 1880 technical problems were being overcome and a more reliable supply could be provided; and so the rate of electricity development accelerated. While the efficiency of municipal undertakings varied a good deal, those supplying the large towns were usually competent and go-ahead. At that time they were well placed to provide a supply; the area covered was small, they were able to use the security of local taxation to raise capital, and various problems such as digging up streets and the abuse of monopoly power had been tackled by Government legislation which, itself, was of a pioneering nature since it provided the

earliest experimentation in the regulation of public utilities.

Thus while the companies had put in the first pioneering installations, it was now the municipalities which led the way in expanding investment. By the turn of the century over two-thirds of connections to the mains had been provided by them, and often they bought out the early successful company undertakings. Favoured by legislation, there was also the enthusiasm of some Victorians for municipal enterprise based on provincial pride.

Technical developments in generation and transmission were now enlarging the optimal area of electricity supply, but the Government were unable to respond with a satisfactory method of organisation.

#### BULK TRANSMISSION - THE POWER COMPANIES

When bulk transmission became a practical possibility, Private Bills were introduced by entrepreneurs for the establishment of power companies, free from reversionary purchase by municipalities. Recommendations on the kind of powers they should exercise had been made by a Joint Select Committee in 1898, but they were not ratified by legislation until 1909 because of opposition from the municipalities. Another feature of the time was the emergence of large financial interests which avoided the ban on the amalgamation of undertakings by setting up holding companies.

The 1909 Act authorised the formation of joint boards of municipalities to provide more economic working units and, although further encouraged by legislation in 1922, only six boards, involving a handful of municipalities, were ever established.

The advent of the power companies with power to supply over an area including districts of numerous municipalities posed organisational issues that were not satisfied by the Act, mainly because opposition from municipalities resulted in compromise legislation.

#### WAR-TIME DEVELOPMENTS

The first World War was a forcing period in the development of electrical technology and it soon became clear that the interconnection of power stations and the joint operation by undertakings were essential for an efficient supply industry. Britain was not benefiting from the achievements in original research and development of its great electrical pioneers.

The organisational problems were considered by various high level Government committees in 1916 and 1917 and the consensus view was that the ownership and control of generation, transmission and bulk supplies should be centralised. In 1919 a Committee, made up of the Chairmen of the war-time committees, concluded that generation and transmission should be a single unified system with state regulation and finance, anticipating the structure that was to be set out under the Electricity Act of 1947.

The proposed solution was too far-reaching at that time for general acceptance and when a Bill to reorganise the industry was introduced in Parliament it met bitter opposition. As a result the Electricity (Supply) Act of 1919 was merely enabling legislation without powers to reorganise on a national scale. It introduced central co-ordination through a body known as the Electricity Commission who were responsible for "promoting, regulating and supervising the supply of electricity". The Commission divided the country into 15 electricity districts, called Joint Electricity Authorities, to take over the powers of authorised undertakers within their areas, but they were able to establish only three by the time of nationalisation 28 years later.

The Commission inherited powers from previous sponsoring Ministers and could sanction loans made by municipalities for electricity purposes and provide for the proper auditing of their electricity accounts. They could refuse permission for uneconomic generating plant extensions, and encourage the interconnection of bulk supplies and the standardisation of frequencies. They also supervised the financing of the JEAs.

It was not an easy matter to persuade undertakings to centralise the control of their power stations in support of a JEA and the Commission were involved in interminable rounds of public enquiries and negotiations between undertakers, and little progress was made. By the mid 1920's less than 10 per cent of electricity sales were obtained from bulk supplies and the flow from the company sector to the municipalities was less than two per cent of total generation, whereas with fully economic operation this figure should have been about 16 per cent.

#### THE NATIONAL GRID

The tide of opinion in favour of fundamental reform was strengthened by a realisation of the political and economic significance of an electricity supply industry ripe for innovation, particularly in the standardisation of frequencies at a time when 17 different frequencies were a national liability. Mid-way through the 1920s there was a general awareness in Parliament of the pressing need for a reorganisation and for some ambitious measure. Government attitudes had moved strongly away from the less interventionist line which Parliament had forced on them in 1919. Stanley Baldwin asked the industrialist Lord Weir to chair a com-

mittee to investigate the national problem of electrical energy, and he agreed, provided that it was "small, private, speedy and to the point". His two members included the Chairman of the Committee whose recommendations had led to the formation of the Electricity Commission, and they appointed as their technical adviser the Chairman of the Electricity Commission, Sir John Snell. Weir warned Baldwin that he would be presenting a new electrical energy policy involving in its application courage and a considerable financial investment. The "Three Wise Men" began work in January 1925 and produced a technical and economic elaboration of all the familiar ideas that had been mooted by the best of the industry's managers. On the thorny questions of how to provide interconnected transmission without nationalisation and how to transfer assets from existing undertakings to a new authority they were able to provide an admirable solution. Existing undertakers would retain control of distribution and operation of power stations and a new state-financed body, the Central Electricity Board, would co-ordinate new power station planning and control the bulk of power stations operation within the framework of a national Grid of high voltage transmission lines which they would build. The CEB would buy electricity from the most efficient stations and re-sell it to undertakings wholesale at cost price after allowing for Grid costs. Undertakings would be prompted by the obvious benefits of cheap electricity to take their supplies from the CEB. The Report was signed on 14 May 1925 but publication was delayed because, as a reappraisal of the role of the state in electricity supply, it was politically explosive. An Electrical Development Committee set up by the Cabinet to consider the necessary legislation accepted the main proposals. A Bill was introduced into Parliament on 10 March 1926 and the Weir Report was published two days later.

The municipalities opposed the Bill as "costly, unworkable and cumbersome". The companies thought it presented "all the bad features of nationalisation". The power companies claimed that they were already achieving cost reductions through voluntary interconnection and that the Bill was bureaucratic and unnecessary and would impose unworkable dual control of stations. Not all private-enterprise supporters of the Conservative Party opposed the scheme. Electrical manufacturers supported it because it seemed to foreshadow more rapid electrical development. Industrialists generally wanted cheap electricity and were aware of the supply industry's clear failure to make progress by voluntary means. The Bill's passage through Parliament was not easy and a core of Conservative backbenchers prolonged the Committee stage from 7 April to 22 July, with amendments aimed at emasculating the CEB in the same way as the Electricity Commission had been emasculated seven years earlier. However, the Government successfully presented the obvious technical advantages of interconnection, and public opinion and the popular press looked forward to cheap electricity. When the Bill received the Royal Assent on 15 December 1926, all the essentials of Weir's proposals had been preserved.

The new Central Electricity Board not only provided an elegant solution to the problem of co-ordinating generation and interconnection, but it was also an experimental public corporation (as indeed were its contemporaries the British Broadcasting Corporation and the London Passenger Transport Board) that was to play an important part in the evolution of the British public corporation. While as an authorised electricity undertaking it had no powers to make regulations of the kind made by a Government Department, it still had a great deal of independence - what was to become known as an arm's length relationship with Government. It was not subject to direct Treasury control on finance and staffing and, although it was entitled to Treasury Guarantee for the capital it raised, it never needed this kind of support. Its members were appointed for terms of five or ten years and a Minister could only dismiss them if they absented themselves from their duties for six months or more. At that time Ministers considered that they were not competent to interfere in the details of industrial affairs and so should not have the power of dismissal. Within a few years the tradition became established that a Minister only rarely intervened in the affairs of the CEB and only then on matters strictly specified by Statute. One Minister of Transport defined the relationship as "... we should give these Boards something approximating to the business latitude which is allowed to ordinary Boards in conducting private business". The CEB were determined to maintain an attitude of independence from Government. In their financial dealings they were not only free from Ministerial control, but even freer than the directors of quoted companies from control by the shareholders, since the CEB's capital was in the form of non-voting, fixed interest securities. Thus the Government left the CEB very much to their own devices, being content for them to operate within the framework of the 1926 Act.

By 1934 the Grid system, which operated at 132 kV, was serving most parts of Great Britain and showing substantial economies in the capital and operating costs of generation. Between 1930 and 1938 the proportion of spare generating plant was reduced from over 80 per cent to about 15 per cent and the resulting capital savings amounted to 75 per cent of the cost of building the Grid. Generation costs fell by 24 per cent in real terms.



## DISTRIBUTION

Weir's proposals were well conceived and succeeded in reducing the wholesale price of electricity and in making it available over wide areas of the country. By the 1930's there were over 600 undertakings entirely responsible for the development of distribution. They had seized upon the technical and marketing opportunities of the late 1920's and 1930's and Britain was no longer so electrically backward in world terms. The municipal undertakings dominated the urban areas outside London, and the companies covered London and the less densely populated areas.

## COMPANY & MUNICIPAL SUPPLY AREAS 1939

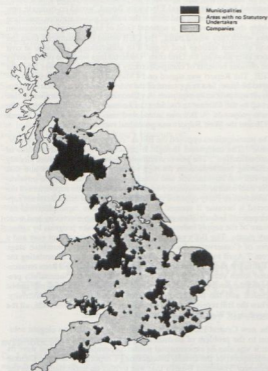


FIGURE 1

About half of capital expenditure was self-financed, and the remainder was easily raised because of the attractive investment status of the industry.

In this inter-war period the municipal undertakings maintained their market share of sales at two-thirds, and by 1939 their electricity departments accounted for 41 per cent of total municipal trading receipts. The large towns could make their own fixed-interest debt issues to finance capital requirements, and all municipalities could borrow from the Public Works Loans Board. The Electricity Commissioners supervised this borrowing and prescribed rather conservative depreciation rates. Depreciation and stock-redemption funds provided a source of self-financing and, in addition, many municipalities were able to finance some of their capital expenditure out of current revenue even after making substantial contributions to reserves. In some cases they were able to use their flow of funds to redeem a large proportion of their issued capital well before the assets financed by this capital had become time-expired, although such operations required that electricity was sold at prices higher than historic average cost. However, most municipalities preferred to keep down prices and borrow externally, which presented no problem as they could float their issues at little more than gilt-edged rates.

Some municipalities plundered their prosperous electricity undertakings in order to subsidise their spending schemes or relieve local taxation. An Act of 1899 limited the amount that could be contributed to the relief of local taxation and this was redefined in the 1926 Act as one-and-a-half per cent on outstanding debt and restricted to undertakings whose reserve funds exceeded five per cent of aggregate expenditure. The legislation provided a limit on the maximum prices that could be

charged, but these were much too high to be credible, having been set in the early stage of electrical development. The overriding consideration was the politicians' own interest to keep electricity prices down because, with the spread of domestic electrification, the interest of consumers and voters coincided.

The municipalities led the companies in cutting electricity prices, charging domestic consumers some 25 per cent less on average than the companies. There may have been some cross-subsidisation by small industrial and commercial consumers who did not have the voting powers of the domestic consumer, and who could not generate privately like large industry. Moreover the companies served more difficult areas and had higher distribution costs per customer. The companies also had to pay a slightly higher fixed-interest on their bonds and higher dividends on preference and ordinary capital in order to raise capital. Many were in holding companies in order to benefit from the economies of large-scale financing operations.

By the late 1920's, the Electricity Commissioners had become concerned that some small companies were delaying price reductions and not developing their areas of supply as rapidly as desirable, being content with high profit margins on small outputs. Because price control was ineffective the companies were allowed to price as they wished, being subject only to public opinion and the elasticity of demand. Extremely high rates of return were being achieved by the holding companies, which were now an important part of the company sector, by exploiting their subsidiaries.

The Electricity Commissioners tried to encourage undertakers to extend their networks into neighbouring areas rather than to expand by means of setting up new undertakings, but the municipalities, in particular, were reluctant to do so. There was a proliferation of new undertakings, some 126 being added between 1921 and 1932. Moreover, by the 1930's and early 1940's a large number of company franchises were due to expire and were liable to be acquired by municipalities. This exercise of purchase rights would have led to even further fragmentation of the industry because many companies supplied more than one municipal area. An especially serious possibility was that urban areas might be cut off from rural surroundings. On top of all this, municipal boundary changes in 1929 increased the number of municipalities with purchase rights. This threat of purchase inhibited the development of large undertakings capable of achieving the benefits of economies of scale and the kind of technical integration that development in distribution technology made desirable. It also inhibited commercial development because no company was likely to adopt a vigorous sales policy requiring new investment in the system if there were no prospects of rewards in years to come.

The Electricity Commissioners, therefore, were concerned about the inefficiency of the distribution systems, and actively campaigned to encourage the undertakers to be progressive in rural electrification and load building through appliance sales and promotional tariffs.

The Labour Government in 1929, with Herbert Morrison as Minister of Transport, had given a clear indication that distribution reorganisation would be welcome. Morrison set up a Departmental Committee to look into the problem. It reported in March 1931 that all existing undertakers should be acquired and reorganised into regional publicly-owned distribution boards, or, alternatively, there might be reorganisation around the existing large undertakings, involving the takeover of some local authorities by power companies and vice versa. Morrison recommended the public board option to the Cabinet in July 1931, but the minority Labour Government collapsed the next month and the proposals remained confidential and unpublished.

In September 1932 the Electricity Commissioners called together 14 highly respected men in the largest municipal and company undertakings to a secret conference on re-organisation. Despite their varied backgrounds, they agreed in June 1933 to recommend to the Minister of Transport larger distribution authorities combining rural with urban areas, to be achieved by compulsory mergers. The removal of artificial electricity boundaries would permit distribution networks to be planned and operated more effectively, bringing savings in administrative costs, an improvement in the quality of technical and managerial staff, and a better chance of standardising the system of supply and extending rural electrification. They considered that this could be done by the larger municipalities and companies absorbing the small undertakings, and that only a few areas would need new publicly-owned distribution boards along the lines of the CEB. By October 1933 a draft Bill along these lines had been prepared under which 80 large undertakers would absorb 420 smaller undertakers, leaving many medium-sized undertakers, accounting for half the industry's capital, unaffected. Subsequently the Civil Service reduced the number of condemned undertakings to 320.

Fears of political repercussions on the question of legislative compulsion led to further redrafting that lasted until the summer of 1934. Then a new Minister of Transport delayed the matter further by calling for a further inquiry which he placed under the ICI Chairman, Sir Harry



McGowan. This Committee reported on 8 May 1936, recommending legislation to give compulsory powers for a reorganisation based on the absorption by the larger and more efficient undertakings of the smaller and less efficient ones. Whereas they considered that there were inadequate grounds for immediate regional reorganisation under public control, they suggested that provision should be made for the possibility of ultimate public ownership of all undertakings. After months of discussion on the problems of legislation, the Government published a White Paper in June 1937. It proposed 123 new grouped authorities of which only 28 would be company owned. Negotiations with individual undertakings became bogged down by fundamental disagreement and blocking tactics. The Government were not keen to provide Parliamentary time for this contentious issue; in July 1938, they shelved the reorganisation indefinitely. The purchase rights of municipalities that were due to mature were suspended for the duration of the War.

Herbert Morrison had long been convinced that the correct solution was full public ownership by regional distribution boards. He produced a policy paper in 1932 which suggested the establishment of a National Electric Board with regional boards controlling large distribution areas under its central direction, and a national consultative committee on which both municipalities and consumers would be represented. The Labour Party went into the 1935 Election with the intention of implementing this policy but, in the event, they did not return to power until 1945. They were then committed to a policy of public ownership, with electricity nationalisation given high priority. Their Electricity Act was passed on 13 August, 1947.

#### THE NATIONALISED INDUSTRY

The Minister of Fuel and Power appointed an Organising Committee in May 1947, and the appointed day for takeover was 1 April 1948.

I joined the industry on 1 January 1949 at quite a senior level, and have been a senior Manager ever since. I have experience at these levels of what actually happened – and had close personal contact with politicians from 1976 to 1983.

The Act laid down that there should be a Central Authority responsible for the general policy and financial control of the whole industry, and for co-ordinating distribution, and which would also have direct responsibility for generation and high voltage transmission of electricity to fourteen separate statutory Distribution Boards.

The fact that generation and transmission involved the day-to-day operation of a complex system of stations and high voltage transmission lines, clearly called for decentralisation and operation on a regional plan of some kind. Accordingly the Committee decided that the management should be decentralised to fourteen Generation Divisions with boundaries approximately the same as those set by statute for the Distribution Boards.

The Committee also drew up a general outline of organisation for consideration by the Area Boards when they were appointed and also preliminary reports on the immediate problems to be faced during the transfer period, so that the Authority and the Area Boards could get down to early consideration of their policy and procedure as soon as they were set up.

Provisional appointments to the chief executive and senior key posts were quickly made and early action was concentrated on ensuring that the industry would continue 'business as usual' to allow a gradual absorption of personnel in the industry into the new form of organisation.

In many instances this meant that staff of similar grades would be working under different categories and conditions of employment. This clearly would be a matter of real difficulty if it were allowed to continue longer than necessary. One of the first functions of the Authority, therefore, was to set up negotiating machinery with the trades unions and recognised staff associations, based to a considerable extent on pre-existing arrangements.

One of the most troublesome problems arose from the fact that the municipalities had a variety of ways of administering their undertakings. A great number of them were separate entities only in so far as the technical operation of the undertaking was concerned, and most of the administrative work was carried out by the central departments of the municipality as a common service to electricity as well as of its other departments. In these cases there were some difficult problems to be faced in sorting out both personnel and assets as between the municipality and the supply industry, and again as between the distribution and generation sides within the industry. To enable the electricity service to continue without interruption local 'servicing agreements' were therefore drawn up with these municipalities, to authorise their staffs to continue the functions which they had carried out prior to the Vesting Date, pending some longer term arrangements for the Board or Division to take over full responsibility for the work involved. The majority of these agreements were negotiated, operated and closed locally, and only those which brought to light unusual difficulties were reported for central action.

Another problem which had to be solved before the vesting date, was

that of the banking and financial arrangements to be made. The banking arrangements were of equal concern to the banks themselves who wished to ensure that the spread of business over the banks throughout the country remained proportionately the same as before Vesting Date. The solution developed by the Authority and the Bankers' Executive Committee was both unique and practical and is still in operation to this day. The Main Account for each Distribution Area and Generation Division was interlinked with that of the Central Authority and agreement was reached on maximum and minimum balances to be maintained by an automatic daily flow of money to or from the centre. This procedure not only secured the maximum economy in the use of moneys but also enabled the financial needs of all Boards to be met by the Central Authority stock issues and by temporary borrowings by the Central Authority alone; it also enabled adjustment of payments between the Authority and Area Boards to be made by book transfers.

In the wider financial field, however, the problem which the accountants had to face were some of the most difficult, and stemmed from the great variety of local practices in keeping accounts and recording statistics. The main problem to be solved concerned the introduction of a uniform system of accounting from which the consolidated accounts necessary to show the overall trading position could be drawn up. The basis of valuation of transferred assets and liabilities and the question of depreciation allowances were only two of the many aspects of this problem. The provision of funds for activities that the local authorities continued to carry out for an interim period, involving the payment of wages, meter reading and collection of accounts, also had to be dealt with.

It was realised from the first that many of the potential differences during this period could be considerably lessened if action on common problems could be co-ordinated. The simplest means of achieving this was for those responsible to get together at frequent intervals. In this way a system of Chief Officers' Conferences came into being which has proved of the greatest value in securing a unified approach and, at the same time, in bringing into consultation the greatest possible range of experience in solving the more difficult problems.

#### THE CENTRAL AUTHORITY

The British Electricity Authority set up on 14 August, 1947 comprised a Chairman, two Deputy Chairmen, one in charge of operations and the other in charge of general administrative functions, and a Member responsible for labour relations and welfare. There were also three part-time Members and four of the fourteen Area Board Chairmen on a two-year rotation. Below them the organisation was spread over five main departments under a Chief Engineer, Secretary, Commercial Manager, Chief Accountant, and Legal Adviser. Other departments were Welfare and Labour Relations, Revenue Purchasing and Economics. Each Department Head was responsible for the functional policy of his department, subject to approval by the Authority, and for dissemination of policy to the Divisions and liaison with Area Boards. The Secretary looked after the co-ordination of general policy, personnel management, office services and estates management. Because plant purchase was now concentrated and the financial advantages of centralised negotiation could be secured, a Chief Contracts Officer was later appointed.

The BEA's Standing Committees and top Conferences embraced all aspects and functions for which the industry was responsible, with membership drawn from the BEA and Area Board Members.

Co-ordination through the industry at top level was achieved mainly through a Conference of Area Board Chairmen and parallel conferences of those in charge of the Generation Divisions.

#### GENERATION AND MAIN TRANSMISSION

Each of the 14 Divisions was in the charge of a Divisional Controller with, broadly, departments corresponding to those at the Authority's Headquarters, and functional lines of reference between them. In general, a system of grouping stations under a Group Headquarters was adopted for convenience of administration. The old CEB's method of Grid control was continued under seven Grid Control Areas.

#### DISTRIBUTION – THE AREA BOARD ORGANISATION

The Headquarters of each of the 14 Area Boards were organised on much the same lines as the Central Authority, but each Board had only two full-time Members. Sub-Areas, normally five or six in each Area, were set up under Sub-Area Managers, large enough for economic administration and sufficiently manageable for each Manager and his Senior Officers to be in close personal touch with all grades of their Headquarters and outstationed staff.

Each Sub-Area consisted of a number of Districts whose main function was to service the consumer through showrooms and servicing arrangements.

There was no strict control of the forms of organisations developed within these general patterns. It was realised that what might prove to be the most efficient organisation in one locality might not be suitable

## AREA BOARD & DIVISIONAL BOUNDARIES



FIGURE 2

elsewhere for a variety of local and technical reasons. What is more the top men embraced a wide variety of experience and individual initiative.

In my own Board, Southern Electricity, 48 undertakings were absorbed into four sub-areas and they were soon reduced to 38 Districts by amalgamations, and after a year further reduced to 23 Districts. Today there are only 13 Districts.

I was an accountant in the Southall Sub-Area which absorbed four municipal undertakings, five company undertakings and the part of another company and the electricity departments of two composite companies that supplied both gas and electricity. The Sub-area was divided into nine districts, reduced to seven in 1949, and there are only three Districts today.

The last part of the organisation of the industry set up by the 1947 Act was outside the scope of the Central Authority and Area Boards. It related to consultative consumer councils set up by the Minister in the area of each distribution Board, designed to give the consumer a voice in the arrangement made for his supply. These councils functioned separately from the Boards, except that each Council Chairman was a Part-time Member of his Area Board.

### THE AUTONOMY OF THE BOARDS

The country was therefore divided into fourteen statutory and largely autonomous distribution boards. In the early days of nationalisation, the specific responsibility of the Central Authority for deciding general policy was viewed with some suspicion by the Area Boards, who wanted no restrictions on their local autonomy. But experience showed that the central co-ordination was essential for the smooth running of the industry. Although policy matters were settled at monthly conferences between the Authority and the Area Board Chairmen the decisions taken did not commit an Area Board, and occasionally one or more took an independent standpoint. In these cases the Full-time Members of the Authority took infinite pains to obtain voluntary acceptance of central guidance, being reluctant to use its powers of direction. These powers of enforcement were only used on rare occasions in order to help gain acceptance of unpopular measures such as tariff increases, and only then with the agreement of the Area Board Chairmen.

The co-ordination of distribution included such problems as standardisation of frequency and voltage and the simplification of retail tariffs,

and these were looked at by Joint Committees which progressed them through a series of compromise solutions.

### THE INITIAL THREE-TIER STRUCTURE

The three-tiered organisation adopted was intended to ensure the greatest possible co-ordination of effort and understanding between an Area Board Headquarters and the smallest outposted operational unit, of which there were many. Without the intermediate level the physical distance between these districts and the seat of direction would have made effective management and personal control difficult at that time.

Also the conditions governing the distribution of electricity made the introduction of a second tier in the organisation, the Sub-Area structure, a virtual necessity as a starting basis, pending working experience over a period of years. Thus in general terms, Headquarters dealt with policy direction, planning and co-ordination; the middle tier, with interpretation of policy, general administration and co-ordination; and the bottom tier with operations and services to the consumer. In practice there was a good deal of variation, with a densely populated Board, such as London, having different requirements from a Board such as South Wales with its wide rural area and small but highly concentrated industrial zone.

In the case of service to the consumer the fullest decentralisation was an essential condition of good business. Local managers wanted scope to use their initiative while being provided with appropriate backing at Sub-Areas or Headquarters by skilled specialists.

The work at District level covered the personal service to the consumer, the preparation of estimates and quotations, the installation of electrical equipment, the sales of appliances and their servicing, with a varying degree of responsibility for administration and accountancy. There were two types of District. A single-headed District with a District Manager responsible to the Sub-Area Manager for the general administration of his District and the local co-ordination of the engineering and commercial functions under his direction. On the functional side his Commercial Officer and District Engineer carried out the technical instructions issued by their counterparts at Sub-Area Headquarters. There was also, in some places, a double headed organisation with no District Manager and the responsibilities divided appropriately between a District Commercial Officer and District Engineer both with direct access to the Sub-Area Manager, but functionally associated with their counterparts in the Sub-Area organisation.

It was essential that a district should be large enough to warrant a qualified staff with the greatest possible measure of local responsibility with regard to sales, installation and maintenance. At Sub-Area level appropriate work could be centralised, and mechanised office processes adopted that would be uneconomical at district level — work with which the consumer was not directly concerned.

Thus on nationalisation the area boards devolved some functions to about 500 local districts, each of which had 20–25 thousand consumers and covered about 340 km<sup>2</sup>, and initially grouped into an intermediate level of control, with an average of five of these sub-areas in each board. The local organisation varied and some boards restricted the devolution of management to the districts.

### AMALGAMATION AND THE TWO-TIER STRUCTURE

I mentioned earlier, in respect of my own Board, the subsequent merging of Districts, and this has applied generally throughout the country. Over the 35 years of nationalisation distribution development has led naturally to some amalgamation, but the Area Boards have also introduced organisational changes because of technological advances and developments in work method. The introduction of computers meant that much accounting work was done between Districts and Headquarters, by-passing the Sub-area level of management. Appliance marketing in Districts was increasingly controlled directly from Headquarters. There was a growing standardisation of engineering design and equipment, and cost savings could be made by central purchasing and control. With the introduction of work study and incentive payment schemes, Headquarters became much more involved in manpower control. Common services such as stores and equipment deliveries, and vehicle maintenance could be provided more economically when operated on a larger scale, free to cross the administrative boundaries of Sub-Area and District.

As main operating units and 'cost centres' the Districts were now in a key position in a management accounting system, and the reduced workload at Sub-Areas meant that, often, they were no longer viable.

Eight Area Boards, therefore, have eliminated the middle tier of management and between them operate their systems with 56 management units variously designated 'Areas', 'Divisions', or 'Groups'. The four Boards, including my old Board, who have maintained the three-tier Sub-Area/District structure, together have 61 Districts. Thus the 500 electricity supply Districts created on nationalisation have been amalgamated into 117 management units.

Generation and main transmission is now in the charge of five Regions,

instead of 14 Generation Divisions, and headquarters' functions of construction, planning and research have been transferred to three Divisions. These Regions and Divisions are independent cost centres under Directors General. Within a few years technology and economics will restrict generation to some 40 sites and the regional management structure will become inappropriate and will gradually be replaced by a single corporate management.

## THE STANDARDISATION OF TARIFFS

### Retail Tariffs

The new Area Boards inherited several thousand different tariffs on nationalisation and average prices ranged from 7.22 old pence per unit in the case of the Hawes Electric Lighting Co. Ltd. operating in the North Riding of Yorkshire to 0.61 old pence per unit charged by the Port Talbot municipality in South Wales. The Electricity Commissioners had been actively urging the adoption of domestic two-part tariffs since 1927 and 'two-part' or 'block' tariffs were increasingly being adopted in the late 1920s and early 1930s by the larger progressive undertakings to supplement the basic flat-rate lighting tariffs.

The initial fixed charge or block, based on the rateable value or floor area or the number of rooms, was intended as a proxy indicator of maximum demand, and there was a 'low' incremental charge per kWh. The fixed charge would yield at least the amount formerly earned by the lighting flat-rate and was aimed to cover the consumer service costs and some of the capital costs. This meant that the incremental charge per kWh, covering the remaining costs, could be sufficiently low to act as an enticement to increase consumption in more price-elastic ways.

Even so, by nationalisation nearly a third of domestic consumers were still on very high, flat-rate tariffs designed for small users. In 1948 load research found that the proxy indicators were poor pointers to peak demand, but because the number of rooms basis showed some slight correlation with load it was considered to be the best that was available. The British Electricity Authority through their Retail Tariffs Committee accepted this basis as a desirable norm in 1950 and six Boards standardised on it. Other Boards preferred to standardise on the dominant practice in their area - six adopted floor area and two rateable value. The Committee also took the important decision to abolish the differentials that existed in the charges to town and country dwellers when these consumers came within the area of any one Area Board. This decision played a significant part in the success of the rural electrification programme of the late 1950s and early 1960s.

In my Board, we inherited 125 different domestic tariffs on the Vesting Day. By October 1951 these had been replaced by a standard block tariff with the size of the block based on the number of rooms. In practice, however, this standardisation did not proceed without difficulty. Confusion as to what constituted a 'room' led to some local bitterness and there was the additional problem of whether or not to include unwired rooms. These problems were not made any easier by the fact that due to standardisation consumers in some Districts suffered price increases while their neighbours in adjoining Districts were left unaffected.

Tariffs for farms and commercial premises were put on a standard basis in 1953; but for industrial consumers the great variety of tariffs which existed in the pre-vesting undertakings meant that standard tariffs could not be introduced until 1956. The delay was due in part to the problem of devising standard tariffs to cover the full range of industrial consumers. The considerable numbers of small diverse low-load-factor consumers could be dealt with without much difficulty. The problem lay with the very large high-load-factor consumers who accounted for a large part of the Southern Board's income.

While ensuring that the new industrial tariffs adequately reflected costs the Board had to safeguard its revenues and at the same time limit the disturbance to consumers' accounts. An indication of the scale of the problem that existed is shown in the following conclusion to tariff calculation prepared in my Board:

"Small, low-load-factor industrial consumers are required to increase payments by about 35 per cent while large high-load-factor consumers are only required to increase payments by about one per cent."

Inevitably, in situations like this, a compromise was sought which allowed for a phased introduction of the new tariff.

Load research had indicated as early as 1943 that the domestic unit charge component ought to be pitched as low as possible, but unfortunately a 'correct' allocation to the standing charge component of the actual standing costs involved in providing a supply was impracticable with the two-part tariffs in use. Their standing charge component covered little more than the standing costs due to the demand for lighting and small domestic appliances, which was but a small fraction of the total demand of a modern domestic installation. By 1961/62 the average standing charge (or initial block equivalent) was barely sufficient to cover the cost of servicing the account and the capital charges of connection, while making no contribution to power station capacity costs.

By the late 1960s, however, most Area Boards were basing their tariff-

making on a comprehensive programme of load and cost research. This research showed that domestic capacity and runnings costs increased in a uniform manner with consumption and could therefore be recovered through a single kWh rate, leaving the fixed charge of the two-part tariff (or initial block equivalent) to recover just the consumer related costs of supply such as meter reading, billing, administration etc. Domestic prices were gradually raised towards a level more nearly sufficient to cover these costs.

The Area Boards have now adopted a domestic pricing strategy designed to promote general tariff harmonisation. To this end all new domestic unrestricted consumers will be offered just one tariff consisting of a fixed charge and a single unit rate. Obviously these charges will reflect the costs of supply as appropriate to each Board.

### BULK SUPPLY TARIFF

When applying the Grid's bulk supply tariff, the Electricity Commissioners were concerned that charging high electricity prices to cover fully the costs of developing the Grid would impede the growth of demand. They chose, therefore, to fix the tariff for a period of 10 years and to adopt a policy of budgeting for losses in the early years. The Commissioners took the view that the demand for electricity was potentially so great that surpluses in the later years would be sufficient to recoup earlier deficiencies. After Vesting Day the tariff was reviewed annually in order to maintain a closer relationship between revenues and costs; it now determined the price which an Area Board paid the British Electricity Authority for its supplies and represented some 80 per cent of the price to the consumer i.e. of an Area Board's costs.

In 1962/63, major reforms were introduced to the bulk supply tariff. The chargeable demand of an Area Board was based not on its own simultaneous maximum demand, but on its demand at the time of system peak. A day and night differential was introduced into the running charge, with the expressed aim of helping Area Boards to improve night rates to consumers, and in the first year it amounted to about 23 per cent. The differential played a large part in system load factor improvement over the next twenty years - from 48 per cent to 57 per cent.

From 1967/68 the running and capacity charges in the tariff were based on marginal costs, rather than the normal average cost approach adopted in previous years. The tariff contained two capacity charges, one related to the costs incurred in providing the basic capacity of the system, and the other to the costs of providing the plant capacity intended for use during peak periods only. In addition to the existing day and night running rates, a peak period running rate for units supplied during specified short day-time peak periods, about 250 hours per annum, was introduced.

Prompted by the signals contained in the Bulk Supply Tariff, the Area Boards have been active in promoting off-peak tariffs and domestic storage space heating has been successfully developed over the years.

### ENGINEERING STANDARDISATION

It was distribution system engineering that provided the biggest and most general benefits from the nationalisation of electricity supply. Previously the planning of bulk supply points had been considered by complex negotiations between the CEB and the undertakings. Engineers were now able to plan an effective layout for the benefit of the whole system, and distribution networks could be planned without the barriers of the former local undertaking boundaries. At the lower voltage levels the Area Boards inherited an extraordinary range of voltage. In London, for example, there were 17 different DC and 20 different AC voltages. In 1946, the Minister of Fuel and Power accepted the recommendations of the Electricity Commissioners that 240 volts should be adopted as the standard low voltage, but standardisation was not completed until about 1974, by which time nearly three-quarters of a million DC consumers had been changed over to AC, and nearly two-and-a-half million non-standard voltage AC consumers had been converted to 240 volts or thereabouts.

The burden was not spread evenly between the Boards. In the North East, which had inherited a 'Rolls-Royce' system borne of the industry's great engineers Merz, Parsons and Reyrolle, conversion from DC to AC involved only 14,000 consumers, and only 52,000 needed to be converted from non-standard to standard voltage AC. But in London, where a hotch-potch of systems had been absorbed, the corresponding figures were 200,000 and 670,000.

Standardisation of electrical equipment was discussed by the various technical sub-committees of the Chief Engineers' Conference, often joint committees with manufacturers, and over the years a wide range of standards and specifications have been prepared. Today, well over 500 detailed technical documents which reflect experience and provide guidance and practical solutions to the problems the supply industry has experienced over many years, are in existence.

### RURAL ELECTRIFICATION

An early decision was to standardise on a light rural line for extending rural electrification and BS 1320 for voltages up to 11 kV was prepared

in 1946, and adopted by the Area Boards for their rural electrification programmes. Even though the integration provided by the Grid had enabled pioneer undertakings to obtain cheap bulk supplies, and encouraged them to expand into rural areas, and they could obtain low interest loans from the Government for this work during the 1930s, at the time of nationalisation only 30 per cent of farms had been connected.

The Board's statutory obligation to develop rural electrification was emphasised in 1953 when, in response to the Government's request, they agreed to achieve an 85 per cent farm connection over ten years. The target was met eighteen months ahead of schedule, but the overall capital cost was £130 million and the resultant loss on revenue account amounted to about £4 million a year. The price the urban consumers paid in bearing these losses was of the order of two per cent on their bills.

#### REORGANISATION

By the sixth year of nationalisation the politicians had become convinced that the organisation of the British Electricity Authority was fundamentally wrong and in 1955, more as a political gesture to Scotland, introduced some decentralisation by giving off the BEA's South of Scotland assets to a new South of Scotland Electricity Board. The BEA then became the Central Electricity Authority. The Minister announced in 1954 the establishment of a Departmental Committee to enquire into the organisation and efficiency of the electricity supply industry in England and Wales. It was chaired by Sir Edwin Herbert, a leading lawyer and company director, and other members also came from a private enterprise background. Their report, published in 1956, disapproved of BEA's management style, preferring a more vigorous commercial outlook. They criticised overcentralisation and the large number of committees, and felt that the whole enterprise had been less profitable than it might have been with a more efficient and decentralised management. The Committee triggered off the beginning of a strong shift of opinion away from the concept of nationalised industries as a public service, towards the view that they best promoted the public interest by commercial behaviour. This was probably the most significant contribution of the Committee, although at the heart of their report were the proposals for reorganisation. Area Boards should, they felt, be more genuinely independent. They wanted the executive functions of generation and transmission to be hived off to a Central Electricity Generating Board, leaving the Central Authority to deal with labour relations and a number of supervisory functions. This new small central authority would be able to issue directives with the Minister's approval in order to achieve co-ordination, but much more power would reside in the periphery and operating groups than had been the case in the centralised BEA.

A new Minister was appointed in December 1955 who, with his civil servants, was anxious to try his hand at close direct scrutiny of the industry's capital programmes with only a relatively weak central authority interposed between him and the Boards. The generating board, by contrast, was to be strong enough to push through the increasingly important nuclear power programme.

The Government White Paper, "Proposals for the Reorganisation of the Electricity Supply Industry", published in 1956, stated that the vesting of all the functions proposed by Herbert in a new central authority would confer on that body great power over the industry with little corresponding responsibility. If the individual Boards were to bear ultimate responsibility for their own well-being then co-ordination between them could best be achieved not through a Central Authority with powers of direction and control, but through a new body in which both the generation and distribution sides of the industry could resolve their common problems under independent guidance. Its function would be to promote and assist the efficient operation of the Boards as part of the co-ordinated system, and to act as agents for the performance of such services as were best performed in common, and to advise the Minister on questions affecting the industry. Although each Board would be ultimately responsible for its capital programme placed before the Minister, it would first submit its plans to the new central body.

#### ELECTRICITY ACT, 1957

These proposals were incorporated in an Electricity Bill to establish a new central body, the Electricity Council, and a Central Electricity Generating Board. The Council would have no executive functions. Thus, unlike the CEA, it could not issue directives to the Area Boards, but it could advise the Minister on the supply industry and had a duty to promote and assist in the development of the system by the CEGB and Area Boards. Its special duties related to research, industrial relations and finance. Although the Boards were required to consult the Council before setting capital programmes and fixing tariffs, only the Minister could give approval. On the provision of common services, the Council first needed the authorisation of the Boards.

The legislation's passage through Parliament was completed under another new Minister appointed in 1957, Lord Mills, who thought little of the new structure and felt that the new Electricity Council would be a "boneless wonder".

In 1968 ten Area Board Chairmen produced a memorandum as part of another general review of the structure of the industry that was taking place at that time, in which they recommended that the independent Members of the Electricity Council should be given additional powers to approve long-term forecasts, annual investment programmes of Boards within the overall programme for the industry approved by the Minister, and the bulk supply tariff and retail tariff structures.

An Electricity Bill was introduced in March 1970 by the Labour Government, aimed at strengthening the central direction of the industry in England and Wales on issues of major policy, but it lapsed on a change of Government. It was clear that the salient feature of the Electricity Council was its institutional domination by the Area Boards and CEGB. The independent Members of Council, whilst able to persuade and mediate, were powerless to secure any firm agreement on policy direction whenever this conflicted with the interests of the Boards. Its structure was more 'confederal' than 'federal' because the sub-units were the holders of ultimate authority, and the Council merely advised and counselled.

A Labour Government, returned in 1974, again considered the question of reorganisation, and its Committee of Inquiry under Lord Plowden reported in 1976 that a major organisational weakness was the lack of strategic control and direction, and it recommended unification of the industry through a new single statutory body which would take over the major responsibilities of the Electricity Council and the Electricity Boards. The Secretary of State for Energy announced in July 1977 that a Bill was in preparation, but the situation in Parliament prevented its introduction.

The Plowden Committee had recommended that there was a need for a 'single voice' in negotiation with the Minister. The Secretary of State for Energy in the Conservative Government partly met this criticism when he announced in July 1980 that, within the terms of the existing statutes, he proposed to develop the relationship between the Council and the Boards in order to strengthen the co-ordinating and advisory role of the Council and of its Chairman, whom he now regarded as his main policy adviser in the development of industry-wide policies.

#### BORROWINGS

While the 1947 Act had left the supply industry with a good deal more freedom than had been granted to the old Central Electricity Board under the 1926 Act, the powers of control by the Minister were significantly increased, the most crucial being the right to sack a Chairman or Member. Moreover the Minister had to be consulted by the Central Authority in settling programmes for the development of the industry, and Ministerial and Treasury approval were needed for the necessary temporary and long-term borrowing.

The British Electricity Authority had made a considerable impact on the capital market, taking more than half the industrial money raised on the London market in 1952, and they were important in the temporary loans market also. There was some feeling in Conservative circles that such demands from the public sector were crowding out the legitimate demands of the private sector. It was evident from the rise in interest rates that the market was under pressure. This independent issue of stock by the nationalised industries was to some extent a fiction concealing a substantial increase in Government borrowing requirements. On the one hand the Treasury guaranteed all this new stock, and on the other the Government took up a large part of the stock themselves, since it was often under-subscribed. Bowing to reality the Government decided in 1956 that the nationalised industries should in future raise their financial requirements by long-term loans directly from the Exchequer.

These Government loans were repayable initially over 25 years, with interest derived from a formula reflecting the rate the Government itself paid for its long-term borrowing. An advantage was flexibility, since the loans could be taken as and when required. With the volatility of interest rates that was a feature of quickening inflation, reaching 17 per cent for a time, some 10-year money was taken in the 1970's. More recently, 5-year money has been taken and, at the moment, loans over three years are being negotiated because, on current cash flow, the supply industry in England and Wales expects to be free of debt within a few years.

In 1969 the Government encouraged borrowing overseas in order to benefit the balance of payment, shouldering the exchange risks on payment of a small premium. Even so, the effective rate to the industry was slightly advantageous. Nearly a half of current overseas borrowing is from the European Investment Bank.

#### Financial Targets

Discussions about the level of capital expenditure were increasingly accompanied by consideration of the way in which it was to be financed and the Government felt that electricity supply should be able to finance a higher proportion of expenditure from their own resources.

In 1959, when electricity supply was accounting for approaching a tenth of the nation's capital investment, a Treasury Committee under Sir



Thomas Padmore considered the general question of financial discipline for the nationalised industries. The feeling was that prices were too low, demand was stimulated unreasonably and capital expenditure was therefore being wastefully incurred. Electricity supply, in particular, was considered strong enough to meet more stringent criteria.

The resultant White Paper, "The Financial and Economic Obligations of the Nationalised Industries"<sup>1</sup>, published in April 1961, laid down that the nationalised industries should aim to balance their accounts taking one year with another over a period of five years after providing for interest and depreciation at historic cost. Provision should also be made for the difference between depreciation at historic cost and replacement cost, and allocations to reserve development programmes. The State as owner, or guarantor, of the capital of the nationalised industries would expect capital employed to earn a higher rate of return than the cost of the money to the Exchequer. Financial objectives were to be determined for each undertaking which, in practice, were normally expressed as a rate of return on assets.

By April 1963 the electricity targets had been published—a 12.5 per cent gross return (operating profit plus depreciation on average net assets) which was expected to lead to 60 per cent self-financing by 1966/67, the end of the five year target period. Hitherto, the return had been 10 or 11 per cent.

Considerations of resource allocation became paramount in Government thinking, and the real rate of return expected by investors in private industry became an important factor in determining an appropriate rate for the supply industry. Thus a 1967 White Paper, "Nationalised Industries: A Review of Economic and Financial Objectives"<sup>2</sup>, laid down two principles—that investment appraisal should be based on the use of a test discount rate, and that long-run marginal pricing should be applied as far as possible. In the event only electricity supply among the nationalised industries attempted long-run marginal pricing.

Financial targetry was substantially undermined by Government price restraint policies in the early 1970's and the supply industry could not meet its target for the five-year period ending 1973/74 because it was trading at a loss. The Government provided compensation under the Statutory Corporations (Financial Provisions) Acts of 1974 and 1975—amounting to £600 million for the years 1970/71 to 1975/76.

<sup>1</sup> HMSO, Cmnd. 1337  
<sup>2</sup> HMSO, Cmnd. 3437

### CAPITAL REQUIREMENTS & METHODS OF FINANCE.

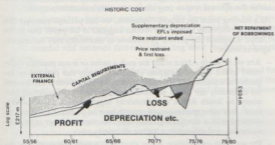


FIGURE 3

As a part of an attempt to reduce enormous public sector borrowing requirements the nationalised industries were allowed to increase their prices in order to reduce borrowing. Then the Government brought out a White Paper in 1976, "Cash Limits on Public Expenditure"<sup>3</sup>, which introduced limits on annual borrowings to supplement the financial targets of profitability.

The last of the major White Papers on financial control was "The Nationalised Industries"<sup>4</sup>, published in 1978, which recommended, among other things, that the state industries should treat their opportunity cost of capital for new investment as five per cent in real terms, to be earned on new investments over their working life.

The current financial target is for the supply industry to earn an average net return (operating profit before paying interest) of 1.4 per cent on average total net assets for the period 1 April 1983 to 31 March 1985. The target is on an inflation accounting basis in line with the annual accounts which have followed the current cost accounting convention since 1980/81. The new target allows for a freeze in the average level of electricity prices during 1983/84 as announced by the Government in November 1982. In addition to the target there is also, for the first time, a "performance aim"—that over the two-year target period the industry will try to reduce its controllable unit costs in real terms by 4.25 per cent.

<sup>3</sup> HMSO, Cmnd. 6640  
<sup>4</sup> HMSO, Cmnd. 7131

At the tariff levels geared to attain the required net return, the expected demand will result in a flow of funds well in excess of investment requirements. In fact this has been the position since 1981/82. The resultant debt repayments satisfy the increasingly stringent borrowing limits that the Government have set for the supply industry of England and Wales, amounting over the years to 1983/84 to £725 million repayment of borrowings. The industry forecasts that by 1986/87 funds will exceed capital requirements by about 60 per cent and borrowing will have been repaid by 1989.

### ACCOUNTABILITY TO PARLIAMENT

During the early debates on nationalisation around 1946, the House of Commons pressed for access to the accounts of the new state boards. But the Government thought this was undesirable on the grounds that it would inhibit managerial freedom, and provision was made for audit only by commercial auditors. Subsequently the operations of the nationalised industries were examined by a new Select Committee on Nationalised Industries made up of Members of Parliament, and by other committees of MPs such as a new Select Committee on Science and Technology and the long-established Committee of Public Accounts and Expenditure Committee. In 1979 the House of Commons changed its committee structure and there are now committees monitoring individual Government Departments, and the electricity supply industry is mainly examined by Members of the Select Committee covering the Department of Energy.

However, Parliament has not lost its desire for greater access to the books and records of the nationalised industries, and a Private Member's Bill on the "Parliamentary Control of Expenditure" was introduced in 1983 that included a provision for the House of Commons' own auditors, the Comptroller and Auditor General, to carry out value-for-money audits of the nationalised industries. This provision did not survive the Bill's passage through the House.

### RELATIONS WITH GOVERNMENT

Political pressures by Government have had a fundamental impact on the operations of the electricity supply system, and I will cite three examples. In 1947 the Government decided to freeze the design of new plant to 30 MW and 60 MW specifications with moderate steam pressures and temperatures in order to accelerate plant commissioning. The decision stifled design initiative and failed to produce significant benefits either in time or cost reductions. It led to higher capital costs and lower thermal efficiencies on the system for 30 years or more afterwards.

It was the Government's nuclear policy that had the greatest impact on the planning and operation of the electricity supply system. From an early stage it was recognised that the nuclear alternative would be expensive in capital resources and that the Treasury would therefore wish to play a major part in the decisions made. Thus it fell to a Treasury working party under Burke St John Trend to investigate the economic feasibility of nuclear power, and their recommendations formed the basis of Britain's first nuclear power programme based on gas-cooled graphite-moderated reactors.

When more advanced nuclear reactors were developed the Prime Minister appointed a Cabinet Office Committee under Sir Richard Powell, Permanent Secretary at the Board of Trade, to consider a second nuclear programme. The CEBG selected the British advanced-gas-cooled reactor for the new programme.

By 1971 a third nuclear programme was being contemplated and the Central Electricity Generating Board were pressing for a pressurized-water-reactor design against the contrary view of the Minister, the UKAEA and the Scottish Electricity Board who favoured a steam generating heavy water reactor. In 1974 the Government decided that the programme should be based on the SGHWR but, later, a variety of factors finally convinced them and the UKAEA that the SGHWR should be abandoned after expenditure on it had amounted to some £145 million. In 1978 it was decided that the next British programme would be based on two further AGR orders. The CEBG have since obtained permission to build a PWR based on American technology, subject to all the planning and safety clearances.

The third example was the decision of the Government twenty years ago to embark on a national planning experiment, hoping that if electricity planned for four per cent annual growth in GDP the rest of British industry would do likewise. The experiment disrupted the industry's investment programme and, even after serious delays in the completion of new power stations, led to over-planting over many years.

At the moment of writing, a Conservative Government, with a mandate for "privatising" the public sector, has before Parliament an Energy Bill to encourage the private generation of electricity. It proposes that organisations other than Electricity Boards will be able to supply electricity as their main business in competition with the Boards, and make use of the Boards' transmission and distribution networks as common carriers. The Boards will be encouraged to purchase surplus electricity from private generation under terms which will be made public.



In March 1983, for the first time, the Government elaborated on the responsibilities and obligations placed by statute on a number of nationalised industries including the CEBG. That Board's Chairman is required not only to run his Board with maximum efficiency, but also to increase the scope for competition in electricity supply and to review the prospects for the injection of private risk capital into areas of his Board's operations.

Under the Competition Act 1980, the Government can ask the Office of Fair Trading to advise whether the Monopolies and Mergers Commission should investigate the activities of the nationalised industries. As far as the supply industry is concerned, the Monopolies Commission have examined the operation by the CEBG of its system, and the direction and management by the London Electricity Board of its business of retailing domestic electrical goods, spare parts and ancillary services.

#### CONCLUSION

In conclusion I would like to mention two developments in system automation that will radically affect the distribution systems.

Firstly, the use of load control devices. Over the past few years developments in microelectronics and improved methods of communication have opened up new possibilities at the interface between the electricity supply industry and its consumers. Through improved two-way communications the load curve can be improved and further savings achieved in meter reading, billing and collection of accounts.

The second major development is in the remote monitoring and control of substations. For example, my old Board commissioned their Southern Electricity Communications and Telemetry (SECAT) system at the beginning of 1983. The Central Control Centre at Head Office controls all the 132 kV, 66 kV, 33 kV and 22 kV networks. Subordinate Control Centres at 13 District Offices cover the 11 kV and LV networks. Altogether over 500 major substations are monitored and controlled remotely, and some 6,500 individual circuits are scanned by the system every few seconds and, when requested, information is presented on visual display screens in the appropriate control centres. This information includes circuit loading and voltage levels, circuit breaker status and alarm indications when a circuit is tripped. SECAT achieves a major improvement in operational efficiency and minimises costs both operational and in network reinforcement. Time taken to restore supplies after faults will be reduced. The wealth of system loading data enhances load transfers and thereby reduces plant margins. Distribution system losses can also be reduced by switching out large transformers at time of low load and, at times of emergency, load spreading can more easily be improved.

These kinds of technical developments will provide the major cost break-throughs of the future and will decide future changes in the organisation of distribution.

#### ABBREVIATIONS USED

AGR - Advanced Gas Cooled Reactor  
CEBG - Central Electricity Generating Board  
PWR - Pressurised Water Reactor  
SGHWR - Steam Generating Heavy Water Reactor  
UKAEA - United Kingdom Atomic Energy Authority

#### MR JAN SMITH: CHAIRMAN - ESCOM

On behalf of all of us here today I thank you, Sir Austin, for a most outstanding and informative account of the development of the electricity supply industry in Great Britain.

Those of us who are in the electricity supply industry often see ourselves as great futurists. We are, after all, just about the only industry that has to plan ten to fifteen years ahead. But what you have indicated to us today, is that we should also take time off to look at the past and, more importantly, understand it.

On the whole one tends to forget that the electricity supply industry as we know it today is the result of a long and evolutionary process. However, when one is presented with such a well-researched analysis of events spanning more than a hundred years, one cannot fail to see that electricity supply is not a static industry but one that changes and adapts continuously to the requirements of the society it serves.

The history of electricity supply in South Africa is in numerous respects very similar to what happened in Great Britain. A hundred years ago electricity supply started with a number of municipal undertakings while some of the mines also generated their own electricity. Through the years the number of municipal undertakings increased. In 1923 Escom was founded and since then one finds a gradual integration of the electricity supply industry into one centralised body. As a result, the country could be electrified systematically, a national grid could be established, economies of scale could be fully exploited. Generally speaking, a sophisticated and reliable supply system producing relatively cheap electricity was created.

As the operations of the central supply authority increased, the role of the municipal undertakings, of course, changed. Although some muni-

cipal undertakings still generate a portion of their own electricity needs, the trend is to handle the reticulation function in their area and buy electricity in bulk from Escom. The extent to which South Africa's electricity industry is centralised is illustrated by the fact that Escom generated about 93% of the electricity used in this country.

From Sir Austin's paper it is evident that when one looks at electricity supply over a period of a hundred years, the major issue is the question of organising a country's electricity industry in a way that it will best serve society. One can see that a specific times the industry is organised to overcome specific problems.

One sees, for example, that initially electricity supply was undertaken as a commercial operation with free enterprise taking part. There we see a phase in which free enterprise seems unable to produce the rapid and co-ordinated expansion in electricity supply which society demanded, and a process of increasing state intervention occurs to help the industry overcome this hurdle. There is increasing emphasis on central or integrated control as a measure to achieve standardisation (both of tariffs and technology), to take full advantage of economies of scale, and to establish a national integrated distribution grid. There appears to be a relationship between financing and centralised control: the higher the financing needs, the greater the tendency towards some kind of central control.

Unlike in Britain, where the move towards centralization - or rather de-fragmentation - took place over many decades with frequent changes in direction, the process in South Africa was clearly defined at the outset. Compared to the United Kingdom, ours was a more and evolutionary process which evolved in a climate of constructive participation by all parties concerned.

This brought stability to the electricity supply industry in this country at an early stage which led to co-ordinated and integrated planning at an equally early stage. In turn, this led to one of the lowest prices for electricity in the world - a status we enjoy even today, despite a number of above-average price increases in recent years.

May I be bold enough to suggest to intending legislators of Electricity Acts in Great Britain - and they have had four Acts in 14 years - that they could do worse than studying the Electricity Act, Act No. 40 of 1958, of the Republic of South Africa.

It appears that now that the electricity supply industry has integrated a fragmented industry into a national and uniform service industry - and in the same process overcoming a series of problems which could not have been dealt with on a fragmented basis - one could legitimately ask: is this the optimal way to provide in a country's electricity needs?

As a starting point for today's discussion, we can perhaps examine this aspect of electricity supply. Sir Austin suggests in his paper that in the United Kingdom the private generation of electricity may be encouraged in future.

- Are we in South Africa ready for such a move or is our position different? In the United Kingdom electricity supply can perhaps be regarded as a mature industry and expectations of growth in the demand for electricity are based on those associated with a developed economy; in South Africa our electricity supply industry is also "mature", but our expectations of growth have to be based on those associated with a developing economy. This means higher capital investment, and ultimately a higher electricity price.
- Do we need competition in the electricity supply industry? Has the concept of a centralised supply authority perhaps served its purpose? With a standardised national system in operation, has the time not come for free enterprise to re-enter the industry? Will this help to contain the price of electricity?
- Have municipal undertakings a contribution to make to electricity supply which is being overlooked by the central supply authority?

These are some of the issues which Sir Austin's paper has triggered off in my mind. I am sure there are many others as important as the ones I have singled out.

Thank you once again, Sir Austin, for providing us with insight into our own situation.

#### MR DENNIS PALSER - CAPE TOWN

Mr President, I note that Sir Austin is an accountant by profession. May I therefore be permitted to pose one or two questions on this subject.

My first question concerns marginal cost pricing.

I gather that for the past 15 years the Area Boards have based their tariffs on long run marginal costs, rather than average on historical costs as in the past. Welfare economists will have us believe that the underlying rationale behind marginal cost pricing is the achievement of the optimal utilization of resources. As a long term national objective it is conceded that equating prices to marginal cost may tend to ensure a more efficient utilization of resources. But in the short term, unless all sectors of the economy adopt marginal cost pricing, surely this ideal economic objective cannot be attained?

I note from Sir Austin's paper that initially only the electricity supply industry amongst the nationalised industries attempted to apply long run marginal costing techniques to electricity pricing. Is this still the position today? And what about the rest of the economy? Are any others, either within the nationalised industries or in the private sector, practising marginal cost pricing?

I also understand that in the United States this is a most controversial subject, there being two opposing camps - one, the marginalists, and the other the anti-marginalists. I am not sure who is winning at the moment but am given to understand that it is the anti-marginalists!

Marginal cost pricing and time-of-day tariffs reflecting peak responsibility are often construed as being one and the same thing. Quite clearly this is not so and time-of-day tariff rates can be based either on historical cost data or on marginal costs.

In view of Sir Austin's considerable experience in the electricity supply industry it would be interesting to have his views on the pros and cons of marginal cost pricing and whether it has achieved what it was intended to achieve.

And finally, Mr President, one last question if I may, on inflation accounting.

I notice the Electricity Council annual accounts have reflected statistical data based on current cost accounting for the past two or three years. I should be grateful to have Sir Austin's views on this subject of current cost accounting and whether it is still necessary today in the light of the relatively low inflation rates currently prevailing in the United Kingdom. Thank you.

#### MR NICO BOTHA - BLOEMFONTEIN

Mr President, the author is to be congratulated on his interesting and informative paper which describes so many facets of an electricity supply system in a manner which is readily understandable. The many advantages and disadvantages which result from the introduction of such a system are equally clear.

The question to be asked today Mr President is, where do we stand in the RSA as far as electricity supply is concerned? The answer however is not so simple and straight forward. I also would like to endorse what other speakers have already said. I think Mr President the time has come that we will have to very seriously reconsider our own position. For the interest of those here today I want to stress the fact that Bloemfontein gave some assistance over the past two years to not less than twenty six smaller electrical undertakings. We have done so Mr President not because we want to be so kind. No Mr President, because the smaller municipalities are to a great extent really battling to keep up with internal and external factors influencing their electricity departments.

Mr President if we do not help these places we will be soon blamed for not being sensitive enough or concerned about the depopulation of the plateau and the possible creation of ideal land for unwelcomed guests.

Mr President I can give you today the assurance that 86% of the municipalities, or rather 86% of those men in charge of electricity undertakings are in favour of regional electricity supply bodies, or authorities or what ever you wish to call it.

My plea today Sir is let us get our heads together and start very seriously to work on a regional concept, similar as what was brought to us by the author today. Thank you.

#### MR E.G. DAVIES - PIETERMARITZBURG

The Association is indeed fortunate to have had a paper on Nationalised Electricity Supply Industry in Great Britain because I suspect that there will be some pressure brought to bear on the electricity supply industry in the Republic to move towards some form of regionalisation as a result of the recommendations of the President's Council and various other committees' reports.

There are, of course, similarities between the situation in Great Britain prior to 1947 and the situation in the Republic. A count of the municipality-owned distribution undertakings indicates that there are at present 163 such undertakings in the Republic and a breakdown is shown in the following table:-

1. Number of undertakings less than 2 MV.A	=	51
2. 2 - 20 MV.A	=	68
3. 20 - 100 MV.A	=	31
4. 100 - 200 MV.A	=	8
5. 200 - 500 MV.A	=	1
6. exceeding 500 MV.A	=	4
		<hr/>
		163

The actual physical size of the undertakings is not always determined by the maximum demand but nevertheless there are 51 undertakings with a maximum demand less than 2 MV.A and only a total of 13 with maximum demands over 100 MV.A.

The difference between the position in the United Kingdom and the Republic appears to me to be that the United Kingdom is in the main densely populated and the various undertakings amalgamated are contiguous whereas in the Republic they are separated from each other by larger distances. A further difference is that in the United Kingdom there were no great differences between the income of the inhabitants of various areas.

It is interesting to note that the comment is made that "municipal ownership" has often been adopted to correct mismanagement on the part of private companies. I personally believe that municipal electrical undertakings are well managed and despite the present tendency to extol private enterprise I do not think that private enterprise has a place in an electricity supply other than the provision of finance but I do consider that the adoption of private enterprise practices would considerably assist the electricity supply industry.

The major municipal electricity undertakings are by any standards large industrial concerns. Nevertheless the tendency appears to be that the accounting system tends to consider them as merely part of the Council operation as a whole. I believe that attention should be given to enable the accounts of electricity undertakings being completely divorced from other Council accounts. I am, of course, referring to the larger and medium sized undertakings. Furthermore a number of restricting features of the present operation should be removed to allow such undertakings to operate amongst other things their own staffing, salary structures and to be able to purchase equipment without the necessity to take into account preferences, etc.

I would not comment particularly on the position prior to the last war other than that we are indeed fortunate that we do not have 17 different frequencies which might be due to the influence of the consulting engineers who had a large part in the initial arrangements for the supply industry in this country.

It is noteworthy that extremely high rates of return were being achieved by holding companies by exploiting their subsidiaries. Again this is what would probably happen if such private enterprise electricity undertakings were ever to be introduced in the Republic. It must also be borne in mind that the company would presumably have to return approximately 45% of its profit to the Government in the form of company tax.

It is noted that at vesting a problem appeared to be the variety of local practices in keeping account and recording statistics which required the introduction of a uniform system.

I believe a uniform accounting system divorced from other operations should be introduced at this stage. It is extremely difficult at present to assess the relative financial operations of one electricity authority with another because of the diversity of the accounting system or for the matter statistics.

The setting up of the B.E.A. Area Board in some areas is set out factually in the paper but it appears that the engineering function was swamped by general administration, labour relations and welfare. There also appears to me to be an over-emphasis on part-time members.

On progressing through the paper it appears that the original system area boards, supply areas and districts, were subject to fairly rapid change and subject to investigation by several commissions of enquiry. Perhaps Sir Austin Bunch might like to indicate how the original arrangement could have been improved because I sense that there were considerable political in-fighting. It is also noted that each area board had only two full-time members but is not stated how many part-time members there were. I am of the opinion that part-time members can serve a useful function but nevertheless it is the duty of the fulltime members to ensure that the operation under its organisation is efficiently and well run. The full-time members presumably are appointed for engineering and business reasons but there seems to be no such requirements for part-time members. Perhaps Sir Austin Bunch would advise how much authority the part-time members had.

Another interesting point is that there was no strict control of the form of organisation developed within a general pattern. It was realised that what might well prove to be a most efficient organisation in one locality might not be suitable elsewhere for a variety of local and technical reasons. This, I believe, is the situation in the Republic that if any form of regionalisation is to be considered it must be flexible enough to provide for the variety of local variations but within a general framework.

With regard to tariffs a similar situation exists at present in the Republic and there are very real reasons for the difference in tariffs. Each undertaking has to balance its books, each undertaking is faced with varying costs and capital charges and some subsidise the Rates Fund more than others.

The danger as I see it is if large areas in the Republic were to be region-

alsed the rural and semi-urban areas would expect immediate expensive electricity reticulation and this could only occur to the detriment of the existing electricity consumers unless differential tariffs are maintained or suitable financial arrangements made, for example, low interest rate loans. In any event the immediate equalisation of tariffs in such a situation can only be a medium/long term objective. It is interesting to note that even in a homogeneous population like the United Kingdom, in the South Western area, industrial tariffs would not be introduced until 1956, i.e. some 9 years after vesting.

The actual method of charging the area boards for the supply of electricity seems to contain elements which well might be considered by Eskom for the supply of larger municipal undertakings.

Undoubtedly prior to vesting various undertakings have resisted expanding into rural areas and after vesting there appeared to be a statutory obligation to develop rural electrification. However, this was achieved by a financial arrangement which resulted in the urban consumers' charges being increased by only 2% and hopefully the method of achieving this should form an important factor in any consideration of regionalisation. As indicated in a recent review of the publication "Engineers, Managers and Politicians", the South Western Electricity Board, which form the outset decided that if the Electricity Act was to be taken seriously, rural electrification would eventually have to be a national rather than an area responsibility.

The period since 1955 when, as the author states, "the Minister with his civil servants is anxious to try his hand at close direct scrutiny of the industry's capital programmes", appears to have been a procession of various White papers and committees some of which made recommendations which were very little short of disastrous. For example, one of the recommendations of the White Paper published in 1956 over-estimated requirements for nuclear power stations to the extent that the larger electricity equipment manufacturers embarked on large and costly research on this field which had a crippling effect on them when the proposals were proved to be completely unrealistic.

I have as yet been unable to obtain the book "Engineers, Managers and Politicians" but the review contains the following comments which I quote:

Lord Citrine, first Chairman of BEA, is stated to have defended the industry's policies and protected its operations from government intervention and ministerial interference in a way that none of his successors were able to do.

The review opens with the statement:-

"Here is just the book for our holiday reading. It has drama, intrigue, lofty ideals and brave resolve, together with a little scandal and an element of romance. There is a large cast of colourful characters, with a somewhat tendentious selection of heroes and villains, and a more or less happy ending."

#### SIR AUSTIN BUNCH

Does one need competition in generation. Although I do not know the situation in South Africa, generally I would say "No".

But where organisations generate because they need steam for industrial processes, then if it is economical to produce electricity as a by-product, it seems to me logical that there should be some mechanism for the electrical industry to purchase that electricity.

With regard to the Area Boards in the U.K., these were 2 full time members; a Chairman and Deputy Chairman. The Chairman sat on the Electricity Council and certain other committees. The part time members of the Area Board were all appointed by the Secretary of State. Many appointees were not business orientated and did not really understand the Electrical Industry and the result was we did not have effective Boards of Management.

The theory of marginal cost pricing really arose when the economists thought that with the increase in size of the generating sets, to sell electricity at the margin, that it is at the cost of the next kilowatt hour which you would have to build to sell, then that was the proper price you would have to pay as the marginal cost. Now in point of fact it is never operated properly in the electricity industry all along because we have had financial targets - we have had to raise certain sums of money.

What we did was to calculate what the long-run marginal cost should be, bearing in mind the time of day and the type of load, and in fact we produced long-run marginal costs for the main tariff heads, and then this was applied by the CGB in their calculation of the bulk supply tariff.

They then looked at the profit that was produced and if it was too much they then reduced all the prices by the same percentage to bring the money in that we required. If it was too little, they increased each one the prices to produce the money that we needed and if you look I think you will find that the economists have always covered themselves by saying that the prices in the tariffs in our industry in Great Britain are based on long-run marginal costs. They are not long-run marginal costs

because if they were we would always either have too much money or too little money as the case may be.

"Has anybody else moved to long-run marginal costing or pricing?" The answer is clearly "No", not in the major industries in Great Britain. Have we adopted current cost accounting? Yes, we have in various ways. So long as you know what your financial target is, then you can run the industry. But you must have a clear understanding and agreement as to what you are going to take out of the profits, what interest you are going to pay on your loans, what the length of those loans are, and over what period you are going to amortize them. Only then you can operate the industry successfully.

#### W. BARNARD : PRESIDENT - INTRODUCING DR. JOHN MORTIMER

Dr Mortimer obtained the degrees of B.Sc. in 1952, B.Sc. Hons 1953, M.Sc. 1955 and A. Ph.D in 1961 at the Witwatersrand University.

He also holds a Transvaal Teachers Higher Diploma and the National Diploma in Organization and Methods.

He has been employed in the Johannesburg City Council since 1956 initially as Chemist and Principal Chemist.

In 1965 he was seconded as team leader in the major Job Evaluation Project undertaken by the Johannesburg City Council.

In 1967 he was promoted to Principal Organization and Methods Officer and in 1970 to Assistant Manager Transport Department and in January 1972 to the position of Director of Organization and Methods Division.

In this capacity Dr Mortimer was responsible for a number of major assignments for the Electricity Department.

On 2nd May 1983 Dr Mortimer was appointed Director Technical Services in which capacity he is today in charge of the City Engineer's and Town Planning Departments.

# SOME PRACTICAL HINTS FOR IMPROVING ORGANIZATION AND METHODS

by John Mortimer, Director of Technical Services, Johannesburg City Council

## INTRODUCTION

Before considering Organization and Methods in local government, let us first focus our attention briefly on management in general, for, in spite of its many peculiar problems, the process of local government is largely one of management. The Town Clerk or the head of a municipal department, like his counterpart in commerce and industry, is responsible for performing a management function.

Clearly, the municipal official in an executive position is responsible for the efficiency of his unit. In the simplest terms, this means solving problems of personnel, organization, procedures and methods.

Organization and methods is one of the ways of improving executive and functional efficiency in municipal administration. Organization and methods is needed particularly in local government because, unlike the private sector, there is no profit motive and it is not always run according to sound business principles. In addition the organization of a municipality is highly complex since many functions have to be performed, each with a different objective and each managed differently. Always remember, though, that organization and methods is complementary to, but no substitute for, good management.

There are three avenues open to the local authority which decides to improve the efficiency of its service by tackling the problems I have mentioned.

The first approach we can consider is to engage an outside consultant. A number of local authorities in the Republic have made use of outside consultants. This has seldom proved successful. I have seen some of their work and although much of it is beyond criticism technically in practice little benefit has been derived from their recommendations when judged over a period of time.

The second approach that a local authority could follow in its quest for efficiency is to appoint its own Organization and Methods Officer. For the smaller local authority this is not really a practical solution. Few smaller local authorities are in a position to pay a salary which would attract an experienced Organization and Methods Officer. If lucky enough to find such a person, the small municipality would be unlikely to retain him for long. The ambitious Organization and Methods man who seeks a challenge would soon find that he has, so to speak, "sucked the orange dry" and would be on the look-out for pastures new - probably leaving an unfinished project behind him.

The remaining alternative is to "do it yourself". Although there are areas of organization and methods work which require the expertise of the specialist - for example, certain work measurement and sampling techniques, or system analysis for computer applications, nevertheless much of the Organization and Methods Officer's work is a matter of sound common-sense and a systematic, logical approach to a problem.

It is true that operational managers may find it difficult to take a dispassionate over-view of the activities they supervise. Time (with no distracting demands from day-to-day operations) is needed to examine systems and procedures. However, we should remember that the man on the job is in the best position to streamline the work. Many of the best organization and methods solutions are suggested by the man doing the work and implementation of organization and methods suggestions is usually left to the section head concerned.

Management participation and total commitment to efficiency and economy are paramount in organization and methods. Far too often wasteful procedures are allowed to persist because supervisors are not sufficiently conscious of the need for efficiency, economy and productivity.

I am not decrying the need for training in organization and methods. But what I am saying is that a man in an executive position in a local authority, who is intimately aware of the complexities of the situation, the pitfalls to be avoided and the personalities involved can, provided he devotes sufficient time to the matter, and follows the basic principles of organization and methods, produce a practical and lasting solution to many of the problems facing his local authority.

## FEATURES OF ORGANIZATION

Organizing begins as soon as the first employee is appointed. Organization and co-ordination are necessary whenever more than one person is involved in a combined action. Organizing strives towards efficiency and economy since it is a conscious effort to rationalize the use of resources. In order to achieve this rationalization it is imperative that the



Dr. John Mortimer

organization should have an objective which is clearly and unambiguously stated.

Division of labour, whereby the work is divided among the workers according to their preferences and abilities, is a natural consequence of united action. Another natural consequence is the development of authoritative management as the need for an hierarchy of relationships makes itself felt. These trends result in development of specialists whose capabilities, interests and specialized knowledge are used for optimum united action.

A most important aspect of organization is the fact that no organizational unit merely deals with the mechanical and formal side of work. People are involved and where this happens an informal organization establishes itself, reflecting the informal relationships and interactions between the members of the organization. To organize without taking into account the "people situation" - their capabilities, strengths, weaknesses, likes and dislikes - is to invite disaster.

Since organizations are "alive" and they are exposed to the ever-changing economic, political, technical and cultural influences surrounding them, organizational structures require constant revision. Gradual changes in the human relations within the organization are always taking place and we must take account of this from time to time to eliminate the friction which would otherwise result.

Signs that a reorganization may be necessary are:

- (a) Indistinct division of work.
- (b) Expansion of activities.
- (c) Curtailment of activities.
- (d) Empire building.
- (e) Inter departmental rivalry.
- (f) Undue organizational delays.
- (g) "Passing the Buck".

General indications of a good organization are:

- (a) A sense of Purpose. (The staff are well informed about the objectives of the Organization).
- (b) Functions and tasks are clearly defined.
- (c) Clear demarcation of responsibility and authority.
- (d) Adaptability to change.
- (e) A balanced, simple structure.
- (f) Minimum levels giving rapid communication.
- (g) Continuity (training of successors is ensured).

Every senior official in local government needs to study the basic principles of organization. Let me touch on these principles here, however briefly:

- (a) Identify the needs of the organization.
- (b) Define clearly the objectives of the organization.
- (c) Determine and define the functions to be performed which are necessary to achieve the purpose of the organization.
- (d) Group homogeneous functions together.



- (e) Avoid grouping operational and control functions together.
- (f) Avoid duplication and overlapping of functions.
- (g) Distinguish staff from line functions.

When establishing staff functions, answer the following questions:

- Is the service really necessary?
- Can it be obtained economically from outside?
- Does the service require professional knowledge and experience and is it available?
- Is there sufficient work for a specific section?
- Can various divisions make use of the same service?

Much organization and methods work is shrouded in mystique. When you penetrate the veil you will more often than not discover the application of a few basic common-sense techniques. The "Questioning Sequence" is one of these. When analysing a situation ask the following questions:

- Purpose:** What is being done?  
Why is it done?  
What else could be done?  
What should be done?
- Place:** Where is it done?  
Why is it done there?  
Where else could it be done?  
Where should it be done?
- Sequence:** When is it done?  
Why is it done then?  
When else could it be done?  
When should it be done?
- Organization:** Who does it?  
Why does that person do it?  
Who else could do it?  
Who should do it?
- Method:** How is it done?  
Why is it done that way?  
How else could it be done?  
How should it be done?

A simple approach, but, if properly applied, very revealing and effective. To quote Kipling:

"I had six stalwart men,  
They taught me all I know,  
Their names were "What?" and "Where?" and "When?"  
And "Why?" and "How?" and "Who?"

If we follow this approach conscientiously we will discover many instances where we are using 19th century procedures in an effort to cope with 20th century problems.

A facet of organization that is of particular relevance in local government is Delegation. In commerce and industry the principles of delegation are, by and large, applied far more than in local government. It is time to say that there are few local authorities, large or small, which are not being crippled to some extent by failure to delegate authority and responsibility.

To quote from Louis Allen's book "The Management Profession":  
"People are generally given sufficient work to do. The prime deficiency is usually a lack of authority to make decisions necessary to carry out the work".

Let us then, when reviewing our organizational structures, consider to what extent the well-tried principles of delegation are being effectively applied. We could use the following check-list:

- (a) Are our senior officers concerning themselves with the management functions of planning, organizing, leading and controlling, and are they delegating sufficient of the routine work?
- (b) Is responsibility and authority clearly defined?
- (c) Is authority commensurate with responsibility?
- (d) How much is it reasonable to delegate, i.e. what responsibility and authority should be retained at high level?
- (e) How far down should responsibility and authority be delegated?
- (f) Is the climate favourable for delegation?
- (g) Have subordinates been motivated and trained to accept delegated responsibility and authority?
- (h) Have adequate controls been established? Remember that whereas responsibility and authority may be delegated, accountability cannot be delegated.

We must probe the barriers that exist to delegation. You will find that these are either organizational or psychological – or both. By "organizational" I mean reluctance to abandon traditional patterns of local government – often, at Council level, for political reasons. Psychological resistance could spring from fear – either that the job will not be done properly – or perhaps that it would be done too well, thus showing up the boss!

A controlling officer or supervisor can effectively control and train only

a limited number of people. This is a problem of human capabilities and is known as the "span of control". When reviewing organizational structures we should always give attention to the span of control. It is generally accepted that a supervisor cannot effectively control more than five subordinates at senior level and more than twenty junior subordinates.

## SYSTEMS

An area of investigation that will always prove fruitful is the control and improvement of forms. You will be astounded at what an investigation into the usage of forms in your organization will reveal. The proliferation of forms in most local authorities is unbelievable. The cost of printing and paper is rising considerably and it is estimated that the cost of handling the forms is 10 to 20 times greater than the intrinsic cost of the form itself.

An effective form control system will entail the following:

- (a) The collection, classification and filing of specimens of forms in a proper forms register.
- (b) The analysis of the forms and their contents with a view to the elimination of unnecessary forms, and the combination, simplification and standardisation of the essential forms.
- (c) Form design.
- (d) A study of the ordering, production, storage, distribution and destruction of forms.

Effective form design has two requirements:

- (a) The form should achieve the purpose for which it was initiated. It should be easy to complete, yet should contribute towards the efficient flow of work in a procedure.
- (b) The form should be economically put to use. Bear in mind that the economising of effort and equipment involved in using the form is usually more important than savings in paper and printing costs.

In practice, form design should follow the redesign of a procedure and here, too, common-sense and the questioning sequence frequently are all that are necessary. Simple aids to improving clerical procedures are flow charts on which the routine of documents and all work carried out on them is entered in simple pictorial form.

It should always be remembered that quality of work is a mirror of good or bad methods, supervision and organization, and of the tools, machines, space, people and materials (both availability and quality). The biggest problem when mechanising any operation concerns the economic justification for purchasing the new machine. Far too often machine applications are based on false claims of economy because their introduction is based on a comparison of the cost of the existing (usually inefficient) manual method with that of the mechanised method.

First simplify the existing method and then compare the costs. Only when it can be shown that there is a distinct advantage, should machines be introduced.

Don't forget that the maintenance of the new machine may give rise to a demand for a new kind of highly skilled labour which is not available to the Council.

Once all this has been considered and it is decided to mechanise the problem resolves itself to finding out what is available on the market and striking a balance between cost and sophistication.

## WORK STUDY

I have mentioned briefly some of the organization and methods techniques you can effectively put to use yourselves.

A technique which is not suited for "do it yourself" is work study. In this case you must have the services of a trained Work Study practitioner.

As you are aware, the application of work study for control and for the introduction of incentive bonus schemes is fairly widespread in electricity undertakings. Recent developments in the statistical treatment of work study observations have even made it possible to set realistic standards for maintenance work and I am certain that the field for work study based incentive schemes in electricity undertakings will expand markedly in the future.

Work study can also be used profitably in associated fields such as the maintenance of vehicles, to control reinstatement of roads and footways, for building work and so on.

Above all, let your staff know you are committed to improvement, efficiency and economy. Reward them in cash for beneficial suggestions made and encourage them to look for further improvements. Once top management has inculcated a consciousness of productivity and thrift throughout the organization, your problems are more than half solved.

As an example of this approach, and in conclusion may I draw attention to the long and cordial association between the Johannesburg Organization and Methods Division and the Electricity Department. We have collaborated to our mutual advantage at all levels for many years now and I look forward to many more years of profitable co-operation between the two departments.

# AMEU 48th CONVENTION TARIFFS

## D.H. FRASER - DURBAN

Over the past three years, the Durban City Council has embarked on a policy of utilising outside management consultants on an extensive basis comprising some eighteen separate studies at a cost of approaching two and a quarter million rands. Departments included in this comprehensive survey are:

Electricity, Market, O & M, Estates, Health and Supplies. In addition special projects in sections of the City Treasurer's, City Engineer's and Town Clerk's Personnel Division are currently in progress.

Naturally Dr. Mortimer's statement that "although much of their work is beyond criticism technically, in practice little benefit has been derived from their recommendations when judged over a period of time" is of particular interest.

Perhaps he could elaborate a little on this score and provide me with some more detailed information for comparison with our experience in Durban. I would be most alarmed to think that the large sums of money being spent by the Durban City Council will be of little value in the long term.

This extensive use of outside consultants in Durban has been brought about by a combination of factors including:

- The Management Committee's contention that an operations review or management audit type survey should be conducted in all municipal departments whereby departmental policy and management performance could be examined in depth by an independent consultant reporting to a Steering Committee made up of Councilors and senior officials as a decision-making forum.
- The need for drastic curtailment of revenue expenditure to comply with the State Treasury macro control recently imposed. The annual percentage increase allowed is below the national inflation rate.
- The inability of the O & M Department to cope with an increasing backlog of project work due to staff shortages and intense recruitment difficulties. The department is unable at prevailing salary rates to recruit trained specialists into their ranks and have to resort to the slower method of internal training of both Work Study and O & M techniques.
- A need to examine problem areas traditionally regarded as outside the scope of an O & M investigation embracing personnel associated matters such as staff turnover, recruitment difficulties, grading, training, fringe benefits, manpower development planning and merit rating in all departments in the service.

Whilst I concur with Dr. Mortimer's sentiments that managers must manage and his third alternative is to 'do it yourself', one must also accept that the overriding problem is invariably to find the time. Staff shortages and recruitment difficulties in the municipal sphere are of long standing duration and departmental executives are usually at full stretch to cope with the routine day to day running of the departments and are fearful of expanding their activities into new areas which may prove unacceptably time-consuming and attention demanding for both themselves and their senior officials.

It is also possible that as there is no 'profit motive' as mentioned by Dr. Mortimer, local authority executives do not place sufficient emphasis on their managerial responsibilities and hence do not make good agents for introducing 'do it yourself' organisation and method reviews.

Even though there is no 'profit motive' one should not accept that as a reason why an organisation 'is not always run according to sound business principles'. Could not the introduction of 'cost motives' be investigated and introduced? It has been suggested in some quarters that executives unjustly blame the 'no profit motive' as the reason for poor performance when often in fact a great deal can be done to improve matters.

Another factor to be borne in mind is that of the size of the undertaking and the unfortunate fact that the bigger the department, the further removed from the action becomes the executive.

In these circumstances it is perhaps wisest for an independent party to examine problem areas at length, assist with suitable recommendations for the changes required and, perhaps most important of all, to assist with the implementation of such changes including the training of staff when necessary. Certainly in my opinion, the daily on-the-job implementations of change is most important and frequently very time-consuming.

In regard to the examination of systems and procedures, the concept of 'the man on the job is in the best position to streamline the work' and to solve problems relating thereto is fast being accepted universally. Quali-

ty Circles have been introduced at lower levels with great success (particularly overseas) i.e. formal meetings of employees involved in the same activity with a view to them making suggestions to management for improvement. It would be interesting to know Dr. Mortimer's views on Quality Circles.

Quite apart from the need for a well-structured delegation of authority within departments is the need to examine whether the Head of Department himself has sufficient delegated powers to efficiently manage his department.

The numerous external controls that exist, not only in the financial area, but also in the personnel field, are at times frustrating and time-consuming.

In Durban only limited delegation exists for staff appointments, promotions and terminations and one sometimes gets the feeling of trying to manage by proxy.

The problem is frequently compounded by the grievance machinery in existence and the need at all times to follow the 'red-tape' route demanded by the system. To try and beat the system is usually to court disaster.

If the need to examine delegation exists, as it certainly does, it should start at the top and be aimed at freeing departmental heads of some of the time-consuming constraints of office relating to reporting to higher authority on matters of relatively minor consequence.

Work Study based productivity payment schemes, administered and verified by the Organisation and Methods Department, have been a part of the local scene in the Electricity and City Engineer's Departments for the past decade.

These schemes have proved most effective in motivating the work force to improve productivity and thereby reduce unit costs in the many areas in which they have been installed.

Quite apart from this increase in productivity, certain other advantages have ensued as follows:

- A substantial reduction in the labour force without reduction in the total output of work achieved.
- Weekly management information summaries which highlight performance of all gangs and provide statistics relating to delays and unusual circumstances.
- Regular middle management meetings between departmental and work study officials to discuss performance and to interchange ideas for improvement.
- A close look at crew configurations to balance the labour requirements of the various individuals making up the gang work force.
- Better job planning and work scheduling to reduce delays and improve bonus opportunities.

The effectiveness of these productivity payment schemes has been recognised by the outside consultants who recently undertook an operations review of the District Works Divisions in the Electricity Department and they have recommended an accelerated programme of introduction of such schemes to all viable areas not yet covered.

The fact that bonus earning potential does not exist in areas of activity not yet included in productivity payment schemes has led to an unfortunate drainage of staff from certain high skill tasks such as suspension cable jointing, which for various reasons do not readily lend themselves to measurement against standard times, to lesser skilled functions of a more routine nature. Artificial shortage of skill allowances have been resorted to to ensure that specialist staff are available in these critical work categories. Perhaps Dr. Mortimer can suggest an alternative solution to this problem.

## C. ADAMS - PORT ELIZABETH

Dr. Mortimer mentioned the difference between municipalities and private enterprise; the lack of a profit motive. It is precisely this aspect which makes the management of a municipal department so much more difficult than the management of a commercial undertaking, and this is unfortunately not appreciated outside local government circles. The private sector can set sales targets, profit targets and targets related to share of the market, they can easily measure results against these targets and reward staff by annual bonuses, but how do you measure functions where there is a large service component, such as providing streetlighting, testing wiring installations, responding to consumers' no light complaints, and even maintaining our distribution networks without causing undue inconvenience to the public?

Dit is juis omdat ons bestuur se taak soveel moeiliker is dat ons aandag toegespeits moet wees op die doelstellings soos deur Dr. Mortimer aangedui. Dit is omdat ons nie oor die nodige maatstawwe of definitiewe aanwysers van winste en markte beskik nie, dat ons soveel meer tyd aan die bestudering van metodes moet spandeer, en ek sluit ook organisatoriese ontwikkeling en werksstudie hierby in.

Ons kan dit nie bekostig om te selfvoldaan te wees omdat ons departementse skynbaar vlot verloop nie – hulle mag oënskynlik vlot, maar miskien baie ondoeltreffend, verloop. Ons moet onself voortdurend en bewuslik die vraag stel: Wat doen ek, waarom doen ek dit, hoe kan ek dit beter doen?

Terwyl ek 'n voorstander is van die doen-dit-jouself benadering, voel ek dat Dr. Mortimer nie genoeg klem lê op die noodsaaklikheid van bestuurdersdeelname nie. En nie net sommer deelname nie, maar deelname met die nodige dryfkrag. Ons middelbestuur en toegesigheids personeel moet gewoonlik geforscer word om meer tyd aan die verbetering van werksprosedures, die materiaal wat ons gebruik en die manier waarop dit deur ons gebruik word, te spandeer. Hulle moet leer om meer tyd aan hierdie aspek af te staan. Die betrokkenheid van die topbestuur is hier uiters belangrik, en in die manier waarop dit gewys kan word is deur middel van gereelde vergaderings tussen die ingenieurs en die personeel, vergaderings waarop spesifieke vrae oor praktiese gestel word, en standaard en prosedures breedvoerig bespreek word. Hierdie riglyn kan selfs deur die kleinste voorsieningsonderneming gevolg word.

One of the largest cost elements in any undertaking is staff costs, and effort devoted to improving the utilisation of labour will yield the biggest return. One can improve labour utilisation without sophisticated work study schemes by two simple measures; matching the gang size to the job, and setting completion times for jobs. These two simple management procedures can be applied by most experienced supervisors, and can be most effective. Unfortunately they are too often neglected.

Very often an artisan or operative worker has a complement of black assistants assigned to him based on his average requirement, or sometimes even on his maximum requirement. This means that very often he is sent on a job where he has too many assistants, they can not all be usefully employed, and the unemployed ones stand around doing nothing. Not only does this result in the job costing too much, but it contributes to a large extent to the bad public image of inefficiency which municipalities have. With a little forward planning on the part of the Foreman, using his experience to judge the work content of the job, the surplus labour can be removed, and used more profitably on another larger job, where additional labour can be of benefit. This can in fact lead to an overall reduction in numbers employed.

Die tweede prosedure, wat eintlik ineenkaskel met die eerste, is dat die Voorman 'n tydberaming van die werksverrigting, gebaseer op sy eie ondervinding, moet maak, en dat hy hierdie inligting aan die werker

moet oordra. Hy moet aan die werker 'n definitiewe tyd gee waarop die werk klaar behoort te wees. Die ondervinding het geleer dat die tydberaming gewoonlik wel gedoen word, maar dat die Voorman nalaat om die informasie aan die werker oor te dra, en sodoende het die werker nie 'n doelwit nie. Dit is dus allerbelangriks dat hierdie informasie aan die werker oorgedra word.

Although not as scientific as proper work study, these measures are quite effective, and can easily be applied by the smaller authorities.

Mr MURPHY, Somerset West, commented that his department had used an incentive bonus scheme for the installation of load control relays in domestic areas, with great success.

Mr SCHOLLES, Johannesburg, observed that fundamentally men wanted to work efficiently and a bonus scheme assists them in doing this.

Mnr BOTES, Roodepoort, kla oor hoe lank dit neem vir O en M om 'n ondersoek in te stel en af te handel.

Mnr LOUBSER, Benoni, het gevra of Dr Mortimer al ooit 'n ondersoek gedoen het waar hy in elk geval gevind het dat betrokke departemente heeltemal onderstaf is.

Dr MORTIMER, in summing up, stated that there are some areas, not the province of O and M, such as staff turnover, where independent management consultants could be used with advantage. In general, however, in his experience, management consultants often give advice which is technically very good but which does not stand the test of time. The money spent on consultants could more effectively be used in payment for staffing a good O and M Organisation.

It must be emphasised that O and M does not undertake management audit. It does not pry into the personal effectiveness of staff.

Other points mentioned by Dr Mortimer were:

Johannesburg's Beneficial Suggestion Scheme effectively solicits suggestions from staff in return for cash payments.

Delegations must imply delegating authority as well as responsibility.

The other side of the staff reduction story is the consideration of not mechanising in order to preserve employment for unskilled staff.

Men on bonus, who are ideal for promotion, often refuse as this could entail financial loss.

Local Government, unlike business, is not out to make profit but this need not prevent their paying attention to targets, quotes, management information systems and human relations.

Zero based budgeting is a budgeting technique where you ask a simple series of questions. Work study is a different technique, another tool, asking another set of questions. They are complimentary to each other but they do not go together.

## REPORT OF THE SECRETARY FOR THE YEARS 1981 AND 1982 VERSLAG VAN DIE SEKRETARIS VIR DIE JARE 1981 EN 1982

Bennie van der Walt, Secretary/Sekretaris

On behalf of the Executive Council of the Association of Municipal Electricity Undertakings of South Africa, I take pleasure in submitting the following condensed report of the activities of the AMEU for the financial years of 1981 and 1982.

### 1. EXECUTIVE COUNCIL

(a) Together with their Councillor Members, who are nominated by the Electricity Undertakings, the following Engineer Members were elected to the Executive Council at the 47th Convention held in Durban in 1981:

D.H. Fraser	- Durban - President
W. Barnard	- Johannesburg - President Elect
J.A. Loubser	- Benoni - Standing Committee
P.J. Botes	- Roodepoort
N.S. Botha	- Bloemfontein
E.G. Davies	- Pietermaritzburg
J.D. Dawson	- Uitenhage
A.H.L. Fortmann	- Boksburg
K.J. Murphy	- Somerset West
G.J. Nortje	- Germiston
D.C. Palser	- Cape Town
E de C Pretorius	- Potchefstroom
K.G. Robson	- East London

(b) The following Past Presidents were co-opted:

G.C. Theron	- Vanderbijlpark
J.K. van Ahlften	- Springs

Mr G.C. Theron resigned from the Executive Council during this period. The Executive Council met four times, whilst the Standing Committee also held four meetings.

### 2. BRANCHES

The five Branches have held regular meetings to discuss matters of mutual interest and their office bearers were as follows:

#### 2.1 Highveld

Chairman - M.P.P. Clarke, Randburg  
Secretary - M. van der Spuy, Johannesburg

#### 2.2 Good Hope

Chairman - A.S. de Villiers, Cape Divisional Council  
Vice Chairman - D. Veldsman, Administration Board Western Cape  
Secretary - A.C.T. Frantz, Cape Town (Hon. Member)

#### 2.3 Natal

Chairman - P.J.G. van Niekerk, Newcastle  
Vice Chairman - E.I. Pike, Vryheid  
Secretary - E.G. Davies, Pietermaritzburg

## 2.4 Eastern Cape

Chairman - K.G. Robson, East London  
Vice Chairman - H.D. Claxton, Graaff Reinet  
Secretary - I.L. Hobbs, Uitenhage

## 2.5 Free State - Northern Cape

Chairman - J. Grobler, Bethlehem  
Vice Chairman - C. Vosloo, Kimberley  
Secretary - F.P. de Kock, Virginia

## 3. COMMITTEES

The following subcommittees were appointed by the Executive Council.

### 3.1 Standing Committee

D.H. Fraser together with his councillor  
W. Barnard together with his councillor D.H. Fraser.  
P.J. Botes  
J.A. Loubser

### 3.2 Papers Committee

W. Barnard  
D.H. Fraser

### 3.3. Finance Committee

J.K. von Ahlften - Convenor and Councillor W. Barnard.

### 3.4 SATEPSA Main Power Sub Committee

P.J. Botes  
G.J. Nortje

### 3.5 Recommendations Committee for new Electrical Commodities

J.A. Loubser - Convenor  
G.J. Nortje  
together with representatives of other organizations.

### 3.6 Electricity Supply Committee

P.J. Botes - Convenor  
W. Barnard  
D.H. Fraser  
D.C. Palsler  
K.G. Robson

### 3.7 SABS Co-ordinating Committee

E. de C. Pretorius - Convenor  
J.A. Loubser  
G.C. Theron  
J.K. von Ahlften

### 3.8 Technical Training Committee

J.D. Dawson - Convenor  
N.S. Botha  
E.G. Davies  
A.H.L. Fortmann  
J.A. Loubser  
D.C. Palsler

### 3.9 AD HOC Committee - New Regulations for Electrical Installations

J.K. von Ahlften - Convenor  
P.J. Botes  
N.S. Botha  
K.J. Murphy  
E. de C. Pretorius  
K.G. Robson  
together with representatives of other organizations.

### 3.10 Electrical Wiremen Registration Board

J.K. von Ahlften - Statutory

### 3.11 Committee: Code of Practice for Earthing

W. Barnard

### 3.12 Electrolytic Corrosion Committees

#### 3.12.1 Main Committee

G.J. Nortje

#### 3.12.2 Witwatersrand Region

G.J. Nortje

#### 3.12.3 Natal Region

E.G. Davies

#### 3.12.4 Northern Cape Region

N.S. Botha

#### 3.12.5 Western Cape Region

K.J. Murphy

#### 3.12.6 Cape Eastern Region

J.D. Dawson

### 3.13 Highvoltage Co-ordinating Committee

W. Barnard

## 3.14 World Energy Conference

D.C. Palsler  
W. Barnard (Alternate)

## 3.15 CSIR/NEERI Advisory Committee

G.J. Nortje

## 3.16 CSIR/NBRI Advisory Committee

P.J. Botes  
J.K. von Ahlften (Alternate)

## 3.17 NBRI Working Subcommittee for Electrical Distribution

J.K. von Ahlften - Convenor  
J.D. Dawson  
A.H.L. Fortmann  
D.R. Hill  
J.A. Loubser  
K.J. Murphy

## 3.18 NBRI Steering Committee on Rational Norms for Township Services

J.K. von Ahlften

## 3.19 Advisory Committee: NBRI Standardised Conditions of Contract for Electrical/Mechanical Engineering Works

A.H.L. Fortmann  
D.R. Hill

## 3.20 CSIR Solar Energy Subcommittee

D.C. Palsler  
J.K. von Ahlften

## 3.21 SANCI

A.H.L. Fortmann

## 3.22 SANCI/RESA/AMEU Street Light Advisory Committee

A.H.L. Fortmann  
J.K. von Ahlften

## 3.23 Interim Committee for Registration of Technologists and Engineers

J.D. Dawson  
J.A. Loubser

## 4. MEMBERSHIP

### 4.1 The membership of the AMEU as at 31st December 1982 was as follows:

Honorary Members .....	29
Past Members .....	32
Engineer Members .....	160
Associate Members .....	15
Local Authorities .....	180
Affiliates .....	136
Grand Total .....	552

### 4.2 Obituaries

We regret having to record the following deaths:

P.A. Giles (Honorary Member)  
C. Kinsman (Honorary Member)  
H.G. Kipling (Honorary Member)  
C. Borchardt (Councillor)  
C. de Kock (Councillor)  
A. Pugsley (Councillor)

## 5. MEMBER MEETINGS

### 5.1 Convention

The 47th Convention held in Durban from 4th to 6th May 1981 was attended by 654 delegates and ladies.

This was a record attendance.

The papers and discussions were printed in the 47th Convention Proceedings.

### 5.2 Technical Meeting

The 9th Technical Meeting was held in George from the 3rd to 4th May 1982.

I wish to extend our sincere thanks and appreciation to all the Affiliates who have sponsored advertisements for the Proceedings and other social functions at these national meetings.

## 6. WORKING GROUPS AND INTERNATIONAL CONFERENCES

It is the policy of the Executive Council that the AMEU be represented as far as possible at international and local meetings concerning the work of the Undertakings.

## 7. LOCAL CONGRESSES AND CONFERENCES

7.1 The President and members of the Executive Council have attended various local congresses and conferences over the two years.

The AMEU is strongly recognised by the local institutes and organisations.



7.2 Much time was devoted by members of the Executive Council on outside bodies where it is important for the AMEU to make a contribution.

## 8. CONSTITUTION

The Constitution of the AMEU was totally redrafted and approved at the 47th Convention held in Durban.

The Constitutions of the Branches were also amended in accordance with the main Constitution and approved by the Executive Council.

## 9. TRAINING

The Executive Council has embarked on a positive basis to encourage students to improve themselves in the electrical field.

The following financial assistance were granted:

### 9.1 B.Sc. Degree in Electrical Engineering

Mr R.R. Fuller - R1 000 Bursary : Cape Town University  
Mr A.N. Bester - R1 000 Bursary : Stellenbosch Universiteit.

### 9.2 Technikon

Merit awards of R250 each were paid to seven Technikon for the last two years, for the students with the best results in T4. Electrical Engineering.

We have received the names of some successful candidates:

Cape Town, R.A. Broers and L.D. Borril.  
Natal, A.E. Clark.  
Port Elizabeth, F.J. Muller.  
Peninsula, E. Kiemmetter.  
Vaaldriehoek, M.A. Costello and J. Fritz.

### 9.3 Technical Training Awards

R2 400 was paid over to eight Municipal Training Centres for the past two years.

During the first year an amount of R100 and R200 during the second year was made available to the most deserving student.

We received the following names of some of the successful apprentices:

C.P. van der Merwe, Boksburg  
W.J. Britz and J.J. Venter, Bloemfontein  
M. Matthys, Cape Town  
C.W. Swart, East London

## 10. GENERAL

This report should be read in conjunction with the reports of the various committees and/or representatives. The considerable time sacrificed by the representatives and the appreciable amount of work put in by them must specially be mentioned. The aid given in this way is of incalculable value to the AMEU and its members and, on behalf of the members, we express our gratitude for the selfless service.

The Executive Council at all times endeavoured to serve the interests of the local authorities to the best of its ability.

We gladly extend thanks to all organisations with whom the AMEU maintains close contact for their goodwill and collaboration.

Namens die Uitvoerende Raad van die Vereniging van Elektriese-ondernemings van Suid-Afrika lê ek met genoë die volgende beknopte verslag van die aktiwiteite van die VMEO vir die finansiële jare 1981 en 1982 aan u voor.

## 1. UITVOERENDE RAAD

(a) Tesame met hul Raadslede wat deur die betrokke Elektriese-ondernemings genomineer word, is die volgende Ingenieurslede tydens die 47ste Konvensie gehou te Durban in 1981 gekies tot die Uitvoerende Raad:

D.H. Fraser - Durban - President  
W. Barnard - Johannesburg - Aangewese President  
J.A. Loubser - Benoni - Dagbestuurslid  
P.J. Botes - Roodepoort - Dagbestuurslid  
N.S. Botha - Bloemfontein  
E.G. Davies - Pietermaritzburg  
J.D. Dawson - Uitenhage  
A.H.L. Fortmann - Boksburg  
K.J. Murphy - Somersets Wes  
G.J. Nortje - Germiston  
D.C. Palser - Kaapstad  
E. de C. Pretorius - Potchefstroom  
K.G. Robson - Oos-Londen

(b) Die volgende oud-presidente was geko-opteer:

G.C. Theron - Vanderbijlpark  
J.K. von Ahlfen - Springs

Mnr G.C. Theron het bedank van die Uitvoerende Raad gedurende hierdie termyn.

Die Uitvoerende Raad het vier keer vergader, terwyl die Dagbestuur ook vier keer byeengekóm het.

## 2. TAKKE

Die vyf Takke het gereëld bymekaar gekóm om sake van gemeenskaplike belang te bespreek en hul ampsdraers was soos volg:

### 2.1 Hoëveld

Voorsitter - M.P.P. Clarke, Randburg  
Sekretaris - M. van der Spuy, Johannesburg

### 2.2 Goëie-Hoop

Voorsitter - A.S. de Villiers, Kaapse Afdelingsraad  
Ondervoorsitter - D. Veldsman, Administrasieraad Weskaap  
Sekretaris - A.C.T. Frantz, Kaapstad (Erelid)

### 2.3 Natal

Voorsitter - P.J.G. van Niekerk, Newcastle  
Ondervoorsitter - E.I. Pike, Vryheid  
Sekretaris - E.G. Davies, Pietermaritzburg

### 2.4 Oos-Kaapland

Voorsitter - K.G. Robson, Oos-Londen  
Ondervoorsitter - H.D. Claxton, Graaff Reinet  
Sekretaris - I.L. Hobbs, Uitenhage

### 2.5 Vrystaat - Noord Kaapland

Voorsitter - J. Grobler, Bethlehem  
Ondervoorsitter - C. Vosloo, Kimberley  
Sekretaris - F.P. de Kock, Virginia

## 3. KOMITEES

Die volgende onderkomitees was benoem deur die Uitvoerende Raad:

### 3.1 Dagbestuur

D.H. Fraser saam met sy raadslid  
W. Barnard saam met sy raadslid  
P.J. Botes  
J.A. Loubser

### 3.2 Referatekomitee

W. Barnard  
D.H. Fraser

### 3.3. Finanskomitee

J.K. von Ahlfen - Saamroeper - en raadslid  
W. Barnard.

### 3.4 SATEKG Hoof Kragsubkomitee

P.J. Botes  
G.J. Nortje

### 3.5 Aanbevelingskomitee vir nuwe Elektriese Verbruikersware

J.A. Loubser - Saamroeper  
G.J. Nortje  
tesame met verteenwoordigers van ander organisasies.

### 3.6 Elektriese-voorsiening-komitee

P.J. Botes - Saamroeper  
W. Barnard  
D.H. Fraser  
D.C. Palser  
K.G. Robson

### 3.7 Koördinerende Komitee : SABS

E. de C. Pretorius - Saamroeper  
J.A. Loubser  
G.C. Theron  
J.K. von Ahlfen

### 3.8 Komitee : Tegnieise Opleiding

J.D. Dawson - Saamroeper  
N.S. Botha  
E.G. Davies  
A.H.L. Fortmann  
J.A. Loubser  
D.C. Palser

### 3.9 AD HOC-Komitee : Nuwe Regulasies vir Elektriese Installasies

J.K. von Ahlfen - Saamroeper  
P.J. Botes  
N.S. Botha  
K.J. Murphy  
E. de C. Pretorius  
K.G. Robson

tesame met verteenwoordigers van ander organisasies.

### 3.10 Registrasieraad vir Elektrotegniese Draadwerkers

J.K. von Ahlfen - Statuut

### 3.11 Komitee : Gebruikskode vir Aarding

W. Barnard

### 3.12 Komitees : Elektrolitiese Korrosie

#### 3.12.1 Hoofkomitee

G.J. Nortje

#### 3.12.2 Witwatersrandse Streek

G.J. Nortje

#### 3.12.3 Natalse Streek

E.G. Davies

#### 3.12.4 Noord-Kaaplandse Streek

N.S. Botha

#### 3.12.5 Wes-Kaaplandse Streek

K.J. Murphy

#### 3.12.6 Oos-Kaaplandse Streek

J.D. Dawson

### 3.13 Koördinerende Hoogspanningskomitee

W. Barnard

### 3.14 Wêreldkrabbronkonferensie

D.C. Palser

W. Barnard (Alternatief)

### 3.15 WNNR/NNEI-Advisiekomitee

G.J. Nortje

### 3.16 WNNR/NBNL-Advisiekomitee

P.J. Botes

J.K. von Ahlften (Alternatief)

### 3.17 NBNL-Onderkomitee vir Elektriese Distribusie

J.K. von Ahlften - Saamroeper

J.D. Dawson

A.H.L. Fortmann

D.R. Hill

J.A. Loubser

K.J. Murphy

### 3.18 NBNL Loodskomitee vir Stedelike Dienste

J.K. von Ahlften

### 3.19 Adviserendekomitee: NBNL Gestandaardiseerde Voorwaardes vir Kontrak vir die Elektrotegniese/Meganiese Ingenieurswerke

A.H.L. Fortmann

D.R. Hill

### 3.20 WNNR Sonenergie Onderkomitee

D.C. Palser

J.K. von Ahlften

### 3.21 SAKV

A.H.L. Fortmann

### 3.22 SANKV/IVISA/VMEQ Straatlig Advieskomitee

A.H.L. Fortmann

J.K. von Ahlften

### 3.23 Interim-Komitee vir Registrasie van Tegnoloë en Ingenieurs

J.D. Dawson

J.A. Loubser

## 4. LIDMAATSKAP

### 4.1 Die ledetal van die VMEQ op 31 Desember 1982 was soos volg:

Erelid .....	29
Voormalige lede .....	32
Ingenieurlede .....	160
Assosiaat lede .....	15
Plaaslike Besture .....	180
Geaffilieerdes .....	136
Groot Totaal .....	552

### 4.2 Doodsberigte

Dit spy ons om te rapporteer dat ons kennis gekry het van die volgende afsterwes:

P.A. Giles (Erelid)

C. Kinsman (Erelid)

H.G. Kipling (Erelid)

C. Borchardt (Raadslid)

C. de Kock (Raadslid)

A. Pugsley (Raadslid)

## 5. LEDE-BYEENKOMSTE

### 5.1 Konvensie

Die 47ste Konvensie is deur 654 afgevaardigdes en dames vanaf 4 tot 6 Mei 1981 bygewoon.

Hierdie was 'n rekord bywoning.

Die referate en besprekings is vervat in die gedrukte 47e Konvensie Verrigtinge.

### 5.2 Tegniese Vergadering

Die 9e Tegniese Vergadering het plaasgevind in George op die 3e en 4e Mei 1982.

Ek wil graag ons besondere woord van dank en waardering betuig teenoor die Geaffilieerdes wat die advertensies van die Verrigtinge georg het asook vir ander sosiale funksies tydens die nasionale byeenkomste.

## 6. WERKSGROEPE EN INTERNASIONALE KONFERENSIES

Dit is die beleid van die Uitvoerende Raad dat die VMEQ, so ver as moontlik, verteenwoordig moet wees op internasionale en plaaslike byeenkomste rakende die aktiwiteite van die Ondernemings.

### 7. PLAASLIKE KONGRESSE EN KONFERENSIES

7.1 Die President en lede van die Uitvoerende Raad het verskeie plaaslike kongresse en konferensies oor die twee jaar bygewoon.

Die VMEQ word reeds sterk erken deur die plaaslike institute en organisasies.

7.2 Baie tyd word ook deur lede van die Uitvoerende Raad afgestaan op buite liggamme waar dit belangrik is vir die VMEQ om sy bydrae te lewer.

### 8. GRONDWET

Die Grondwet van die VMEQ was in geheel herskryf en goedgekeur by die 47e Konvensie wat gehou was in Durban.

Die Konstitusies van die Takke was ook gewysig in ooreenstemming met die hoof Grondwet en goedgekeur deur die Uitvoerende Raad.

### 9. OPLEIDING

Die Uitvoerende Raad het 'n positiewe beleid aanvaar om studente aan te moedig ter verbetering van hulself in die elektrotegniese beroep.

Die volgende finansiële bystand was verleen:

#### 9.1 B Graad in Elektrotegniese Ingenieurswese

Mr R.R. Fuller - R1 000 Beurs : Cape Town University

Mr A.N. Bester - R1 000 Beurs : Stellenbosch Universiteit.

#### 9.2 Technikon

'n Meriete toekening van R250 elk per Technikon was oorbetaal aan sewe Technikon vir die laaste twee jaar vir die student wat die beste gepresteer het in die T4 Elektrotegniese Ingenieurswese.

Ons het die name van sommige suksesvolle kandidate ontvang:

Kaapstad, R.A. Broers en L.D. Borrril.

Natal, A.E. Clark.

Port Elizabeth, F.J. Muller.

Skierieland, E. Kriesmetter.

Vaaldrichhoek, M.A. Costello en J. Fritz.

#### 9.3 Tegniese Opleiding Toekennings

R2 400 is betaal aan agt munisipale opleidingsentrums vir die afgelope twee jaar.

Gedurende die eerste jaar is 'n toekening van R100 en in die tweede jaar R200, aan die mees verdienstelike student gemaak.

Ons het die volgende name van die suksesvolle vakleerlinge ontvang, n.l.

C.P. van der Merwe, Boksburg

W.J. Britz en J.J. Venter, Bloemfontein

M. Matthys, Kaapstad

C.W. Swart, Oos-Londen

## 10. ALGEMEEN

Hierdie verslag moet saamgelees word met die verskillende komitees en/of verteenwoordigers se verslae. Daar dien vermeld te word dat 'n aansienlike hoeveelheid tyd deur die verteenwoordigers opgeoffer en heelwat werk gelewer is. Die hulp wat aldus verleen word, is van onskatbare waarde vir die VMEQ en sy lede en ons betuig namens die lede dank vir daardie onbaatsugtige dienste.

Die Uitvoerende Raad het te alle tye getrag om die belange van die plaaslike besture en sy lede na die beste van sy vermoë te dien.

Graag bedank ons ook alle instansies met wie die VMEQ 'n noue verbintenis het vir hulle goeie verstandhouding en samewerking.

Mr President, distinguished delegates, I would like first of all to take this opportunity to congratulate you Mr President on your election as the 47th President of the AMEU. I have had the privilege to be very closely associated with you during the past number of years but specifically during this year in organising this convention. My experience is that you are a livewire, although an unusual character, and I have no doubts

about your abilities to render outstanding services at all levels to the AMEU in your capacity as President. May you experience a most successful term in office.

I wish to thank the immediate past President, Mr Denis Fraser, for his guidance and leadership. I really enjoyed working with you, Denis.

Meneer laat my ook toe om my vriend mnr Jan Loubser geluk te wens met die onderskeiding wat hom te beurt geval het met sy verkiesing as aangewese President. Ek glo dat Jan vir u en die VMEO goeie dienste sal lewer want hy steek nie sy lyf weg nie.

Geluk ook aan al die nuutverkose Uitvoerende Raadslede.

Meneer die President, soos u weet het ek op 1 Januarie 1973 diens aanvaar as sekretaris van die VMEO en u is die sesde president waaronder ek dien. Dit is ook my sesde konvensie. Ek het dus my eerste 10 jaar van vakleerlingskap agter die rug en volgens die rekords lyk dit vir my of die sekretarisse van die VMEO nie veel langer uithou as 10 jaar nie! Maar, meneer die President ek sal u gerusstel, ek sal u nie teleurstel nie.

Mr President, I would very much like to highlight certain items in the Secretarial report.

Firstly, the numerous committees as you have referred to in your Presidential Address. I think the convention is indebted to the representatives who served on those committees, because if one has read the various reports one can really gauge the tremendous amount of work the committees demand. Let us therefore give your representatives a warm applause for the sterling work each and every one of them gave during the past two years.

Secondly the membership. Mr President, a municipal institute like the AMEU has got limited growth potentialities, but nevertheless our membership has shown a steady growth over the past decade, viz:

	1983	1973
Honorary Members	29	27
Past Members	32	28
Local Authorities	180	135
Engineers	160	117
Associate Members	15	29
Affiliates	136	90
GRAND TOTAL	552	426

This convention is also proof of the growth of the AMEU because in 1973 a total of 443 delegates attended the Pietermaritzburg Convention as against a record attendance of an all inclusive 700 at this Convention.

Meneer die President ek wil nie verder uitbrei op my verslag nie behalwe om my dank te betuig teenoor al die lede van die Uitvoerende Raad vir hul vriendelike bystand wat hul te alle tye aan my verleen het.

Once again I wish to extend my sincere appreciation to all the affiliates for their support given to the AMEU whenever called upon, especially for the advertisements sponsored for the annual proceedings.

#### E. DE C. PRETORIUS - POTCHEFSTROOM

Hierdie verslag en al die ander verslae (behalwe nr 4) dek die tydperk wat op 31 Desember 1982 afgesluit het. Sedertdien het daar meer as nege maande verloop, verslag waaroor ons seker net mondelings sal verneem. Vir my is dit nie goed genoeg nie.

Dit is seker 'n uitgemaakte saak dat konvensies van die VMEO voortaan in September of Oktober sal plaasvind. Daarom stel ek voor dat die huidige boekjaar van die VMEO sal strek tot vroegstens 31 Mei 1984 en dat toekomstige boekjare sal strek van 1 Junie tot 31 Mei; verder, dat verslae dienoreenkomstig opgestel word.

## FINANCIAL REPORT 1981/1982

J.K. von Ahlften, Convenor

The Association had an excess of income over expenditure of R29 144,69 for the two year period ended 31 December 1982. This surplus is invested to enable the Association to meet its financial commitments in respect of the expenses associated with symposia, working groups, university scholarships, travelling expenses, overseas visits, technician awards etc. which will amount to R19 750 in the Budget for 1983.

The Finance Committee has however proposed that the subscriptions remain unchanged since the increase in 1982 but has accepted the Standing Committee's recommendation to increase the attendance fees for the 1983 Convention from R50 to R75 per delegate to meet the ever rising costs associated with large Conventions of this nature. This recommendation was confirmed by the Executive Council.

The Association's income for the two year period ended 30 December 1982 was made up as follows:

Subscriptions, Conventions and Technical Meeting	
attendance fees R92 929	R92 929
Interest on Investments	R38 373
Publications and Advertisements	R 8 690

It will be observed that the interest on investments is adequate to meet the Association's commitments referred to above and credit is due to our Financial Manager and Secretary for a very healthy investment portfolio, especially in these inflationary times and downturn in the economy.

It has also been possible for the Association to increase its University Scholarship to R4 000 p.a. for the students. An amount of R7 350 has also been allocated to Technicians and Apprentice Training centres for merit awards during 1983.

During the discussion of the Financial Report at the 1981 Convention it was suggested that a list of the names of people to whom these awards were made be made available at Conventions and the Secretary has been requested to include these details in his Secretarial Report.

The suggestion was also followed up that awards to Apprentices be made either at Branch meetings or Council meetings applicable to the particular Apprentice by the Branch Chairman or Mayor as the case may be.

In view of the fact that the work load of Branch Secretaries is increasing the Executive Council also resolved that an annual honorarium of R100 be paid to Branch Secretaries as from 1982.

To maintain its national and international affiliation and standing the AMEU endeavours to participate in as many Conferences and Committees in the Republic as it deems possible, the expenses involved being largely met from the interest on investments. This is vital and in the interest of not only the suppliers but also the consumers of electricity in this country.

In conclusion I wish to thank the other members of the Finance Committee for their support and guidance during the past two years which has enabled me to submit a healthy financial report at this Convention.

Copies of the Auditors Report and the Financial Statements are available to members from the Secretary on request.

#### P.-J. BOTES - ROODEPOORT

Meneer die President, ek wil graag oor die Finansiële verslag iets sê en lê die gesikureerde verslag ter tafel in die afwesigheid van mnr Jules von Ahlften, Voorseter van die Finans-komitee.

Die VMEO se groei op finansiële gebied was fenomenaal. In 1973 was die totale inkomste uit alle bronne R13 415,00 teenoor verlede jaar se R96 429,00. Die totale uitgawe in 1973 was R12 735,00 teenoor verlede jaar se R67 516,00. Die VMEO het 'n belegging van R2 000,00 in 1973 gehad teenoor verlede jaar se R196 222,00.

I wish to thank the other members of the Finance Committee for their support during the 1981/82 financial period under review.

Members will notice that despite the high rate of inflation and steady eroding of our monetary value, the AMEU has been able to maintain a healthy reserve fund to meet its financial commitments. Here I think we must also express our sincere appreciation to those member undertakings who have generously contributed towards the expenses of their engineer members who have attended many official meetings and discussions on behalf of the AMEU which has certainly lessened our financial burden.

However, there is no doubt that the AMEU will have to continue to apply a strict financial discipline in its financial affairs in future which under the able guidance of our financial manager, Bennie van der Walt, has so far proved to be very successful.

With these few remarks I wish to move the adoption of the Financial Report.



## save the drops and you won't get into deep water

With sky-rocketing costs of equipment and resources, it is vital to extend the life of equipment and maximize the use of production commodities by extracting every re-usable drop!

Chemilite are Engineering Design Consultants, specialising in the manufacture, installation and servicing of oil purification, water treatment and fluid movement equipment.

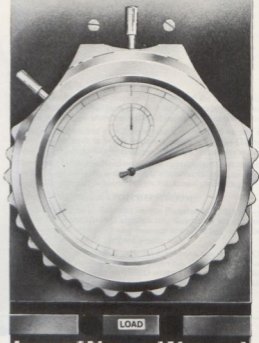
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CAPE TOWN: 30 Selsdon Road, Parow, Tel. 93-2197.  
DURBAN: 7 Schenk Road, Pinetown, Tel. 71-1347.  
MIDDELBURG: TVL 2, 5th Street, Middelburg, Tel. 4979.  
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# TRIPS ON TIME...

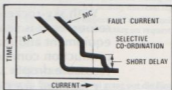


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# REPORT ON THE AMEU COLUMN (PUBLICITY) IN THE JOURNAL "LOCAL GOVERNMENT IN SOUTHERN AFRICA"

## VERSLAG OOR DIE VMEQ RUBRIEK (REKLAME) IN DIE TYDSKRIF "PLAASLIKE REGERING IN SUIDELIKE AFRIKA"

A.H.L. Fortmann – Representative/Verteenwoordiger

On a suggestion by Dr. Johan Meyer, Editor of the journal "Local Government in Southern Africa", it is preferable to refer to the publicity, the AMEU receives in the journal as the "AMEU Column" rather than "AMEU Publicity."

At the Executive Council meeting of the AMEU held on 30 October 1981, the Council expressed its desire that the column published in the journal appear under the heading "Covering The Activities Of The AMEU".

This request was conveyed to Dr. Meyer.

At a meeting of the AMEU Standing Committee held on 30 August 1982 with Dr. Meyer and Mr. Jutson of Melton Publications, the Standing Committee resolved to recommend to the AMEU Executive Council that the journal "Local Government in Southern Africa" may report on matters of interest coming from the AMEU annual meetings but that papers should not be reprinted in full.

Judging from the articles appearing in the journal "Local Government in Southern Africa", and the close association I have had with the Editor, Dr. Johan Meyer, it is evident that he is doing sterling work in an effort to promote the AMEU and its activities. In this regard Dr. Meyer needs all the assistance, not only from me as the liaison or contact person between the AMEU and "Local Government in Southern Africa", but from all our members and our various branches.

A section is set aside in the journal for the AMEU and Dr. Meyer uses three guidelines in its development as follows:

1. News about the AMEU and its varied activities.
2. Popularised articles about electricity, aimed at the layman, to introduce him to the achievements and problems of this complex sphere.
3. Scientific articles aimed at the engineer.

"Local Government in Southern Africa" is read by Town Clerks, Heads of Departments of all sections in Local Authorities and I guess by Councillors as well, making this an ideal medium for promoting the AMEU. It could prove to be the AMEU mouthpiece to the outside world.

It is probably not incorrect to state that many of us have complained about the meagre publicity recognition we receive. Perhaps we have ourselves to blame to a large degree.

In this journal, with the help of Dr. Meyer, we have the opportunity to improve the situation.

For Dr. Meyer to gain access to information, he needs advance notice of our Branch meetings, symposia and conventions, which he would dearly like to attend, so that he is able to fit these into his busy programme. SANCI Congresses concern the AMEU, and are also of interest to Dr. Meyer.

The opinion has been expressed that SANCI papers and SANCI-related matters should not appear under the "AMEU Column", because SANCI is not the AMEU and SANCI's papers and SANCI matters appear in the journal "Vector".

However, many AMEU members are not SANCI members and possibly do not receive "Vector" and reading something about SANCI under the "AMEU Column" may stimulate non-SANCI AMEU members to become interested in SANCI affairs.

A sincere call is therefore made to all our members, especially our secretaries, chairmen of Branches and convenors of any committees of the AMEU to make contact with Dr. Meyer and let him have agendas and minutes of meetings, as if he were one of our members. Dr. Meyer does not expect to be given information of a confidential nature.

Where information is conveyed to me, I will in turn pass this on to Dr. Johan Meyer.

It is an important task for the liaison person to provide the Editor with every detail concerning the AMEU country wide in all its activities and it is therefore absolutely essential that everyone – engineers, branches, committees, etc. – assists in this matter.

I would like to recommend that the various AMEU Branches place on every agenda for their meetings – the Highveld Branch does this regularly – an item "AMEU Column".

Every City or Town Electrical Engineer should receive a copy of "Local Government in Southern Africa" – this is after all our official journal.

The publishers are:

Melton Publications (Pty) Ltd.,

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2034.

Telephone No. (011) 41-0151/2/3/4

The Editor:

Dr. Johan Meyer's address is:

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Verwoerdpark,

Alberton,

1453.

Telephone No. (011) 869-4561

Na aanleiding van 'n voorstel deur Dr. Johan Meyer, Redakteur van "Plaaslike Regering in Suidelike Afrika", word dit verkies om nie na publisiteit van die VMEQ in die tydskrif te verwys nie, maar na die "VMEQ Rubriek".

Op die vergadering van die Uitvoerende Raad van die VMEQ, op 30 Oktober 1981, het die Raad sy begeerte uitgespreek om die rubriek wat in die tydskrif verskyn onder die opskrif "Dekking van die Aktiwiteite van die VMEQ" te laat publiseer.

Die versoek is aan Dr. Meyer oorgedra.

Op die vergadering van die VMEQ Dagbestuur op 30 Augustus 1982, met Dr. Meyer en Mr. Jutson van Melton Publikasies, het die Dagbestuur besluit om aan die VMEQ Uitvoerende Raad aan te beveel dat die tydskrif "Plaaslike Regering in Suidelike Afrika" op sake van belang van die VMEQ se jaarlikse vergaderings, mag rapporteer maar dat die referate nie tenvolle herdruk mag word nie.

Met die inagneming van die artikels wat in die tydskrif "Plaaslike Regering in Suidelike Afrika" verskyn en die noue kontak wat ek met Dr. Johan Meyer, die Redakteur, het, is dit duidelik dat Dr. Meyer uitstekende werk verrig om die VMEQ en sy aktiwiteite te bevorder. Dit is daarom belangrik dat Dr. Meyer alle hulp, nie net van my as skakel of kontakpersoon tussen die VMEQ en "Plaaslike Regering in Suidelike Afrika" nie, maar ook van al ons ander lede en die verskeie takke moet kry.

In die tydskrif word 'n gedeelte vir die VMEQ opsy gehou. Dr. Meyer gebruik drie riglyne in die ontwikkeling hiervan, naamlik:

1. Nuis oor die VMEQ en die verskillende aktiwiteite.
  2. Interessante artikels oor Elektrisiteit, hierdie artikels is gerig op die leek om hom sodoen bekend te maak met die suksesse en probleme in hierdie ingewikkelde veld.
  3. Wetenskaplike artikels vir die ingenieur.
- "Plaaslike Regering in Suidelike Afrika" word gelees deur Stadslerke, Departementshoofde van alle departemente in Plaaslike Regering en, ek neem aan, ook deur Raadslede. Bogenoemde maak dit die ideale media om die VMEQ se saak te bevorder en dit kan die VMEQ se spreekbuis aan die buitewêreld wees.

Dit is heelwaarskynlik nie foutief om te sê dat baie van ons al gekla het oor die skamele publisiteitserkenning wat ons geniet nie. Dalk is ons self grootliks hiervoor verantwoordelik.

Met hierdie tydskrif en die hulp van Dr. Meyer het ons nou die geleentheid om sake te verbeter.

Om die informasie aan Dr. Meyer bekend te stel behoort by vooraf van die Takvergaderings, simposiums en kongresse te weet. Hy sal dit baie

graag wil bywoon, maar 'n vroegtijdige kennisgewing is nodig om dit by sy besige program te kan inpas. SANKV-Kongresse het betrekking op die VMEO en is ook van belang vir Dr. Meyer.

Die gedagte is uitgespreek dat SANKV-referate en SANKV-sake nie in die VMEO Rubriek moet verskyn nie, aangesien SANKV en die VMEO nie dieselfde liggaam is nie. SANKV-sake word ook reeds in die "Vector" tydskrif gepubliseer.

Heelwat VMEO-lede is nie SANKV-lede nie en ontvang waarskynlik nie "Vector" nie. Deur 'n artikel oor SANKV in die "VMEO Rubriek" te plaas kan nie-SANKV-VMEO-lede se belangstelling in SANKV-sake geprikkel word.

'n Dringende versoek word dus aan al ons lede, met 'n spesiale versoek aan sekretarisse, voorsitters van takke en sameroepers van komitees, gerig om in kontak met Dr. Meyer te bly en hom van agendas en notules van vergaderings, asof hy 'n normale lid is, te voorsien. Dr. Meyer verwag nie inligting van 'n vertroulike aard nie.

Waar inligting aan my gestuur word sal ek dit oordra aan Dr. Johan Meyer.

Dit is 'n onbegonne taak vir die skakelpersoon om die Redakteur in sake elke besonderheid in die aktiwiteite van die VMEO landswyd in

te lig. Dit is daarom baie belangrik dat elkeen - ingenieurs, takke, komitees, ens. 'n bydrae hiertoe sal lewer.

Ek wil voorstel dat die verskeie VMEO-takke 'n item "VMEO-Rubriek" op elke agenda van hulle vergadering plaas: Dit is reeds 'n geruime tyd die gebruik by die Hoëveld-tak.

Elke Elektrotegniese Stadsingenieur behoort 'n uitgawe van "Plaslike Regering in Suidelike Afrika" te ontvang - dit is ons amptelike tydskrif.

Die publiseerder is:

Melton Publikasies (Edms) Bpk.,  
Posbus 84248,  
Greenside,  
2034.  
Telefoon No. (011) 41-0151/2/3/4

Die Redakteur:

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Telefoon No. (011) 869-4561

## REPORT : SABS CO-ORDINATING COMMITTEE VERSLAG : KOÖRDINERENDE SABS-KOMITEE

Eugene Pretorius

1. In accordance with a standing resolution of the Executive Council (permitting rapporteurs to submit their reports in the official language of their choice) the language of this report will be alternately Afrikaans and English.

Ingevolge 'n vaste besluit van die Uitvoerende Raad (wat verslaggewers toelaat om hulle verslae in die amptelike taal van hulle keuse aan te bied) is hierdie verslag beurtelings in Engels en Afrikaans opgestel.

2. Tensy anders gestel, dek hierdie verslag die tydperk 1981-01-01 tot 1983-06-30.

3. The members of the Committee, which was appointed on 1981-05-07, are Messrs. J. A. Loubser, J. K. von Ahlften and E. de C. Pretorius (Convener). Up till January 1983, when he retired, Mr. G. C. Theron was also a member.

### 4. Vergaderings - Meetings

4.1 Die Komitee het 8 keer vergader. Daarbenewens is 2 vergaderings saam met 'n ad hoc-komitee van die Uitvoerende Raad oor die kwessie van IEK-standaarde vir Elektriese Kables. Heelwat sake is onderling ook telefonies afgehandel.

4.2 Salient points from the deliberations and activities of the Committee are the following:

- (a) In the previous (1981) report it was reported that the Committee had resolved to withdraw AMEU representation on some 30 SABS committees due to the, in the Committee's opinion, irrelevance of the subject matter of the projects involved. Due to adverse criticism from the floor at the 1981 Convention, the Committee resolved to reinstate representation on 6 of these committees (dealing mostly with domestic electric appliances).

#### (b) Standaard laespanning

In 1979 het hierdie Komitee takke van die VMEO versoek om hulle uit te spreek of hulle ten gunste daarvan is aldan nie dat die toekomstige standaard laespanning in die RSA dieselfde moet wees as die voorgestelde standaard IEK-laespanning, nl. 230/400 V 6%, - 10%. Al die takke se reaksie was positief.

Intussen blyk dit of die IEK-voorstel al meer en meer teenkanting van sy lede kry en vir my persoonlik lyk dit of aldan nie dat die toekomstige standaard laespanning in die RSA dieselfde moet wees as die voorgestelde standaard IEK-laespanning, nl. 230/400 V 6%, - 10%. Al die takke se reaksie was positief.

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volgens die Komitee se mening, veel meer nadele as voordele daaraan verbonde is en omdat dit blyk dat die IEK-voorstel (230/400 V) slegs deur enkele lede van die IEK gesteun word.

#### (c) IEC standards for electric cables

The Committee was approached by the SABS to express an opinion on the desirability of bringing SABS cable specifications in line with those of the IEC.

The Committee considered this to be of such great importance, with far-reaching implications, that it requested the Executive Council to form an ad hoc committee from its members to deal with the matter in collaboration with the Committee. The members appointed were Messrs. D. H. Fraser, P. J. Botes, N. S. Botha, A. H. L. Fortmann, G. J. Nortjé, D. C. Palser and K. G. Robson.

The ad hoc committee had two meetings. At the first meeting the members were addressed by Mr. Felix Prins, the former head of the SABS Cables Section, who vehemently argued against the adoption of the IEC standards and Mr. J. V. (Ian) Grant who strongly advocated such adoption.

At the second meeting it was resolved to support a SABS compromise proposal to the effect that -

- (i) South Africa adopts international standards for conductors in insulated cables. This should apply to all copper and solid circular and stranded aluminium conductors. However the present standards for solid shaped aluminium conductors could (should?) be retained as it is recognized that difficulties may arise in respect of crimping lugs and ferrules. Further investigation into the lug and ferrule problem may, in time, change this approach;
- (ii) the present dimensional and other requirements as written in current SABS power cable specifications be retained as some requirements have relevance in the South African environment while most conform already to international standards.

(Due to serious objections by several members of the SABS General Co-ordinating Cables Committee at its meeting held on 1983-06-21 it was decided, by this committee, not to change to IEC conductors for the time being but the concept might be reconsidered at a later date.

At the same meeting the principle of subdividing cable specifications, i.e. separate specifications for conductors, PVC, paper, XLPE, armouring etc. etc., was accepted).

#### (d) Nuwe kontakprop en -sok

Uit verskillende oorde, o.a. die Departement van Man-

nekrig by monde van die Hoofinspekteur van Fabriek, is vertoë tot die SABS gerig om 'n standaardspesifikasie vir 'n nuwe, kompakte prop en sok ("plug and socket outlet") op te stel omdat die bestaande standaard (driepenn-16-A)-sok en prop kwansuis uitgedien en te lomp is. (Eie persoonlik deel nie hierdie stenswyse nie).

Die logiese stap is om die RSA-spesifikasie te baseer op 'n IEK-spesifikasie maar dit lyk asof die voorstelle vir die veelbesproke internasionale (IEK-) sok en prop skipbreuk gaan ly by die op hande synde IEK-vergadering (nadat daar al 'n dekade of meer daarvoor beraadslaag is). Indien dit die geval is, sal daar of van die konsep van 'n internasionale sok en prop afgestap word of die sal novo met 'n splinternuwe spesifikasie begin word wat 'n tydrovende proses is. In daardie geval sal die RSA seker maar sy eie paadjie moet loop.

(e) Arising from the proceedings of the 1982 Technical Meeting (George) the Committee has approached the SABS to draw up a standard specification for a single phase 220 V ± 50 A stove connector. The SABS has promised to investigate this matter but to date the Committee has had no further communication from the SABS.

(f) Die SABS is versoek om die standaard spesifikasie vir wolframgloeilampe uit te brel om ook voorsiening te maak vir 240-V-lampe soos die geval is in die ooreenstemmende IEK-spesifikasie.

(g) SABS 0142-1981: Code of practice for the wiring of premises

(i) Exclusion of electrical appliances

This matter has been dealt with in AMEU Bulletin no. 149 d.d. 1982-02-19 under the heading SABS CERTIFICATION. (Please note that the word "required" should read "requested" – the Afrikaans version is correct).

(ii) Pursuant to a request from Mr. W. Bozyczko, Lady-smith, the Committee has approached the SABS to revise the requirements for socket outlets and plugs for supplies to caravans. The SABS has already deliberated with the S.A. Caravan and Camping Council and instructed Working Group 4 (of the Main Committee dealing with the Code) to submit proposals that would surmount the relevant problem.

(iii) Op versoek van mnr. K.G. Robson, Oos-Londen, is die SABS genader om 'n skets op te stel om regulasie 5.4.3(b)(6) toe te lig. In die proses het die SABS ontdek dat hierdie regulasie, soos dit tans lees, onsinig is en dit is nou in die proses van wysiging.

(iv) Mnr. A.A. Weich, Hoofinspekteur van Fabriek, het sy kommer uitgespreek dat daar heelwat regulasies is wat op verskillende maniere – voorsieners eersyds en aannemers andersyds – vertolk (kan) word. Hierdie saak geniet ook aandag. (O.a. is VMEO-lede versoek om sulke gevalle by die Sekretaris aan te meld).

5. A new Standards Act, Act no. 30 of 1982, has been promulgated.

6. Mnr. J.W. Smit, Direkteur van die SABS se afdeling Elektrotegniese Ingenieurswese en Fisika en 'n gewaardeerde vriend van die Komitee, was vir ernstig ongesteld maar ons is dankbaar om te verneem dat hy baie bevredigend herstel het.

#### 7. Progress report – Vorderingsverslag: SABS

During the period under review the following SABS committees, on which the AMEU is represented, were active. Also in the table are the names of the representatives concerned – (P/A means "plaasvervanger"/alternate) – and brief summaries of the activities given. (Notes: "Reported"; (a) Project no.; (b) TITLE (some condensed); (c) Representative(s); (d) Progress. Some reports are based on information received directly from the SABS or abstracted from the committee minutes).

7.01 (a) 361/50280: (b) ISOLEEROLIE VIR TRANSFORMATORS EN SKAKELING; (c) \*G.J. Nortjé, A.J. v.d. Berg (P/A); (d) Voorgestelde wysiging: SABS 555-1976; IEK-publikasie 296-1969 is onlangs vervang deur IEK 296-1982 wat 'n aantal wysigings bevat. Aangesien SABS 555 op eersgenoemde publikasie gebaseer is, moet besluit word of hierdie spesifikasie dienoreenkomstig gewysig gaan word. Een vergadering is gedurende Mei 1983 gehou. Daar is besluit dat sekere tegniese inligting aan lede voorsien sal word vir bestudering, waarna daar weer 'n vergadering belê sal word.

7.02 (a) 711/50220: (b) MOBIELE KOMMUNIKASIE TOE-RUSTING VIR LANDGEBRUIK; (c) \*M.W. Odendaal,

J.J. Swanepoel (P/A); (d) Vier vergaderings is gehou. Tydens die laaste vergadering wat gehou is op Donderdag 2 Junie 1983 te Acacia-komiteekamer, SABS, Groenkloof, Pretoria, is bogenoemde dokument weer bespreek. Daar is besluit om die proefdokument te laat sirkuleer vir 'n tydperk van 2 maande en dan finaal te bespreek tydens 'n vergadering. Daar is slegs 'n paar veranderinge tydens die vergadering van 2 Junie 1983 aangebring.

7.03 (a) 721/50020 & 721/50070: (b) PUBLIC LIGHTING I & II; (c) \*J.K. von Ahlften, G.C. Theron (P/A); (d) Nil – A request has however been submitted for a revision of the Code in respect of a lower standard for residential road lighting applications as recommended by the AMEU/NBRI Electrical Committee for township services.

7.04 (a) 721/50040: (b) TUNGSTEN FILAMENT GENERAL SERVICE ELECTRIC LAMPS; (c) \*J.K. von Ahlften, P.J. Botes; (d) 1. Regarding the Highveld Branch complaint on short lamp life the SABS has responded as follows:

We refer to your letter of 11 June 1982 and to subsequent discussions that we had with lamp manufacturers in your presence during the SANCI Annual Congress in Kimberley. During these discussions it was agreed that at this stage it will not be advisable to amend the SABS specification for tungsten filament general service electric lamps to cover longer life lamps.

We are aware of the fact that your suggestion to consider a specification for longer life lamps originated as a result of some of the members of your association experiencing unsatisfactory short lamp lives. During our discussions, the lamp manufacturers offered to inspect the burnt-out lamps to try and determine the cause of the exceptionally short lives. We would therefore request you to invite your members to send burnt-out lamps that were short-lived, either to us or to the manufacturer concerned. In the latter case we would appreciate receiving a copy of the covering letter as we would like to be kept informed.

To determine the exact life of a lamp will however require that an accurate record be kept of each individual lamp. This will call for extra effort from your members but we are of the opinion that it will be worth your while. We hope to solve the problem in this way to the satisfaction of your members.

2. The revised specification was circulated for comment in November 1981 and was accepted by the Committee.

This revision covers details of lamp holders suitable for use in the torsion test and method of measurement of light centre lengths in the case of internally white lamps.

7.05 (a) 621/50050: (b) BALLASTS FOR L.P. SODIUM VAPOR AND H.L.D. LAMPS; (c) \*J.K. von Ahlften. (d) SABS 1266-1979 has been amended to standardize a marking on the ballast.

7.06 (a) 721/50120: (b) CAPACITORS FOR USE WITH FLUORESCENT AND OTHER DISCHARGE LAMPS (SABS 1250); (c) \*A.J. v.d. Berg, R. Yates (P/A); (d) 1. Discussions took place on self-heating capacitors with a rated voltage exceeding 300 V AC and it was finally decided that Messrs. African Capacitors will submit test results as no final decision could be reached at the meeting with regard to the endurance test voltage. The results are still awaited.

2. Capacitor losses. It was proposed that the tangent of the loss angle of an oil-filled (Type A) capacitor shall not exceed 0,008.

3. It was also proposed that the capacitance of a capacitor element at its rated maximum temperature shall in both Type A and B capacitors not differ from the value at 25°C by more than 5% (present current limit of 3% for Type A capacitors proved to be too stringent).

4. It was proposed that because there is only one SABS standardization mark and to avoid confusion manufacturers to add a specification number to the standardization mark, as this would protect both the SABS and the manufacturer should a capacitor be used for the wrong purpose.

5. The SABS received a letter from African Capacitors (see 1 above) and in a letter dated 21 July 1983 they proposed the following amendment:

"Connect each capacitor element through a suitable fuse to an a.c. supply having an r.m.s. voltage that is 1,3 times the rated maximum working voltage of the capacitor, but in the case of a capacitor element having a rated maximum working voltage exceeding 300 V, 1,2 times the rated maximum working voltage of the capacitor".



- It was stressed that if no reply is received within three weeks it will be assumed that members are in agreement and the specification will be amended accordingly.
- 7.07 (a) 721/50140: (b) BUISFLUORESSERLAMPE VIR ALGEMENE GEBRUIK (SABS 1041); (c) "D.S. v.d. Merwe, J.A. Loubser (P/A); (d) "n Voorstel deur die SABS was ingedien op 15 November 1982 waarin aanbeveel was dat 25 mm fluoreseerbuisligte by spesifikasie SABS 1041 ingesluit moet word.
- Omsendbriewe met voorgestelde wysigings was aan alle lede van die komitee gestuur.
- Voorts het die SABS in 'n skrywe gedateer 10 Januarie 1983 laat weet dat geen tegniese beware ontbreek nie en dat voorgaand woord met die wysiging.
- 7.08 (a) 721/50240: (b) FIXED LUMINAIRES FOR FLUORESCENT LAMPS; (c) G.C. Theron (up till 1983-01-31, thereafter J.K. von Ahlfen), "R.S. Yates (P/A); (d) A meeting of the above Committee was held on 16 September 1982 in order that alterations could be made to align specification No. 1119 with Government Notice 466. Some relatively minor alterations were made and a new subsection added concerning tests to appliances.
- 7.09 (a) 751/50010: (b) GEBRUIKSKODE VIR DIE BEDRADING VAN PERSELE (SABS 0142); (c) "J.A. Loubser, "E. de C. Pretorius, P.J. Botes, J.K. von Ahlfen; WG3: "J.A. Loubser, WG4: "J.J. Boshoff en "C. Hecker; (d) Alhoewel die kode al sedert 1978 beskikbaar is, het sekere versoeners nie daarvolgens gewerk nie. In die Staatskoerant van Maart 1982 word die verpligte gebruik van die kode egter afgekondig.
- Die eerste wysiging op die kode (SABS 0142-1981) is beskikbaar vanaf Augustus 1981, maar met 'n kode soos hierdie sal wysigings altyd daar wees en verskeie vergaderings is sedertdien alweer gehou waarvan meeste gegaan het oor die "Verselede magtigingsprosedure", volgens aanhangsel G van die kode.
- Binnekort behoort hierdie aspek van die kode ook afgehandel en gepubliseer te wees.
- Die werk van Werkgroep 3 van die Hoofkomitee (Internasionale Regulasies) gaan steeds voort, met mnr. Toms van SABS as nuwe Sekretaris van die Suid-Afrikaanse Nasionale Komitee.
- Bedradingskode - Werkgroep 4.
- Gedurende die betrokke tydperk het hierdie groep slegs een vergadering op 25 Junie 1981 gehou.
- ("n Subkomitee is benoem om regulasies vir die "Verselede magtigingsprosedure" ("Accelerated authorization procedure") op te stel. In die konsultasies, was deur die SABS opgestel is, speel die VME0 se "Aanbevelingskode" 'n pertinente leidende rol. Ek verneem dat sekere lede van die subkomitee nie daarmee gediens was nie - tydens 'n vergadering wat heel onlangs gehou is - en daar nie tot 'n vergelyk gekom kon word nie).
- 7.10 (a) 751/50030: (b) PLUGS, SOCKET OUTLETS AND ADAPTORS (NON-DOMESTIC); (c) G.C. Theron (up till January 1983, thereafter J.K. von Ahlfen), "J.A. Loubser (P/A); (d) 2 meetings were held. Draft for general comment is being prepared. (SABS).
- 7.11 (a) 751/50060: (b) TWEE-POOL-EN AARDINGSPEK-KONTAKPROPPE EN SOKKUITGANGE; (c) "J.A. Loubser, P.J. Botes (P/A); (d) Voltooi: SABS 164-1980. Een vergadering vir 'n wysiging i.v.m. die "aan" posisie van die skakelaar is sedertdien gehou.
- 7.12 (a) 751/50110: (b) MANUALLY OPERATED AIR-BREAK SWITCHES; (c) G.C. Theron (up till January 1983, thereafter J.K. von Ahlfen); (d) One meeting was held. Second draft is being prepared for issue to the Committee. (SABS).
- 7.13 (a) 751/50170: (b) BEDRADINGSKANALE VIR ELEKTRIESE KABELS; (c) "J.J. Boshoff, M.E.O. Bick (P/A); (d) Deel 2: Metaalbedradingskanale vir installering in vloere. Die derde vergadering van hierdie komitee is op 2 April 1981 gehou en op 14 Desember 1982 is sekere wysigings per brief voorgestel. Geen vordering sedertdien.
- 7.14 (a) 761/50010: (b) PVC-GEÏSOLEERDE KABELS; (c) "E. de C. Pretorius, J.K. von Ahlfen, J.A. Loubser (P/A); (d) Wysigings nr. 5 en 6 van SABS 150-1970 is onderskeidelik op 1981-05-20 en 1983-03-02 goedgekeur. Dit omvat verskeie wysigings; die wysigingstrokkies is gratis by die SABS verkrygbaar.

- 7.15 (a) 761/50020: (b) PAPER-INSULATED CABLES (SABS 97); (c) G.C. Theron (up till January 1983, thereafter J.K. von Ahlfen), "M.P.P. Clarke, M.J. Human (P/A); (d) Amendment 3 of SABS 97-1970 was issued on 20 May 1981. Amendment 4 is being prepared for publication.
- 7.16 (a) 761/50060: (b) XLPE-KABEL (SABS 1339-1981); (c) P.J. Botes, "A.H.L. Fortmann, E. de C. Pretorius, M.W. Odenaal (P/A); (d) Hierdie projek dek kruisgebode poliëteen elektriese verspreidingskabels in die 3,8/6,6 kV- tot 19/33 kV-reeks.
- Aangesien plaaslike owerhede van die grootste - moontlik die heel grootste - verbruikers van verspreidingskabels in Suid-Afrika is, het die VME0, namens sy lede werklik baie belang by hierdie projek gehad.
- Die projek is afgehandel en SABS 1339/1981 is reeds in werking.
- 7.17 (a) 761/50120: (b) THE SELECTION, HANDLING AND INSTALLATION OF ELECTRIC POWER CABLES UP TO AND INCLUDING 22 kV RATING; (c) "P.J. Botes, C.F. Coetzee (P/A); (d) One meeting was held on 24 November 1981 where some comments mostly from the post office were considered, but most of it was deleted and in some instances replaced with a more practical reference. Quite a number of small alterations were effected, whereafter it was decided to proceed with the final publication.
- 7.18 (a) 771/50140: (b) AARDLEKBEVEILIGINGSEENHEDE VAN DIE STROOMBALANSTIPE; (c) "F.J. v.d. Merwe, J.A. Loubser, G.C. Theron (tot Januarie 1983, daarna J.K. von Ahlfen); (d) Deel I van die dokument is afgehandel en gepubliseer onder SABS 767-Deel I - 1982.
- Deel II van die dokument is voltooi na 'n vergadering gehou op 1982-06-24 en word gereed gemaak vir publikasie.
- 7.19 (a) 771/50310: (b) INSTRUMENT TRANSFORMERS; (c) "L.F. Boyack, G.J. Nortjé (P/A); (d) First meeting held in September 1981. Further meetings held in 1981 and 1982.
- Latest meeting in September 1982; this meeting was adjourned until such time as consensus with Escom achieved regarding the use and control of the SABS mark.
- 7.20 (a) 781/50120: ELECTRIC COOKING PLATES AND SURFACE UNIT HEATERS; (c) "J.H. Davies; (d) On 27 March 1981, the first revision of SABS Specification 154-1981 (title as above) was circulated to Committee Members. On 1 September 1981 the Committee considered the foregoing and certain amendments were agreed upon.
- A new document will be circulated by the SABS following completion of certain experimental and development work required.
- 7.21 (a) 781/50140: REVISION OF COMPULSORY STANDARD SPECIFICATION FOR ELECTRIC STOVES, COOKING TOPS, OVENS, GRILLS AND SIMILAR APPLIANCES (SCHEDULE 8); (c) "J.H. Davies; (d) On 22 March 1982, the first revision of the proposed Specification (title as above) was circulated to Committee Members.
- On 15 April 1982 a meeting of the Committee took place to consider the foregoing and certain amendments were agreed upon.
- It was further agreed that no further meetings of this Committee were necessary.
- The document will be prepared for publication and comment in the Government Gazette after the SABS has brought this into line with the general requirements for all appliances in accordance with I.E.C. documentation.
- 7.22 (a) 781/50380: (b) ELECTRIC STOVES, COOKING TOPS, OVENS GRILLS AND SIMILAR APPLIANCES; (c) "J.H. Davies; (d) On 25 March 1981, the third revision of SABS Specification 153-1981 (title as above) was circulated to Committee Members. This document has subsequently been approved by the SABS Council and has now been published.
- 7.23 (a) 781/50420: (b) KITSVERWARMERS; (c) "J.J. Boshoff, A.J. v.d. Berg (P/A); (d) Die derde vergadering van hierdie komitee is op 8 Julie 1981 gehou en op 19 April 1982 is kennis ontvang dat die spesifikasie deur die SABS-raad goedgekeur is as SABS 1356.
- 7.24 (a) 791/50010: (b) PROTECTION OF STRUCTURES AGAINST LIGHTNING; (c) "M.P.P. Clarke; (d) The draft of SABS 03 is about to be circulated for comment and with accelerated procedures, is expected to be published by the end of 1983. The preliminary document has received very favourable comments from local and overseas organizations.

7.25 (a) 791/50150 and 791/50160: (b) INSULATION LEVELS FOR ELECTRIC POWER SUPPLIES; STANDARD VOLTAGES AND CURRENTS; (c) "I.F. Boyack, \*E.H. Scholes, D.H. Fraser, W. Barnard, \*E. de C. Pretorius. In a meeting of the Co-ordinating Committee held in August 1983 the AMEU representation on this (new) combined committee was reduced to the latter three members: Mr. Boyack has retired and Mr. Scholes will be retiring shortly). (d) This standard originally covered only standard voltages and currents but is now in process of amendment to include limits of supply system unbalance (in addition to voltage variations) as well as recommended insulation levels for use in South Africa. Tables of lightning impulse withstand voltage and power frequency withstand voltage from nominal system voltages up to 400 kV are being included, also guidance on the ratings of surge arresters to be used on different systems.

A meeting was held in October 1981 to discuss the standardization of no load voltages for mining transformers.

See also item 4.2(b) of this report.

7.26 (a) 791/50170: (b) VERSPREIDINGSTRANSFORMATORS; (c) I.F. Boyack, F.L. Knobel (P/A); (d) Wysiging nr. 2 van SABS 780-1979 (1983-03-02): Die spesifikasie is gewysig deur die insulering van enkelfasige transformators met drywingsaanslae van hoogstens 2 000 kVA; die wysiging van 'n ver wysing na 'n standaardspanning; die wysiging van 'n woordbepaling; die dielektriese toetsprosedures en verskeie konstruksievereistes; die skraping van 'n woordbepaling, seker standaardverlieswaardes en die vereistes vir standaardtoehore vir miniatuursubstasietransformators; en deur standaardverliese op meer as een aangeslane sekondêre spanning van toepassing te maak. (SABS-geskrif).

7.27 (a) 791/50250: (b) OVERHEAD TRANSMISSION LINES; (c) E.H. Scholes, H.D.P. von Oppel (P/A); Ad hoc sub committee: Regs. C.63-C.70 of the Factories Act; I.F. Boyack, \*M.P.P. Clarke, D.B. Briers, N.S. Botha, \*D.H. Fraser, D.C. Palser, G.F. Rautenbach, J. van S. Lochner, K.G. Robson, C. Vosloo, \*H.D.O. von Oppel; (d) Following recommendations of the committee amendments to Regulations C.63 to C.71 of the Factories, Machinery & Building Works Act were published in Government Notice R.1880 on 11 September 1981.

A single meeting of the Ad Hoc Committee was held on 12 August 1982 to discuss publication of the SAIEE Code of Practice as an SABS Code of Practice. After discussion it was resolved that the SAIEE be requested to continue publication with an additional note drawing attention to revised Regulations issued under the Factories, Machinery and Building Work Act 1941. It was further resolved that the Committee study a document on design principles being prepared by ESCOM for wood pole lines not exceeding 24 kV. Should the Committee accept that this document is suitable for publication as an SABS Code of Practice, then project 791/50250 would be cancelled.

Subsequently the above was approved by the full committee subject to inclusion in the SAIEE Code, and any subsequent SABS Code, of a table of revised clearances above the property of the South African Transport Services Administration.

7.28 (a) 791/50280: (b) EARTH RODS; (c) G.H. Dawes; (d) Two meetings were held, both in June 1983, the first by the full committee and the second by a sub committee.

It was agreed, amongst others, to limit the scope of the specification to copper-plated steel rods only ("of circular cross section to provide an earth electrode in soil").

A final draft specification could be expected in the near future, it seems.

7.29 (a) 791/50230: (b) MINIATURE SUBSTATIONS; (c) \*E. de C. Pretorius, P.J. Botes, I.F. Boyack (P/A); (d) Amendments no. 1 and 2 of SABS 1029-1975 were approved respectively on 1981-03-04 and 1982-03-03. Amendment slips are available from the SABS free of charge.

7.30 (a) 791/50310: (b) CODE OF PRACTICE FOR THE APPLICATION OF PROTECTIVE MULTIPLE EARTHING TO LOW VOLTAGE DISTRIBUTION SYSTEMS; (c) W. Barnard, M.D.R. McIntosh; (d) The final Code is on the agenda of the Convention.

7.31 (a) 851/50850: (b) GLADDE-END METAALLEIPE EN TOEBEHORE VIR ELEKTRIESE BEDRAGING (SABS 1007-1973); (c) \*J.J. Boshoff; (d) Tydens die VMEO-kongres in Durban in 1981 het ek berig dat ek beswaar aangeteken het teen voorgestelde wysigings van hierdie spesifikasies wat

daarop sou neerkom dat gladde-end metaalleipe nie as aardeleë gebruik sou kon word nie en dat die krag nodig, om lasse uittekaar te trek van 2 000 N en 4 000 N vir 20 mm en 63 mm pyp onderskeidelik sou verminder tot 110 N en 500 N.

'n Afskrif van my briewe aan die SABS in hierdie verband word aangeheg.

Na aanleiding van my vertoë het die SABS aanvaar dat die gebruikskode gewysig sou word om te bepaal dat metaalleipe nie as aardeleërs aanvaarbaar sou wees nie. Daar is besluit dat as 'n tussentydse maatregel elke langte gladde-end leipe voorsien sal word van 'n etiket met die woorde "n aparte aardeleë moet gebruik word".

Nadat die toetse deur die SABS uitgevoer is, is verder besluit om die uittrek-krag op 600 N vir alle pyp-diktes vas te stel.

Op 3 Augustus 1982 is 'n gesamentlike vergadering van die komitees vir hierdie projek en vir projeknommer 851/5007, verwysing 15/11/5/5 - skroefleipe en toebehore vir Elektriese Bedrading, gehou.

Daar is besluit om die spesifikasies te rasionaliseer en as resultierende dele van 'n gesamentlike spesifikasie op te stel.

Deel 1 van die hersiene konsepsiespesifikasie is pas ontvang met die versoek dat dit indien moontlik per korrespondensie afgehandel moet word.

## 8. Vorderingverslag: IEK - Progress report: IEC

Die normale prosedure is dat die SABS IEK-dokumentasie aan VMEO-verteenwoordigers (korrespondente) stuur vir kommentaar. In buitengewone gevalle, soos in dié van die internasionale kontaktsok en -prop, word soms 'n vergadering van verteenwoordigers belê.

Notas: (a) IEK-nr.; (b) TITEL; (c) Verteenwoordiger/Korrespondent; (d) Verslag. (\*Verslag gedoen).

8.01 (a) TC 8: (b) STANDARD VOLTAGES, CURRENT RATINGS AND FREQUENCIES; (c) W. Barnard (\*B. Cumming); (d) The only item considered, it appears, was the standardization of d.c. high voltages. Correspondent did not comment on comments of the German National Committee on Document 8 (Norway) 1010.

8.02 (a) SC 23 C: (b) WORLDWIDE PLUG AND SOCKET OUTLET SYSTEM; (c) \*J.A. Loubser, \*P.J. Botes; (d) Twee vergaderings is deur die S.A. Nasionale komitee in dié verband gehou en verskeie aanbevelings is aan die internasionale komitee gemaak. Mr. Grant van die SABS en verskeie ander lede van die S.A. Nasionale Komitee het ook die internasionale vergaderings bygewoon. Die jongste aanduidings i.v.m. die maontlike aanvaarding van 'n internasionale standaard is etger baie negatief. Die moontlikheid om 'n nuwe nasionale grootte daar te stel word tans oorweeg.

It seems that the new 16 A - 250 V round pin system met with stiff opposition and it will therefore not be submitted to the Six-month's Rule. The next meeting will be in Tokyo on 22/24 October 1983.

8.03 (a) SC 23 E: (b) CIRCUIT BREAKERS AND SIMILAR EQUIPMENT FOR HOUSEHOLD USE; (c) \*P.J. Botes; (d) This document has been prepared, and is now submitted to the National Committees for approval under the Two Month's Procedure.

8.04 (a) TC 28: (b) INSULATION CO-ORDINATION; (c) \*D.H. Fraser; (d) Following deliberations of IEC T.C. 28 over a considerable period an IEC Standard on Insulation Co-ordination Part 3: Phase-to-phase insulation co-ordination Principles, rules and application guide Publication 71-3 was issued in 1982.

8.05 (a) (i) TC 34 A; (ii) TC 34 B; (iii) TC 34 C; (iv) TC 34 D; (b) (i) LAMPS; (ii) LAMP CAPS AND HOLDERS; (iii) AUXILIARIES FOR DISCHARGE LAMPS; (iv) LUMINAIRES; (c) \*J.K. von Ahlfen; (d) The S.A. National Committee only takes part in these activities by way of correspondence and has cast positive votes on all amendments proposed during this period which did correspond with the SABS requirements.

(Mr. G.C. Theron was die AMEU representative/correspondent up till January 1983).

8.06 (a) SC 59 A; (b) ELECTRIC DISHWASHERS; (c) \*P.J. Botes; (d) Discussions still centres on test and measuring methods of measuring the performance of electric dishwashers.

8.07 (a) SC 59 H; (b) MICROWAVE APPLIANCES; (c) \*P.J. Botes; (d) National Committees are requested to review the

clause on Defrosting and Heating Performance and to submit new test proposals as in their present form the tests have not had sufficient technical support.

8.08 (a) SC 61 B: (b) INVESTIGATION INTO THE SAFETY OF HOUSEHOLD MICROWAVE OVENS; (c) \*J.H. Davies; (d) Progress: Pending comments invited by 29 July 1983 on a draft revision of publication 335-25.

9. Die Verpligte Standaardspesifikasie vir die Veiligheid van Elektriese Toestelle is vanaf Maart 1982 van krag.

10. Van Staatsweë is onlangs 'n waarskuwing aan gebruikers van elektriese kables gerig dat sekere leweransiers tender vir kabel wat die SABS-merk dra maar dan ingevoerde kabel lewer. Lede moet asb. op hulle hooë hiervoor wees en dergelike gevalle **onnadelik** aan die SABS rapporteer.

11. On behalf of my committee and myself I wish to thank all those AMEU representatives who, invariably under difficult circumstances and pressure of work, studied the relevant SABS documents and attended the committee meetings. Certain representatives had to travel long distances to attend the meetings. Thank you, too, to those who have submitted progress reports.

11.1 I also wish to thank those city and town councils in whose employ these representatives are, for the opportunities afforded to them to carry out this work, which is of national interest: I believe that this is a matter of casting one's bread on the waters.

12. Weens die ligging van die SABS se setel en die gevolglike afstand-probleem word VMEQ-verteenwoordigers feitlik sonder uitsondering uit die Hoëveldtak benoem. Ek sou eger graag wou sien dat daar heelwat meer verteenwoordigers uit ander takke aangewys word en sal praktiese voorstelle in die verband uit die Konvensie verwelkom.

13. I wish to thank all the SABS personnel concerned for their hearty co-operation notwithstanding the fact that we have not always supported their proposals. In particular I wish to thank Messrs. J.W. Smit, Director of the Electrical Engineering and Physics Department, J.V. (Ian) Grant and J.C. (Kees) van Alphen.

14. Ter afsluiting wil ek herhaal wat ek in my 1981-verslag geskryf het: Ons, die VMEQ, moet die SABS beskou as een van ons getrouste en sterkste bondgenote in ons strewe om net die beste aan ons elektrisiteitsverbruikers te bied. Maar die SABS se hande is afgekap as ons nie saamwerk deur nie self lojaal (o.a. merk-bewus) te wees nie.

#### J.K. VON AHLFTEN - SPRINGS

Wat die Gebruikskode betref is die probleme waarna mnr Pretorius verwys in item 4.2(g)(iv) tydens die besprekingspunt 6 Nuuwe Regulasies vir Elektriese Installasies bespreek.

Wat item 7.03 betref is die SABS deur die NBNI versoek na aanleiding van die elektriese werkekomitee vir stedelike dienste se aanbeveling.

dat daar gekryk word na 'n laer en meer ekonomiese standaard vir resiesensie straatverligting en hoopelik sal die SABS spoedig aandag aan die versoek skenk.

Wat item 7.04 betref rakende die klage van 'n baie kort lewensduurte wat met algemene dienslampe ondervind word, het die SABS versoek dat die VMEQ lede terugvoering daaroor doen om hulle in staat te stel om die saak te ondersoek maar blykbaar het die versoek nie juis vrugte afgewerp nie. Graag versoek ek lede om kommentaar hieroor te lewer vernameklik die Hoëveld Tak wat die saak aanhangig gemaak het.

Wat die aanvaarding van 'n standaard spanning van 230/440 V betref, sal die saak seer sekerlik bespreek word onder besprekingspunt 7, maar ek wil graag die voorstel onder item 4.2(b) ondersteun.

#### E. DE C. PRETORIUS - POTCHEFSTROOM

Die van u wat dit nog nie gedoen het nie, teken gerus in op die SABS-bulletin wat maandeliks verskyn; dit hou 'n mens op hoogte van die bydrygheide van die SABS teen 'n baie geringe uitgawe.

#### MR VAN ALPHEN - SABS

In August 1982 an ad hoc committee of the SABS Committee appointed by Council to prepare a code of practice on overhead power transmission lines passed the following resolutions which were confirmed by the full Committee in November 1982:

RESOLUTION 1. That the South African Institute of Electrical Engineers be requested to continue selling the Institute's code of practice for overhead power lines for conditions prevailing in South Africa, as revised and issued in 1966, subject to the following:

(a) That a note be printed on the inside cover of the code of practice (or by means of a sticker on the inside cover):

"Regulations C.63 to C.71 of the 'Factories, Machinery, and Building Work Act and Regulations' on which this code of practice was based have been revised, see Government Notice R1880 of 11 September 1981. Where provisions of this code are in conflict with the revised Regulations, the provisions given in the revised Regulations shall apply."

(b) That the attached revised table of outdoor clearances above property of the South African Transport Services Administration be added to replace the existing Appendix IX.

RESOLUTION 2. That the SABS Committee review design principles for wood pole lines for voltages not exceeding 24 kV, which are being prepared by the Electricity Supply Commission (ESCOM) and determine whether these are suitable for publication as a SABS code of practice. It is expected that the preparation of these design principles by ESCOM will be completed not later than 1984.

A third resolution that the SABS should not proceed beyond the limited scope given in Resolution 2 has recently been contested in the annual meeting of the High Voltage Co-ordinating Committee. This resolution, although approved by the committee, has therefore not been included.

## INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC) TECHNICAL COMMITTEE No. 64 ELECTRICAL INSTALLATIONS OF BUILDINGS (TC64) MEETING HELD IN QUINCY (USA) : 4 - 8 OCTOBER 1982

Report by W. Barnard

Fifty-one delegates from 19 countries attended the meeting. The South African delegation consisted of Messrs W. Barnard, A. McDonald and J.E. Toms. Mr. Barnard who represented the Johannesburg City Council also attended on behalf of the AMEU.

1. The progress made in formulating an acceptable International Standard is, as is to be expected, painfully slow. After many years, agreement has still not been reached on an International Plug and Socket.

As with previous meetings the Agenda was extremely lengthy, comprising 45 items covering a wide field. It is therefore only possible to summarise briefly those items of interest to Local Supply Authorities:

#### (a) HV INSTALLATIONS

Committee of Action postponed this work for the next few years.

#### (b) WG11 - DEMAND AND DIVERSITY

Disbanded. Too many national variations depend on local conditions. Not possible to proceed.

#### (c) 64 (SECRETARIAT) 342 : ELECTRICAL IMPEDANCE OF THE HUMAN BODY. (REVISION PUBLISHED 479)

Now on 6MR, incorporating Quincy decisions.

(6MR) - (NOTE THAT 6MR IS A DOCUMENT WHICH HAS APPARENT MAJORITY AGREEMENT AND ON WHICH EACH COUNTRY MEMBER MUST VOTE AND THE DOCUMENT WILL BE ADOPTED IF NOT MORE THAN ONE-FIFTH OF THE VOTES ARE NEGATIVE, WITH ABSTENTIONS COUNTING AS POSITIVE VOTES).

#### (d) 64 (SECRETARIAT) 354 : EFFECTS OF DIRECT CURRENT (REVISION OF PUB. 479)

Also on 6MR.

#### (e) 64 (SECRETARIAT) 319 : INITIAL VERIFICATION

Committee 50/50 divided on material - majority being for the "guide" or non-mandatory publication. WG12 to produce new draft.

(f) **64 (SA) 60 : COMBINED EXTERNAL INFLUENCES**

To be discussed by WG3.

(g) **64 (SECRETARIAT) 348 : PROTECTION AGAINST UNDER-VOLTAGE**

Now on 6MR.

(h) **TC62 : INSTALLATIONS IN MEDICALLY USED PREMISES**

Considerable argument. TC64 did not undertake this work. SC62A did. TC64 thinks this should be in Pub. 364! But there are conflicts. Everyone asked nationally to review TC62 work because this report is shortly to be issued as a 6MR document.

(i) **PROTECTION OF LV GENERATORS**

Private generators of all types.

Decision : 14 for, 1 against, 2 abstained.

NEW WORK to be commenced, priority 1.

2. The following discussions are of particular interest:

(a) **RESULTS OF A QUESTIONNAIRE ON ELECTRICAL ACCIDENTS**

Mr. Stiner of USA stated that substantially different accident rates had been found between large conglomerations and in rural areas. This suggested that the mode of living and the climatic conditions had to be considered before making conclusions. The committee discussed the influence of the compulsory use of high sensitive earth leakage circuit breakers and it was the consensus that the number of fatal accidents could be *reduced considerably* by such devices.

Investigations in Switzerland led to the conclusion that a reduction of fatal accidents by 60% was possible. Certain doubts were expressed as to whether the statistical data of the various countries were sufficiently comparable.

The United Kingdom proposed that a working group be set up to make recommendations for collecting substantial data in a uniform manner. A working group WG23 will be set up to prepare a standard format for collecting statistical data on electrical accidents. (NOTE BY REPRESENTATIVE : ALL MEMBERS WILL BE CIRCULATED IN DUE COURSE AND IT WOULD BE APPRECIATED IF CAREFUL STATISTICS OF ALL ELECTRICAL ACCIDENTS COULD BE KEPT).

(b) **DISCUSSIONS OF THE DRAFT OF THE REVISION OF PUBLICATION 479 : PART 6 : ELECTRICAL IMPEDANCE OF THE HUMAN BODY**

The Austrian delegate gave a short introduction to the document mentioning in particular that it was based on measurements made on corpses and additional measurements performed with lower voltages - 15 V and 25 V on living persons.

The Committee then considered the Austrian comment that as a worst case condition the path impedance of 1 000 ohms irrespective of the current path should be generally accepted. As this proposal was only supported by the South African delegation it was not agreed to.

After conclusion of the discussion on this document the Committee agreed to turning the draft into a 6MR Document.

(c) **DISCUSSION OF THE DRAFT ON CHAPTER 45 : PROTECTION AGAINST UNDER-VOLTAGE AND SECTION 535 : DEVICES FOR PROTECTION AGAINST UNDER-VOLTAGE (64 SECRETARIAT) 348**

The Committee considered the comments collated in Document 64 (Secretariat) 359 and took the appropriate decisions. Regarding further handling of the Draft the Committee decided as follows:

*Decision:* After revision by the Editing Committee the Draft will be circulated under the Six Months' Rule aiming at its publication as an IEC standard.

(d) **MR R.C. MIERENHOF, CHAIRMAN OF SC 28A, ON INSULATION COORDINATION OUTLINED SOME OF THE SCOPE AND WORK OF THE COMMITTEE**

"The subject of Insulation Coordination deals with the dimensioning of clearances and solid insulation in electrical equipment so as to withstand over-voltages without flashover and consequential fault current or degradation and breakdown of solid insulation.

In the high voltage field insulation coordination is quite normal. However, physics do not stop at the borderline between high voltage and low voltage. The physical phenomena that determine the rules of insulation coordination are the same down to the Paschen voltage limit (about 250 volts).

Electrical equipment is, at the present time, mostly dimensional to specific design standards which specify certain values for clearances. That is the reason why great differences in such di-

mensions exist between various countries as well as between various types of equipment. The solution to this problem would be performance standards which specify withstand voltages instead of clearances.

SC 28A has prepared a performance standard for clearances which is based on investigations on the nature of the electric field with clean electrodes (Hermstein, Pfeiffer).

Up to now some sort of *ipso facto* coordination exists throughout electrical installations which depends on the clearances of the various pieces of equipment. However, present electrical systems do not have a known transient over-voltage controlled limit and electrical equipment does not have a known transient over-voltage withstand capability. In general, solid insulation breaks down first because its withstand capability is much lower than that of air distances.

An IEE report on Reliability of Electrical Plants indicates that transient over-voltages are a significant cause of insulation failures in all electrical apparatus. Over-voltage conditions do not normally exist in equipment that is functioning, but during no load times over-voltage can rise to very high values.

In an installation natural attenuation of the over-voltages occurs due to the impedances of the various branches of the installation. This results in a staircase of descending over-voltages. Each staircase consists of series impedances (for the frequency of the transient surge) and shunt impedances (due to the load).

In uncontrolled situations the magnitude of the steps, as well as the over-voltage level at the service entrance varies largely.

Publication 664 aims at bringing the over-voltages down to controlled levels. For this purpose external over-voltages and over-voltages generated in the equipment have to be taken into account and be controlled to the same level.

TC 64 should recognise this problem and introduce it in its Publication 364 Requirements for Insulation Coordination based on Publication 664.

Mr Mierendorf felt that this situation was in the past where failures due to insulation breakdowns presented a relatively low risk. For sensitive industries and expensive electronic equipment things were much different.

Mr Hoyle mentioned the case of damages to mobile homes after manufacturers had changed over from metallic boxes for circuit outlets which served as a kind of natural surge arrester to insulating boxes.

Mr Mierendorf reported on a court decision in Wisconsin on a home burning that had been traced down to a surge voltage. The utility had been made responsible because they had contracted for 120 volts but delivered a surge voltage of several thousand volts over the line.

Mr Wyss, speaking from his experience in an insurance company, gave some figures of fires caused by atmospheric over-voltages which showed that such damages are not negligible. He said he was convinced that considerable reduction was possible if some control over the voltages at the service entrance existed.

(e) **QUESTIONS FROM SC 23C**

A letter received from the Secretary of SC 23C, Mr Grant, had been tabled as a meeting document. It dealt with two problems.

(i) **Marking of neutral terminals of socket outlets.**

The discussion revealed that the geometrical disposition of the neutral conductor was closely related to the question of polarization. The proposed standards for plugs and socket outlets of SC 23C allow for polarization. This can however not be made mandatory.

Mr Roberts made it clear that the use of the letter N for terminal marking was not acceptable for the USA because it inferred that the terminal was indeed connected to the earthed neutral conductor. They had, however, systems in the USA where this was not the case.

Mr Hoyle pleaded for a colour marking in such a way that the colour of the terminal corresponds to the colour of the conductor to be connected to it.

Since the question had only been raised at the meeting and there had been no opportunity to consult the National Committees most of the delegations were not prepared to take a decision on the spot.

*Decision:* The question is deferred to the next meeting. Mr Hoyle undertook to prepare a Secretariat document for explaining the situation.

(ii) **120 V touch voltage at plug pins**

The Secretary said that the opinion expressed in the letter



that Working Group 4 was competent for fixing touch voltage levels for electrical equipment was certainly not correct.

Mr Hoyle and Mr Roberts informed the Committee that the problem stemmed from the fact that the plug and socket outlet system at present in use in the USA, Canada, Brazil and Japan and in some other countries did not prevent persons from touching the live pins of the plug during insertion. Since this plug and socket outlet system was a candidate for the 120 volt plug and socket outlet system to be adopted by

the IEC they said it was important that the IEC rules did not forbid this practice. Mr Hoyle suggested a note to the effect that in some countries the requirement of IP 2X protection need not be met for the plugs during insertion. The Secretary was opposed to the "in some countries . . ." clause.

Most delegations were not prepared to take a decision on this question which had only been raised at the meeting.

*Decision:* The matter is deferred to the next meeting. In the meantime Mr Hoyle will prepare a Secretariat Document which sets out the problem and formulates the question.

## REPORT OF THE AD HOC COMMITTEE : NEW REGULATIONS FOR ELECTRICAL INSTALLATIONS

by J.K. von Ahlften – Convenor

As reported to the 1981 Convention held in Durban the Government has accepted those recommendations of the Wiehahn Commission of Enquiry into labour legislation which resulted in the repeal of the Electrical Wiremen and Contractors Act and the inclusion of the regulations for electrical installations in the Factories, Machinery and Building Work Act 1941 as promulgated in Government Notice R2756 dated 30 December 1981.

The ad hoc committee was intimately involved either by correspondence and/or attendance at meetings with officials of the Department of Manpower in preparing the new regulations for electrical installations.

Subsequently the Chief Inspector of Factories issued an Instruction No. OS/BV0088 dated 30 November 1981 to all the Divisional Inspectors with comprehensive explanatory notes on the new regulations for Electrical Installations copies of which were made available to the AMEU, ESCOM the ECA and all other suppliers of electricity.

As these new regulations were to become effective from 1 March 1982 seminars under the Chairmanship of the Chief Inspector of Factories were arranged in all the major centres of the Republic to which all AMEU members were also invited to explain and discuss the regulations and answer any questions. As Convenor of this ad hoc committee I, with Mr. Eugene Pretorius, accompanied the Chief Inspector to all these seminars which proved to be very necessary and valuable and all credit is due to the Chief Inspector for his guidance and assistance in this regard. It is therefore fitting to record the AMEU's gratitude towards the Department of Manpower which has made the application of the new regulations a much easier task than it otherwise would have been.

As was to be expected certain administrative and interpretation problems did however arise with the application of these regulations but these have been adequately dealt with and the necessary changes will be made to obviate further problems none of which however has been of a serious nature.

In terms of Government Notice R227 of 12 February 1982 the Minister of Manpower has also exempted Suppliers from the provisions of regulations C176 and C179 in respect of electrical installations or installation work performed by or on behalf of a supplier. This exemption however does not affect the application of Regulation C180 (1) and (2) (a), (b) and (c) of the new Regulations.

The exemptions being granted to the larger users of machinery and other similar users where competent persons are employed to undertake installation work on their behalf have also relieved the task of the supplier in the application of these regulations but it has become pretty obvious that, despite the minimum 70% inspection level required from suppliers, the industry itself has not yet reached the stage where this level can be met and much more self discipline within the industry itself will be required which, no doubt, should be forthcoming as the industry adapts itself to the principles embodied in these new regulations.

The initial task of this ad hoc Committee has therefore been concluded and the Committee could be dispensed with but I would recommend that liaison be maintained with the Department of Manpower, as these regulations may need amendment from time to time, by establishing a smaller AMEU Regulations Committee for this purpose consisting of say not more than three members of the AMEU Executive Council who were actively involved in the previous exercise.

In conclusion I wish to thank all the members of this Committee for their support in bringing these new regulations to a successful conclusion with a special vote of thanks to Mr. Weich, the Chief Inspector of Factories, for his with patience and guidance to the Suppliers in drafting the new regulations.

### J.K. VON AHLFTEN – SPRINGS

As mentioned in the second last paragraph of my report, this ad hoc Committee has now completed its initial task and need not be reconstituted. I would however, suggest that this Convention supports the suggestion that the Executive Council forms a smaller say "AMEU Regulations Committee" to maintain liaison with the Department of Manpower whenever these regulations may need amending or updating as the case may be.

MR WEICH stated that to date the tendency for suppliers is still to test between 90 – 100% of the installations. The Department of Manpower does not object to this but it would seem that suppliers are not taking advantage of the relaxation and are not trying very hard to differentiate between the good and bad contractors.

## VERSLAG VAN DIE REGISTRASIERAAD VIR ELEKTROTEGNIËSE DRAADWERKERS

deur J.K. von Ahlften – Verteenwoordiger

Soos vermeld in die verslag aan die 1981 Konvensie in Durban was dit die laaste volledige verslag van die Registrasieraad as sodanig voordat die Wet op Elektriese Draadwerkers en Aannemers herroep sou word en die regulasies vir elektriese installasies en installeerwerk in die Wet op Fabriek, Masjinerie en Bouwerk opgeneem sou word soos afgekind in Desember 1981 met intredatum van 1 Maart 1982.

'n Afsluitingsvergadering van die Registrasieraad was derhalwe op 16 Februarie 1982 gehou wat as die 508ste vergadering aangeteken staan sedert die Wet in 1939 tot stand gekom het. Die VME0 was dan ook sedertdien verteenwoordig op hierdie Raad en vir rekorddoelindes en

moontlik ook as 'n historiese gebeurtenis was die laaste Raad soos volg saamgestel:

Mnr. A.A. Weich

Hoof Inspekteur

Mnr. A.C.L. Elisien

van Fabriek as Voorsitter

Verteenwoordiger

Mnr. J. Hughes

van die Elektriese Werkers Vakbond

Verteenwoordiger

Mnr. D. Kneale

van die Draadwerkers

Verteenwoordiger

van die E.K.V.

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Mnr. J.K. von Ahlften

Mnr. C.P. de Leeuw

Mnr. L.H. Hare

Mev. E.J. Koogje

Die werk van die Raad in belang van die nywerheid, werkers, aannemers en voorsieners maar in besonder die veiligheid van verbruikers met die toesig en beheer oor elektriese draadwerk behoort egter nooit onderskat te word nie. Dit was egter duidelik dat 'n nuwe bedeling nodig geword het om aan te pas by veranderende omstandighede wat die elektriese installasie bedryf in sy geheel betref en dat die ou Wet en die Raad nie meer aan die doel en verwagting van die nywerheid sou kon

Verteenwoordiger van die VMEQ  
Verteenwoordige van die Departement Mannekrag  
Verteenwoordiger  
Sekretaresse

beantwoord nie. Daar word derhalwe nou eervol afskeid geneem van die Raad met 'n erkenning van getroue dienste wat gelewer is oor 'n tydperk van byna 43 jaar.

#### J.K. VON AHLFTEN - SPRINGS

Met die indiening van die laaste verslag oor die Registrasieraad wat nou weggeval het, is dit seker net nodig om kennis te neem van die jarelange bydrae wat die VMEQ se verteenwoordiger op die Raad en was die belang van die voorsieners altyd in ag geneem tydens beraadslagings.

Daar word dus eervol afskeid geneem van die Raad met 'n erkenning van getroue diens in belang van die elektriese voorsieningsnywerheid oor 'n tydperk van bykans 43 jaar.

## REPORT OF THE TECHNICAL TRAINING COMMITTEE FOR THE PERIOD 1981/83

J.D. Dawson - Convener

### 1. COMPOSITION OF THE COMMITTEE

The following members of the AMEU were appointed to this Committee by the Executive Council at its meeting held on the 7th May, 1981.

N.S. Botha	Bloemfontein
E.G. Davies	Pietermaritzburg
J.D. Dawson	Uitenhage
A.H.L. Fortmann	Boksburg
J.A. Loubser	Benoni
D.C. Palser	Cape Town

Three meetings of the Committee have been held during the period under review to consider items referred to the Committee by the Executive Council in respect of technical training and associated matters.

### 2. PROFESSIONAL ENGINEERS ACT No. 81 OF 1968 : AMENDMENT

At the AMEU Convention held in Durban on the 4th to 6th May, 1981 the Executive Council was requested to investigate the implications in so far as municipal electrical engineers are concerned of Proclamation R108 of 1981 and Government Notice No. R1142 as contained in Government Gazette No. 7598 published on the 29th May, 1981 and this request was referred to the Technical Training Committee for attention.

Basically the proclamation and notice require in terms of the Professional Engineers Act, No. 81 of 1968 as amended that all juristic persons including local authorities shall not later than the 29th May, 1986 ensure that all "work reserved for professional engineers" which is done "for reward" and "for any other person" shall be done by a professional engineer.

The Committee considered this matter at length, sought numerous legal opinions, held discussions with engineering institutions and finally sought confirmation of the opinion formulated by the committee from the Federation of Societies of Professional Engineers.

A final recommendation was then submitted to the meeting of the Executive Council on the 29th October, 1982 and approved as follows:

- A professional engineer IS NOT legally required for any work undertaken by a local authority for that local authority, i.e. where the end product of the work remains in the ownership of the local authority.
- A professional engineer IS required for any kind of work reserved for professional engineers in terms of section 7(3)(c) of the Professional Engineers Act No. 81 of 1968, as amended, undertaken by a local authority for reward for any other person, whether a natural or a juristic person.

All engineer members of the AMEU were advised of this opinion by the President in a letter dated 18th January, 1983.

### 3. SHORTAGE OF MUNICIPAL ELECTRICAL ENGINEERING STAFF

Shortage of municipal electrical engineering staff has been an issue of major concern for a number of years and has been the subject of numerous reports and of much correspondence between the President of the AMEU and the United Municipal Executive.

The Technical Training Committee is of the opinion that the only solution to the shortage of electrical engineering staff is to make such posts financially attractive and this will only be possible if the present restrictions placed on salaries are removed.



Mr. Bennie van der Walt, Secretary of the AMEU, presents the AMEU Apprentice Award to Mr. R.C. Rogerson in the presence of the Mayor of Johannesburg Cnr. Alan Gadd, MPC at the Johannesburg Annual function for the Presentation of Awards to Apprentices.

This in turn requires the support of the United Municipal Executive and the Technical Training Committee recommended to the President that the following facts relevant to the shortage of municipal electrical engineers should be submitted to the UME:

- It is the prognosis of the Federation of Societies of Professional Engineers that there will be a severe shortage of professional engineers in both the private and public sector by 1985.
- This prognosis is applicable to the country as a whole but because of the salary differentiation in favour of the private sector compared to the public sector it can be expected that the engineers who are available will prefer to work in the private sector.
- The Federation of Societies of Professional Engineers has recommended that it is in the public interest that it should be the long term objective of local authorities to appoint professional engineers. This will never be realised until sufficient individuals become professional engineers and this in turn will require that salaries paid to professional engineers should be radically improved.
- The restriction imposed by the Government and/or the Provincial Administrations on the Town Clerk's salary which in turn restricts the salary paid to municipal engineers is a major factor in the shortage of engineers in the public sector.

This can only be solved by either removing the restriction on the Town Clerk's salary thus allowing all municipal officials to be paid more or removing the relationship between the Town Clerk's salary and that of the heads of the engineering departments thus allowing engineers to be paid more than other municipal officials.

- Because of the shortage of municipal electrical engineers, local authorities will either have to face up to the very real danger of a collapse in the function of municipal electricity undertakings or employ consultants to take over the responsibilities of the municipal electrical engineers.



- (f) If municipalities are compelled by a shortage of electrical engineers to employ consultants instead of their own staff this in turn will increase the drift of electrical engineers to the private sector and the problem will escalate.
- (g) If and when municipalities are forced to make use of consultants instead of their own staff and particularly so in respect of ongoing projects there is no doubt that this will add considerably to the cost of electrical energy sold and such increases if allowed to develop unchecked would not be in the interest of South Africa's economy.
- (h) The majority of electrical engineers required by municipalities must be heavy current engineers and because of the lower salaries paid by the public sector young persons entering universities are deciding not to attempt to become heavy current engineers.
- (i) As further proof of the above, it is a fact that offers of municipal bursaries for heavy current electrical engineering are not being taken up which indicates an almost complete lack of interest in municipal electrical engineering as a career.
- (j) It is the experience of all municipalities that despite repeated advertising sufficient suitable electrical engineering staff are not attracted to local authorities at the salaries being offered at present.
- (k) It is noted from reports received that the standards of safety, quality, productivity and design are already deteriorating as a result of the present shortage of electrical engineers and this is resulting in financial losses and wastage to the local authority and it is expected that this condition will deteriorate even further as the number of available engineers decreases.
- (l) It would appear that South Africa is lagging behind the general practice in other parts of the world and it is known that in Europe, for example, the salaries for engineers in the public sector are often higher than those paid in the private sector, and that this is done to ensure that the best engineers are attracted to the public sector in order to provide the best and most economic service to the community.

A letter based on the above facts was approved by the Standing Committee at its meeting held on the 2nd March, 1983 and sent to the UME. To date no reply has been received.

However Mr. J. A. Loubser of Benoni has been appointed by the Executive on invitation from the UME to represent the AMEU on the UME

committee for "Training and Retention of Staff" and this at the least acknowledges the seriousness of the problem facing all municipal electricity undertakings.

#### 4. SUBSIDY FOR THE TRAINING OF MUNICIPAL APPRENTICES

It is the Government's policy to encourage the private sector to train apprentices by granting them tax concessions which in effect mean that 200 per cent of an employer's expenditure on apprentice training is deductible for taxation purposes.

In an effort to obtain comparable assistance for those municipal electricity undertakings who train apprentices the Committee supplied the President with the motivation as to why such assistance is justified and the President then wrote to the United Municipal Executive asking it to submit the AMEU's request to the Department of Manpower.

The UME did this but requested financial assistance for all staff training schemes and the request was refused by the Department of Manpower.

The Technical Training Committee is of the opinion that, if the UME had supported the application for the training of municipal apprentices only, this would have had a better chance of being granted because of the Government's policy of supporting all schemes which will help alleviate the technical manpower shortage problem.

The President has therefore asked the UME to again request the Department of Manpower for financial assistance for the training of staff of local authorities but at this stage to limit the request to the training of apprentices only.

To date no reply has been received from the United Municipal Executive.

#### 5. INTERIM COMMITTEE FOR REGISTRATION OF TECHNOLOGISTS AND ENGINEERS

Two members of the Technical Training Committee, viz. Messrs. J. A. Loubser and A. H. L. Fortmann attended the general meeting of SAARET on the 25th August, 1982, which was called to inform all Institutes of Engineering of what is being done to establish a Board of Control for SAARET.

The AMEU representatives were of the opinion that the meeting was non-productive and a formal request for a copy of the minutes of the meeting in order to submit a report to the AMEU has met with no response.

## VERSLAG DEUR DIE TEGNIESE OPLEIDINGSKOMITEE VIR DIE TYDPERK 1981/83

J.D. Dawson – Saamroeper

### 1. SAMESTELLING VAN KOMITEE

Die volgende lede van die VMEO is deur die Uitvoerende Raad tydens sy vergadering gehou op 7 Mei 1981 tot hierdie Komitee verkies.

N.S. Botha	Bloemfontein
E.G. Davies	Pietermaritzburg
J.D. Dawson	Uitenhage
A.H.L. Fortmann	Boksburg
J.A. Loubser	Benoni
D.C. Palser	Kaapstad

Gedurende die onderhawige tydperk is drie vergaderings van die Komitee gehou om oorweging te skenk aan items wat na die Komitee verwys is deur die Uitvoerende Raad ten opsigte van tegniese opleiding en verwante aangeleenthede.

### 2. WET OP PROFESSIONELE INGENIEURS No. 81 VAN 1968 : WYSIGING

Die Uitvoerende Raad is tydens die VMEO-kongres wat van 4 tot 6 Mei 1981 te Durban gehou is versoek om ondersoek in te stel na die implikasies, wat elektrotegniese ingenieurs betref, van Proklamasie nr. R108 van 1981 en Goewermementskennisgewing nr. R1142 soos vervat in Staatskoerant nr. 7598 wat op 29 Mei 1981 gepubliseer is, en hierdie versoek is na die Tegniese Opleidingskomitee vir aandag verwys.

In wese word daar ingevolge die Wet op Professionele Ingenieurs, Wet 81 van 1968, soos gewysig, veres dat alle regsperseone insluitende plaaslike owerhede nie later nie as 29 Mei 1986 moet toesien dat alle "werk wat vir professionele ingenieurs gereserveer word" en wat "teen vergoeding" en "vir iemand anders" gedoen word, deur 'n professionele ingenieur verrig word.

Die Komitee het hierdie aangeleentheid breedvoerig uitgepluis, ver-

skeie regsmennings ingewin, samesprekings met ingenieursinstellings gevoer en het uiteindelik bekragtiging vir die mening wat deur die Komitee geformuleer is by die Federasie van die Verenigings van Professionele Ingenieurs aangeva.

'n Finale aanbeveling is toe aan die vergadering van die Uitvoerende Raad op 29 Oktober 1982 voorgeleë en as volg goedgekeur:

- (a) 'n Professionele ingenieur se dienste NIE regstens benodig word vir enige werk wat deur 'n plaaslike owerheid vir daardie plaaslike owerheid onderneem word nie, d.i. wanneer die eindproduk van die werk in die plaaslike owerheid se besit bly.
- (b) 'n Professionele ingenieur se dienste BENODIG WORD vir enige tipe werk wat ingevolge artikel 7(3)(c) van die Wet op Professionele Ingenieurs, Wet 81 van 1968, soos gewysig, gereserveer word en deur 'n plaaslike owerheid vir iemand anders, hetsy 'n natuurlike of 'n regsperseon, teen vergoeding gedoen word.

Die President het alle ingenieurslede van die VMEO per brief, gedateer 18 Januarie 1983, van hierdie mening verwittig.

### 3. GEBREK AAN MUNISIPALE ELEKTROTEGNIESE INGENIEURSPERSONEEL

Gebrek aan munisipale elektrotegniese ingenieurspersoneel wek vir 'n aantal jare al groot kommer en het die onderwerp uitgemaak vir verskeie verslae en heelwat briewe wisseling tussen die President van die VMEO en die Verenigde Mun- Bestuur.

Die Tegniese Opleidingskomitee se mening dat die enigste oplossing vir die gebrek aan elektrotegniese ingenieurspersoneel sal wees om sodanige betrekkinge geldelik aantreklik te maak en dit sal slegs moontlik wees indien die huidige beperkinge wat op salaris geplaas is, afgesak word.

Diit benodig weer die steun van die Verenigde Munisipale Bestuur en die Tegniese Opleidingskomitee het by die President aanbeveel dat die volgende feite wat met die gebrek aan munisipale elektrotegniese ingenieurs verband hou, aan die Verenigde Munisipale Bestuur voorgelê behoort te word:

- (a) Die Federasie vir Verenigings van Professionele Ingenieurs voerspel 'n uitermate groot gebrek aan professionele ingenieurs teen 1985 in beide die private- en die openbare sektor.
- (b) Hierdie voorspelling raak die land as 'n geheel, maar omrede die salarisonderskeiding ten gunste van die private sektor in vergelyking met die openbare sektor, kan dit verwag word dat die ingenieurs wat beskikbaar is, dit sal verkies om in die private sektor te werk.
- (c) Die Federasie vir Verenigings van Professionele Ingenieurs het aanbeveel dat dit in die openbare belang is dat die aanstelling van professionele ingenieurs deur alle plaaslike owerhede as langtermyn-doelwit beskou behoort te word. Dit sal nooit werweslike word nie tensy voldoende enkelinge hulself as professionele ingenieurs bekwaam nie en sal op sy beurt dit vereis dat die salarisse wat aan professionele ingenieurs betaal word, radikaal verbeter behoort te word.
- (d) Die beperking wat die Regering en/of Provinsiale Administrasies op die Stadsklerk se salaris plaas, wat op sy beurt die salaris wat aan munisipale ingenieurs betaal word, beperk, is 'n groot faktor by die gebrek aan ingenieurs in die openbare sektor.  
Die enigste oplossing daarvoor is om óf die beperking op die Stadsklerk se salaris te verwyder en sodoende daarvoor toe te laat dat munisipale amptenare meer betaal word, óf om die verwantskap tussen die Stadsklerk se salaris en dié van die hoofde van ingenieursdepartemente te verwyder en sodoende daarvoor toe te laat dat ingenieurs meer betaal word as ander munisipale amptenare.
- (e) As gevolg van die gebrek aan munisipale elektrotegniese ingenieurs, sal plaaslike owerhede óf die wesenlike gevaar van die industriestorting van die funksies van munisipale elektrisiteitsondernemings in die gesig moet staar óf konsultante in diens moet neem om die verantwoordelikhede van die munisipale elektrotegniese ingenieurs oor te neem.
- (f) Indien 'n gebrek aan elektrotegniese ingenieurs munisipaliteit daartoe dwing om werk aan konsultante in plaas van hul eie personeel toe te sé, sal dit op sy beurt daartoe lei dat elektrotegniese ingenieurs in toenemende mate by die gelede van dié in die private sektor gaan aansluit, wat die probleem gaan vererger.
- (g) Indien, en wanneer, munisipaliteit daartoe gedwing word om van konsultante in plaas van hul eie personeel gebruik te maak en veral só ten opsigte van voortgesette projekte, sal dit ongetwyfeld die koste van elektrisiese krag wat verkoop word, aansienlik verhoog en indien sodanige toenames toegelaat word om onghendend voort te gaan, sal dit nie in die belang van Suid-Afrika se ekonomie wees nie.
- (h) Die meerderheid elektrotegniese ingenieurs wat deur munisipaliteit benodig word, moet swaarstroomingenieurs wees en omrede die laer salarisse wat deur die openbare sektor betaal word, besluit jongmense wat universiteit toe gaan, om nie te poog om as swaarstroomingenieurs te kwalifiseer toe.
- (i) Ten veredere bewys van bovermelde, is dit 'n feit dat aanbiedinge van munisipale beurse vir swaarstroom elektrotegniese ingenieurs-wese nie benut word nie wat daarop dui dat daar so te sé geen belang gestel word in die munisipale elektrotegniese ingenieurswese as loopbaan nie.
- (j) Uit ondervinding is dit bevind dat alle munisipaliteit, ten spyte van herhaalde advertensies vir geskikte elektrotegniese ingenieurs-personeel, geen aansoekers na plaaslike owerhede kan lok teen die salarisse wat tans betaal word nie.
- (k) Verslae wat ontvang is, het dit onder die aandag gebring dat die standaarde wat gestel word vir veiligheids, gehalte, produktiwiteit en ontwerp as gevolg van die huidige gebrek aan elektrotegniese ingenieurs, alreeds aan die afneem is, wat tot gevolg het dat plaaslike owerhede geldelike verliese ly en vermosing ondervind en dat daar na verwagting selfs 'n verdere agteruitgang van hierdie toestand ondervind sal word namate die aantal beskikbare ingenieurs aan die afneem is.
- (l) Dit sal voorkom asof Suid-Afrika nie met die algemene gebruik in ander wêrelddele tred hou nie en dit is bekend dat daar in Europa, byvoorbeeld, dikwels hoër salarisse aan ingenieurs in die openbare sektor as in die private sektor betaal word, en dit word gedoen om dit te verseker dat die openbare sektor die beste ingenieurs lok ten einde die beste en mees ekonomiese diens aan die publiek te kan verskaf.

'n Brief wat op die bogenoemde feite gebaseer is, is deur die Dagbestuur tydens sy vergadering wat op 2 Maart 1983 gehou is, goedgekeur en aan die Verenigde Munisipale Bestuur gestuur.

Tot op datum is nog geen antwoord ontvang nie.

Mnr. J.A. Loubser van Benoni is egter deur die Uitvoerende Raad, op uitnodiging van die Verenigde Munisipale Bestuur, aangestel om die VMEO op die VMB se Komitee vir die "Opleiding en Behoud van Personeel" te verteenwoordig, en dit dien minstens as bewys daarvoor van die erns van die probleem wat alle munisipale elektrisiteitsondernemings in die gesig staar.

#### 4. SUBSIDIE VIR DIE OPLEIDING VAN MUNISIPALE VAK-LEERLINGE

Dit is die Regeringsbeleid om die private sektor aan te moedig om vakleerlinge op te lei deur belastingtoewings aan hulle toe te staan, wat in werklikheid beteken dat 200% van die werkgewer se uitgawe ten opsigte van vakleerlingopleiding vir belastingdoeleindes afgetrek kan word.

In 'n poging om vergelykbare hulp te bekom vir daardie munisipale elektrisiteitsondernemings wat vakleerlinge oplei, het die Komitee die President voorsien van die motivering vir waarom sodanige hulp geregtig is, waarna die President 'n skrywe aan die Verenigde Munisipale Bestuur gerig het en gevra het dat die versoek deur die VMEO aan die Departement van Mannekrag voorgelê word.

Die VMB het dit gedoen, maar het om geldelike steun vir alle personeelopleidingskemas versoek en die versoek is deur die Departement van Mannekrag geweier.

Die Tegniese Opleidingskomitee is van mening dat indien die VMB sy steun toegesê het aan die aansoek vir slegs die opleiding van munisipale vakleerlinge, dit 'n beter kans sou gehad het om toegestaan te word omrede die Regering se beleid om sy steun toe te sé aan alle skemas wat daartoe sal bydra om die probleem rakende die gebrek aan tegniese mannekrag te kan verlig.

Die President het derhalwe die VMB versoek om weer eens die Departement van Mannekrag om geldelike hulp te versoek vir die opleiding van personeel vir plaaslike owerhede, maar om op hierdie stadium die versoek tot slegs die opleiding van vakleerlinge te beperk.

Tot op datum is nog geen antwoord van die Verenigde Munisipale Bestuur ontvang nie.

#### 5. TUSSENTYDE KOMITEE VIR DIE REGISTRASIE VAN TEGNOLOË EN INGENIEURS

Twee lede van die Tegniese Opleidingskomitee, nl. mnr. J.A. Loubser en A.H.L. Fortmann, was op 25 Augustus 1982 aanwesig op die algemene vergadering van SAVRIT wat belê is om alle Institute van die Ingenieurswese te verligting en wat gedoen word om 'n Beheerraad vir SAVRIT tot stand te bring.

Die VMB se verteenwoordigers was van mening dat die vergadering onproduktief was en 'n formele versoek om 'n afskrif van die notule ten einde 'n verslag aan die VMEO voor te lê, het onbeantwoord gebly.

#### D.C. PALSER - CAPE TOWN

Mr Palser referred to the chronic and serious shortage of Municipal Electrical Engineers. He made an appeal to all Councillors to give the matter of engineers' salaries their urgent attention and asked that the AMEU make urgent representations to the UME to give the matter top priority.

#### L. DE WET - AFFILIATE

Mnr Dawson noem in sy verslag dat indien munisipaliteit nie aan raaggewende ingenieurs sou gee, dit daartoe aanleiding sou gee dat meer munisipale elektrotegniese ingenieurs in diens sou tree by konsultante. Ek twyfel of dit 'n belangrike faktor is aangesien munisipale elektrotegniese ingenieurs in die verlede munisipale diens verruil het vir raaggewende werk ongeag of die firmas raaggewende werk vir munisipaliteit doen of nie. Daar is ander meer belangrike faktore wat hulle besluit beïnvloed.

Duer konsultante aan te stel vir sommige projekte is ek van mening dat munisipale elektrotegniese ingenieurs, indien hulle nie voldoende personeel het nie, hulle aandag kan wy aan sake wat hulle alleenlik kan hanteer. Duer konsultante te gebruik, hoef nie noodwendig te lei tot duurder projekte en verhoogde elektrisiteitskoste indien die opdrag en vereistes waarvolgens ontwerp moet word, volledig aan die konsultante gegee word. Aan die ander kant kan dit lei tot duurder projekte indien munisipaliteit self projekte aanpak sonder die nodige opgeleide personeel.

# ELECTRICITY SUPPLY COMMITTEE

P.J. Botes – Convener

## 1. GENERAL

At the last Executive meeting the name of this Committee was changed from Escom Committee to Electricity Supply Committee.

At the Technical Meeting in George, better liaison between Escom and the AMEU was requested, but I have to report that it was by pure chance that the AMEU was invited to attend the Escom meeting convened to discuss the drought situation.

Since the tariff increase, announced during the Technical Meeting in George, another substantial increase came into effect from 1 January 1983. The Government appealed for a revision of the proposed increase and it was marginally decreased. Since then the drought took on severe proportions, and as it may have adverse effects on the generating costs as well as sales, one can only hope that the next increases due on 1 July 1983 and 1 January 1984 will be moderate.

## 2. THE DROUGHT SITUATION

Mr. Palsler and myself attended two meetings at Megawatt Park on 17 May and 1 June 1983 convened by Escom to discuss the effect of the present drought situation on Escom. At the first meeting, after a review by Escom of the drought situation in Natal and the Eastern Transvaal and its effect on the generating capacities, a Committee under the Chairmanship of Dr. R. Fockema was established to meet on 1 June 1983 to consider:

1. How allocations of water can be made;
2. The timing of rationing electricity, and
3. How rationing is to be implemented.

After a further review of the drought situation at the meeting of the 1st June, 1983 and of what the financial implications for Escom and the country as a whole would be, it was decided:

- (a) That the rate of saving in water consumption ( $\pm 20\%$  for May 1983) be carried on with and it be left to the responsible authorities to arrange for an increase in this rate if and when necessary.
- (b) That industry and commerce take cognisance of the situation and contribute towards the saving of water consumption,
- (c) That Koeberg be put on line as soon as possible.
- (d) That rationing of electricity be not considered, but that a call be issued to save water.

## 3. LOAD SHEDDING

Due to the adverse effect of the drought, requiring a substantial reduction in the generating capacities of Camden Power Station and others, coupled with the loss of the Caborra Bassa supply, Escom may request consumers to shed load over peak periods. The extent however will not be more than the load shedding requirements experienced during the winter of 1981.

## 4. THE PRESIDENT'S COUNCIL : LOCAL AND REGIONAL MANAGEMENT SYSTEMS

Copies of the reports of the Natal and Orange Free State Municipal Associations on President's Council are being studied by the members of this committee and a report thereon will be tabled at the convention.

## 5. COMMISSION OF ENQUIRY INTO THE SUPPLY OF ELECTRICITY IN THE REPUBLIC OF SOUTH AFRICA

In the Government Gazette dated 20 May 1983 the names of the members of the Commission was published with the following terms of reference:

- (a) the responsibility and functions of the Government, including local authorities, vis-à-vis those of the private sector in regard to the supply of electricity;
- (b) the principles applicable to the supply of electricity and policies in this regard;
- (c) the effectiveness of existing legislation relating to the supply of electricity;
- (d) the structure and functions of existing institutions involved in the supply of electricity in the Republic of South Africa;
- (e) the cost effectiveness of such institutions, including the policy followed in the acquisition of raw materials;
- (f) the impact of capital formation, price determination, methods of financing and the existing tariff structure on the financial policy of the country with special reference to inflation, economic growth, the creation of infrastructure and decentralisation;
- (g) the functions and responsibilities of members of the Electricity Supply Commission and of the Electricity Control Board; and
- (h) any other matter concerning the supply of electricity, including matters submitted for investigation to the Commission of Inquiry by the Electricity Supply Commission.

During its meeting on 22 March 1983 the Executive Council instructed the Committee to examine the terms of reference in order that the AMEU may give evidence at the enquiry. The Committee decided to advise the Secretary of the Commission of Inquiry that the AMEU offers its full co-operation and would like to give evidence.

Following a request by the UME, the Committee decided to combine with the UME and the Institute of City Treasurers and Accountants in submitting a combined report, without jeopardizing the rights of the AMEU if it considers it necessary to submit a report on its own.

Further developments will be tabled at the Convention.

I wish to thank the members of this Committee for their co-operation and support.

# ELEKTRISITEITSVOORSIENINGSKOMITEE

P.J. Botes – Saamroeper

## 1. ALGEMEEN

Tydens die onlangse Uitvoerende Bestuursvergadering is die naam van hierdie komitee verander vanaf Evkom Komitee na Elektrisiteitsvoorsieningskomitee.

Beter samewerking is bepleit tussen Evkom en die VME0 by die Tegniese Vergadering wat in George gehou was, maar ek moet verslag doen dat dit feitlik per toeval was dat die VME0 uitgenooi was om die vergadering by te woon wat deur Evkom belê was om die droogte toestand te bespreek.

Sedert die tariefverhoging wat aangekondig is tydens die Tegniese Vergadering in George was daar 'n verdere groot verhoging vanaf 1 Januarie 1983 ingestel. Die regering het gevaar 'n heroorweging van die voorgestelde verhoging en dit was marginaal vermind. Sedertdien het die droogte ernstige afmetings aangeneem en aangesien dit nadelige effekte op die opwekkingskoste sowel as die verkope van elektrisiteit het, kan ons alleen hoop dat die volgende verhogings met ingang 1 Julie 1983 en 1 Januarie 1984 nie so hoog sal wees nie.

## 2. DROOGTE TOESTAND

Mnr. Palsler en myself het twee vergaderings by Megawattpark bygevoon op 17 Mei 1983 en 1 Junie 1983 wat deur Evkom belê was om die effek van die huidige droogte toestand op Evkom te bespreek. Tydens die eerste vergadering nadat Evkom verslag gelewer het oor die droogte toestand in Natal en Oos-Transvaal en die uitwerking daarvan op die opwekkingsvermoë van Evkom is 'n komitee onder die voorsitterskap van Dr. R. Fockema aangestel om weer op 1 Junie 1983 te vergader om die volgende aspekte te bespreek:

1. hoe alokatie van water gedoen kan word;
2. wanneer rantsoneering van elektrisiteit ingestel moet word;
3. hoe rantsoneering ingestel moet word.

Na 'n verdere hersiening van die droogte situasie tydens hierdie vergadering en wat die effek daarvan op die finansiële aspekte van Evkom en die land in geheel sal wees, is besluit:

- (a) dat die huidige besparing in die verbruik van water ( $\pm 20\%$  vir Mei

1983) mee aangegaan moet word en dat dit oorgelaat word aan die verantwoordelike instansies om te reël vir 'n verhoging in besparing indien en wanneer nodig;

- (b) 'n beroep is op industrie en handel gedoen om toe te tree tot die besparing in waterverbruik;
- (c) dat alle pogings aangewend word om Koeberg so spoedig moontlik in werking te stel;
- (d) dat die rantsoenering van elektrisiteit nie oorweeg word nie, maar dat 'n beroep gedoen word om water te bespaar.

### 3. LASAFWERPING

As gevolg van die nadelige effek van die droogte moes die opwekkingskapasiteit van Evkom ingekort word veral in die geval van Campdon kragstasie asook die verlies van die invoer vanaf Caborra Bassa, en Evkom verbruikers mag versoek word om las af te werp gedurende spits-verbruikstye. Die toestand sal egter nie erger wees as wat ondervind was gedurende die winter van 1981 nie.

### 4. PRESIDENTSRAAD : PLAASLIKE EN STREEKSBESTUURS-SISTEME

Kopieë van die verslae van Transvaal, Natal en O.V.S. Munisipale verengings oor die voorstelle van die Presidentsraad word bestudeer deur lede van hierdie komitee en 'n verslag sal voorgeleg word aan die Konvensie.

### 5. 'N KOMMISSIE VAN ONDERSOEK NA ELEKTRISITEITS-VOORSIENING IN DIE REPUBLIEK VAN SUID-AFRIKA

In die Staatskoerant van 20 Mei 1983 is die name van die lede van die Kommissie afgekondig tesame met die opdrag aan die Kommissie wat as volg lui:

- (a) die verantwoordelikheid en funksies van die owerheid, insluitende plaaslike owerhede, ten opsigte van elektrisiteitsvoorsiening teenoor die verantwoordelikheid en funksies van die private sektor in hierdie verband;
- (b) die beginsels waarop elektrisiteitsvoorsiening berus en die beleid

wat in dié verband gevolg word;

- (c) die doelmatigheid van bestaende wetgewing met betrekking tot elektrisiteitsvoorsiening;
- (d) die struktuur en funksies van bestaende instellings gemeed met elektrisiteitsvoorsiening in die Republiek van Suid-Afrika;
- (e) die kostedoeltreffendheid van sodanige instellings, met inbegrip van die beleid wat met grondstofaankope gevolg word;
- (f) die invloed van kapitaalvoering, prysbeheer, finansieringsmetodes en die bestaende tariefbeleid op die land se finansiële beleid met spesifieke verwysing na inflasie, ekonomiese groei, infrastruktuur skepping en desentralisasie;
- (g) die funksies en verantwoordelikhede van die lede van die Elektrisiteitsvoorsieningskommissie en van die Elektrisiteitsbeheerraad, en
- (h) enige ander aangeleentheid wat met elektrisiteitsvoorsiening in verband staan, met inbegrip van aangeleenthede wat vir ondersoek deur die Elektrisiteitsvoorsieningskommissie aan die Kommissie van Ondersoek voorgeleg word.

Gedurende die Uitvoerende Raadsvergadering wat gehou was op 22 Maart 1983 het die Uitvoerende Raad die komitee gevra om die opdrag te bestudeer met die oog daarop dat die VMEOM getuienis mag lewer daarop. Die komitee het besluit om die Sekretaris van die Kommissie in kennis te stel dat die VMEOM sy volle ondersteuning aanbied en graag getuienis sal wil lewer.

As gevolg van 'n versoek van die VMB het die Komitee besluit om 'n gesamentlike verslag met die VMB en die Instituut van Munisipale Tesouriers en Rekenmeesters op te stel sonder dat die reg van die VMEOM benadeel word om 'n aparte verslag in te dien indien daar gevoel word dat so 'n verslag ingedien behoort te word.

Verdere ontwikkelings sal tydens die Konvensie ter tafel gelê word.

Ten slotte wil ek al die komiteelede bedank vir hul samewerking gedurende die afgelope aantal jare.

## REPORT OF THE RECOMMENDATIONS COMMITTEE FOR NEW ELECTRICAL COMMODITIES 1981/82

J.A. Loubser - Convener

### 1. OBJECT

During the 1981 Convention, the previous convener of this committee Mr. P.J. Botes reported that "with the taking over of the Wiring Regulations Committee by the S.A.B.S., it was felt that the function of the committee should be re-assessed in an endeavour to streamline the whole procedure."

According to Annexure G of the Code of Practice for the wiring of premises in other words "Authorisation of Techniques and Electrical Equipment", it is possible to obtain authorisation for new techniques and equipment. This authorisation is granted by the relevant statutory authority. At the request of the Chief Inspector of Machinery, Mr. Weich, the Committee continued to exist in order that recommendations be made to him in regard to new commodities. It was thus necessary that the terms of reference of the committee be reconsidered and on the 29th October, 1982, the Executive Council adopted the following terms of reference for the committee:

**Terms of reference of the Recommendations Committee in regard to new electrical commodities.**

1. The Recommendations Committee's duties are limited to new electrical commodities for use in fixed installations only and the S.A.B.S. has jurisdiction over all plug-in appliances.

In this regard, the Committee makes recommendations to the following:

- (a) The "Suppliers" in terms of 3.1.1. of the Code of Practice for the Wiring of Premises whereby a new commodity can be approved pending the authorisation of the Chief Inspector of Factories.
- (b) The Chief Inspector in respect of authorisation when tests have been carried out by the S.A.B.S., which are based on any other specification (except the S.A.B.S. Specification) or a test schedule compiled by the S.A.B.S. if the Committee regards the investigations as adequate. If not, the Committee advises the S.A.B.S. of any possible additional requirements.
- (c) The members of the AMEU in respect of those fixed electrical commodities which do not carry the S.A.B.S. mark and which do not form part of the fixed installation in terms of the definition of the Code of Practice.

2. Equipment which complies with an appropriate S.A.B.S. Specification will be authorised directly by the Chief Inspector of Factories and therefore does not fall under the jurisdiction of the Recommendations Committee.

This term of reference made provision for the so called "Accelerated Procedures for Authorisation" which were at that time only a suggestion to the Main Committee for the Code of Practice for the Wiring of Premises. The suggestion has however not as yet been adopted by the Main Committee and it is possible that the terms of reference will have to be re-assessed after consideration thereof by the Main Committee.

Under normal circumstances the Committee meets once every 3 months but in order that the so called "Accelerated procedures for Authorisation" function effectively, the committee declared itself willing to meet as regular as is necessary on short notice.

The Recommendations Committee is grateful for the recognition given to it by the Chief Inspector.

### 2. REPRESENTATION

As a result of the foregoing, it was necessary to re-assess the composition of the Committee. The Committee subsequently recommended to the Executive Council that the Chief Inspector also be represented on the Committee, which recommendation was adopted by the Executive Council. (Apparently this representation was already decided upon many years ago). Mr. L.E. Stewart now represents the Department concerned on the Committee and I am pleased to report that he contributes his share in a very thorough manner.

The representation on the Committee now consists of representatives from the AMEU, SAIEE, ESCOM, SABS, EEIA, SAACE, ECA (S.A.), GPO, the Johannesburg City Electrical Engineer's Department and the Chief Inspector of Machinery.

During the last 2 years, two of our most devoted members resigned from the committee, they are Mr. J.A. Morrison who represented the EEIA and Mr. D.J.J. Conradie who represented the SAACE.

The sincere gratitude of the AMEU goes to these two gentlemen for the many years service which they rendered to the Committee. Mr. Morrison has been succeeded by Mr. G.A. Ewen whilst Mr. Conradie's suc-



cessor has not as yet been selected. It is however of utmost importance that all the organisations be represented, because of the fact that the Recommendations Committee and therefore the AMEU is the only body through which knowledge of "Authorisation" can be disseminated.

Arising from our own ranks, the Vice-Chairman Mr. D.E.T. Potgieter also resigned and was succeeded by Mr. G.J. Nortje.

### 3. ACTIVITIES

As will be observed from the undermentioned schedule, eight ordinary meetings were held:

Date	No. Approved	No. deferred	No. not approved	Additional Requirements
1981.02.19	4	-	-	3
1981.06.04	1	2	-	-
1981.08.20	2	3	2	1
1981.11.12	2	-	-	2
1982.02.11	6	2	-	-
1982.06.03	-	1	-	-
1982.08.19	1	1	-	-
1982.11.18	1	2	-	-
<b>TOTAL</b>	<b>17</b>	<b>11</b>	<b>2</b>	<b>6</b>

Although the totals are not very impressive, it must be borne in mind that a considerable number of approvals were for a series of products in respect of which inspections had to be carried out by a sub-committee at the manufacturer's/supplier's premises.

A sub-committee also conducted an inspection of the new wiring methods which were being used in Soweto on an experimental basis and thereafter recommended that three of these methods be utilised namely the Multi-bore System, the Mini P.V.C. trunking system and the twin and earth P.V.C. insulated system.

### 4. CONCLUSION

Once again I can report the whole-hearted co-operation and the cordial support of all the members of the Committee. My sincere thanks to them.

## VERSLAG VAN DIE AANBEVELINGSKOMITEE VIR NUWE ELEKTRIESE TOEBEHORE 1981/82

### J.A. Loubser – Saamroeper

#### 1. DOEL

Tydens die 1981 Konvensie het die vorige saamroeper van hierdie komitee getwee Mnr. P.J. Botes gerapporteer dat "Gesien in die lig van die oorname van die Bedrings Regulasiekomitee deur die S.A.B.S., die funksionering van hierdie komitee heroorweg sal word in 'n poging om die gehele prosedure te verbeter."

Volgens aanhangsel G van die Gebruikskode vir die bedrading van persele d.w.s. "Magtiging van tegniese en Elektriese Uitrusting" is dit moontlik om magtiging vir nuwe tegniese en uitrusting te verkry. Hierdie magtiging word deur die toepaslike statutêre owerheid verleen. Op versoek van Mnr. A. Weich, Hoofinspekteur van Fabriek, het die komitee bly bestaan ten einde aanbevelings aan hom te doen i.s. nuwe kommoditeite. Dit was dus nodig om die opdrag aan die komitee te heroorweg en op die 29ste Oktober 1982 het die Uitvoerende Raad die volgende opdrag aan die komitee aanvaar:

#### Opdrag aan die Aanbevelingskomitee i.s. Nuwe Elektriese Toebehoere

1. Die Aanbevelingskomitee se pligte word beperk tot nuwe elektriese toebehoere vir gebruik in vaste installasies alleenlik en die S.A.B.S. het jurisdiksie oor alle inprop kommoditeite.

In die verband maak die komitee aanbevelings aan:

- die "voorsieners" ingevolge 3.1.1. van die Gebruikskode vir die bedrading van persele; waarvolgens 'n nuwe kommoditeit goedgekeur kan word in afwagting van die magtiging deur die Hoof Inspekteur van Fabriek.
- die Hoof Inspekteur i.v.m. magtiging wanneer toets deur die S.A.B.S. uitgevoer is gebaseer op enige ander spesifikasie (behalwe die S.A.B.S. spesifikasie) of 'n toets skedule saamgestel deur die S.A.B.S. indien die komitee die ondersoek as genoegsaam beskou. Indien nie, stel die komitee die S.A.B.S. in kennis van enige moontlike bykomstige benodigde.
- die lede van die VMEQ i.v.m. vaste elektriese toebehoere wat nie die S.A.B.S. merk dra nie en wat volgens die definisie van die Gebruikskode nie deel van die vaste installasie uitmaak nie.

2. Toerusting wat aan 'n toepaslike S.A.B.S. spesifikasie voldoen sal direk deur die Hoof Inspekteur van Fabriek gemagtig word en val dus nie onder die jurisdiksie van die Aanbevelingskomitee nie.

Hierdie opdrag het voorsiening gemaak vir die s.g. "Versnelde prosedures vir Magtiging" wat toendertyd egter net 'n voorstel aan die Hoofkomitee vir die Gebruikskode vir die Bedrading van Persele was. Die voorstel is egter nog nie deur die Hoofkomitee aanvaar nie en dit is

moontlik dat die opdrag weer hersien sal moet word nadat die Hoofkomitee die weer oorweg het.

Normaalweg vergader die komitee eenkeer elke 3 maande, maar ten einde die s.g. "Versnelde prosedures vir magtiging" werklik effektief te laat werk het die komitee homself bereid verklaar om so dikwels as wat nodig is op kort kennisgewing te vergader.

Die Aanbevelingskomitee is dankbaar vir die erkenning wat die Hoofinspekteur aan hom verleen het.

#### 2. VERTEENWOORDIGING

As gevolg van bogenoemde was dit egter nodig om die samstelling van die komitee in heroorweging te neem. Die komitee het toe aan die Uitvoerende Raad aanbeveel dat die Hoofinspekteur van Fabriek ook op die komitee verteenwoordig moet wees, welke aanbeveling deur die Uitvoerende Raad aanvaar is. (Blykbaar was sodanige verteenwoordiging reeds jare gelede op besluit). Mnr. L.E. Stewart verteenwoordig nou die betrokke Departement op die Aanbevelingskomitee en dit is aangenaam om te berig dat hy sy deel deeglik bydra.

Die verteenwoordiging op die komitee bestaan dus nou uit verteenwoordigers van die VMEQ, SAIEI, EVCOM, SABS, EIAN, SAVRI, EKV (S.A.), HPK, die Johannesburgse Elektriesiteitsdepartement en die Hoofinspekteur van Fabriek.

Gedurende die afgelope twee jaar het twee van ons getrouste lede egter uit die komitee bedank. Hulle is mnr. J.A. Morrison wat die EIAN verteenwoordig het en mnr. D.J.J. Conradie wat die SAVRI verteenwoordig het.

Die opregte dank van die VMEQ gaan aan die twee here vir die baie jare diens wat hulle gelewer het. Mnr. Morrison is opgevolg deur mnr. G.A. Ewen terwyl die opvolger van mnr. Conradie nog nie aangewys is nie. Dit is egter uiters noodsaaklik dat alle belanghebbende organisasies moet verteenwoordig word, omdat die Aanbevelingskomitee en dus die VMEQ die enigste manier is waar deur kennis van "Magtiging" oorgedra kan word.

Uit ons eie geleedere het die onder-voorsitter mnr. D.E.T. Potgieter, ook bedank en hy is opgevolg deur mnr. G.J. Nortje.

#### 3. WERKSAAMHEDE

Soos op die onderstaande tabel gesien kan word is agt gewone vergaderings gehou:

Datum	Aantal goedgekeur	Aantal terugverwys	Aantal nie goedgekeur	Bykomende vereistes
1981.02.19	4	-	-	3
1981.06.04	1	2	-	-
1981.08.20	2	3	2	1
1981.11.12	2	-	-	2
1982.02.11	6	2	-	-
1982.06.03	-	1	-	-
1982.08.19	1	1	-	-
1982.11.18	1	2	-	-
<b>TOTAAL</b>	<b>17</b>	<b>11</b>	<b>2</b>	<b>6</b>

Hoewel die totale nie vreeslik indrukwekkend is nie, moet daar inageneem word dat heelwat van die goedkeurings vir reekse produkte was wat dikwels inspeksies duer 'n onder-komitee by die vervaardiger/voorsiener self tot gevolg gehad het.

'n Onder-komitee het ook 'n inspeksie op die nuwe bedragsmetodes wat as eksperiment in Soweto uitgevoer is gedoen en het daarna aan-

beveel dat drie van die metodes wel gebruik mag word tewete die Multi-kanal sisteem die Mini P.V.C. kanaalsisteem en die dubbel geleier in aarding P.V.C. ge-isoleerde sisteem.

#### 4. SLOTT

Weereens kan daar getuig word van die goeie samewerking en ondersteuning van al die lede van die komitee. My opregte dank aan hulle. Mnr Loubser het gesê dat sedertdien sy verslag ingedien was is mnr W. Seymour aangewys deur die SAVRI om hulle te verteenwoordig.

#### E. DE C. PRETORIUS - POTCHEFSTROOM

Mnr Loubser noem dat die Aanbevelingskomitee o.a. aanbevelings doen aan lede van die VMEQ i.v.m. vaste elektriese toebehore wat nie die SABS-merk dra nie. Ons het groot waardering hiervoor.

In hierdie verband herinner ek u daaraan dat die Uitvoerende Raad VMEQ-lede 'n jaar of wat gelede versoek het om slegs toebehore en toestelle met spesiale verwysing na stowe, warmwatertoestelle (geisers) en fluooreseerligarmature wat die SABS- of die spesiale SABS-goedkeuringsmerk dra, toe te laat vir aansluiting by die vaste installasie. Dit is feitlik aksiomaties dat toebehore wat deur die Aanbevelingskomitee aanbeveel word, hierby ingesluit word. Kan die Uitvoerende Raad sy gedagte hieroor laat gaan.

## TRANSVAAL REGIONAL COMMITTEE OF THE BUILDING RESEARCH ADVISORY COMMITTEE

P.J. Botes - Representative Highveld Branch : J.K. von Ahlften - Alternate

The previous name of this AMEU Committee was CSIR/NBRI Advisory Committee. Following re-organization of the CSIR/NBRI Activities representatives were called for the Transvaal Regional Committee and I and Mr. J.K. von Ahlften (alternate) were nominated by the Executive Council. As it clearly has to do with the Transvaal Region, the Highveld Branch accordingly reaffirmed our nominations.

Of the seven meetings over the past two years Mr. von Ahlften and myself attended three.

Frequent reports on the progress made in establishing international

standards for plug and socket outlets by the IEC were tabled. Discussion also centred on the NBRI view point, a view point which I shared with them, that compulsory earth leakage protection in domestic premises be done away with.

Discussion also took place on the failure to stop fire around electrical cables where they penetrate fire division walls. This has caused some highly dangerous fire situations.

It should be noted that very few items regarding electricity were discussed at these meetings.

## DIE TRANVAALSE STREEKSKOMITEE VAN DIE BOUNAVORSINGS ADVIESKOMITEE

P.J. Botes - Verteenwoordiger Hoëveld Tak : J.K. von Ahlften - Alternatief

Die vorige naam van hierdie VMEQ Komitee was die WNNR/NBNV Advieskomitee. As gevolg van re-organisasie van die WNNR/NBNV aktiwiteite is verteenwoordigers aangewys vir die Transvaal Streekskomitee. Myself en mnr. J.K. von Ahlften as alternatief was deur die Uitvoerende Raad genomineer. Aangesien hierdie Komitee net te doen het met die Transvaalstreek het die Hoëveld-tak ons nominasie herbevestig.

Van die sewe vergaderings oor die afgelope twee jaar het mnr. von Ahlften en myself net 3 bygewoon.

Verskeie verslae oor die vordering wat gemaak is in die daarstelling van

internasionale kontakprop en sokkietgange deur die IEK is voorgelê en bespreek. Besprekings het ook plaasgevind oor die sienswyse van die NBNV, 'n sienswyse waarmee ek saamstem, dat verpligte aardlekbeveiliging in huise mee weggedoen behoort te word.

Bespreekings het ook plaasgevind oor die onvermoë om brand rondom elektriese kables te keer waar hierdie kables deur vuurvaste mure gaan. Hierdie toestand het reeds hoogsgevaarlike brand situasies laat ontstaan.

Kennis moet geneem word van die feit dat baie min items oor elektrisiteit bespreek word.

## REPORT ON THE CSIR NEERI ADVISORY COMMITTEE 1981/82

W. Barnard - Representative

This Committee meets annually to advise the National Electrical Engineering Research Institute of the CSIR on its research programmes and is assisted by sub-committees for cybernetics, semiconductor technology and power electrical engineering.

A problem common to all departments of the Institute was the lack of suitably qualified staff to undertake active research in many key fields

and as a result the activities of the Institute had in some cases been reduced to maintaining a service with very little emphasis on research. The position had been made worse by the retirement of Dr Anderson who held the position of Assistant Director (Research) and by the resignation of his successor, Dr Eriksson.

The recommendations of the sub-committees were therefore mainly

concerned with re-evaluating the allocation of research staff and with attracting and maintaining suitably qualified staff.

The Institute has now commissioned its ultra high voltage impulse generator and several projects including assessment of impulse current response of instrumentation, impulse current penetration of steel sheets and studies on the electrical aspects of 800 kV transmission tower design have been carried out. The electrical vehicle group has pursued the automatic control of gearboxes for electric vehicles and is involved in the Johannesburg Trolley Bus Demonstration Project.

## REPORT OF THE NBRI STEERING COMMITTEE AND ELECTRICAL WORKING SUB-COMMITTEE FOR NATIONAL NORMS FOR TOWNSHIP SERVICES

J.K. von Ahlften – Convenor and Steering Committee Representative

Both the Steering Committee and the Electrical Working Sub-committee have now completed their task on behalf of the NBRI which was commenced in March 1979 and the final Norms documents for all the engineering services were submitted to the Housing Matters Advisory Committee (HMCA) of the Department of Community Development at its meeting on 26 February 1982.

The Housing Matters Advisory Committee then decided to appoint a sub-committee from its members to make final recommendations to it at its next meeting on the publication and application of the Rational Norms Report. This sub-committee met on 28 May 1982 under the Chairmanship of Mr. W.J. Marais, Deputy Director-General of the Department of Community Development and resolved to recommend to the HMCA that the Norms be published through existing Provincial Channels by the Department in their present form for application as "GUIDELINES" for a period of a year.

A proposed permanent updating Committee is to be formed to review the Norms at the end of the trial period and each year thereafter. In the meantime an executive summary was to be prepared of the existing Norms containing those criteria and standards that could be applied as mandatory elements for each of the services. This summary will then also be considered by the updating Committee at its first review.

With regard to the form and publication it was agreed that the various parts be made available separately in loose-leaf binder form so as to simplify the replacement of revised pages or sections from year to year.

The above proposals of the sub-committee were accepted by the HMCA on 2 July 1982 and were to be published by the Government Printer for use for a trial period of one year whereafter the updating committee appointed by the HMCA will bring about any amendments arising out of experience during the trial period or new findings.

Since the 2 July 1982 however nothing further has transpired concerning this whole matter apart from a demonstration project being carried in Jakaranda Park Indian Township, Pretoria, the progress of which has not yet been reported to me as Chairman of the Electrical Working Sub-committee. In view of this the following letter dated 12 January 1983, was sent to the Director of the NBRI.

"I wish to refer to your letters dated 10 July 1982 and 28 September 1982.

As we understand the position the HMCA accepted the Norms on 2 July 1982 and that these were to be published by the Government Printer for use for a trial period of one year. Six months have transpired since this decision was taken and I now wish to submit a report to the Executive Council of the AMEU on the publication and implementation of the Electrical Norms document at its meeting scheduled for 22 April 1983.

As no official norms document has however been issued since the decision of the HMCA on 2 July 1982, I am naturally not in a position to report any progress on the publication or implementation of the electrical norms apart from the fact that a demonstration project is apparently being carried out in the Jakaranda Indian Township, Pretoria Townlands.

### J.K. VON AHLFTEN – SPRINGS

Since submission of the report that the "Guidelines for the Provision of Engineering Services in Residential Townships" have been officially issued by the Department of Community Development.

The idea is that these norms should now be applied for a trial period of one year, whereafter an updating Committee will be formed to update or amend the Guidelines where this has been found to be necessary from practical experience.

No doubt further discussions on the electrical section of the Guidelines will pursue with the discussion of TOPIC 8 – Retiulation of new Townships – submitted by John Dawson, a member of the electrical Working Sub-committee.

### NAUDE VAN WYK – CSIR

The Institute of Electrical Engineers had a very good year of achievement. The ASETS award had been made to the research team of lighting under Drs. Anderson and Erikson for their contribution, over a number of years, to new knowledge in this field which is of great importance to the electrical engineering industry.

Both ad hoc Committees have therefore completed their tasks and only the "Working Sub-committee" should be retained to assist the updating Committee with its task.

Regarding the standardised conditions of contract for electrical engineering works, Alwin Fortmann will no doubt respond to any questions with the discussion of his report later on.

In the meantime a considerable controversy has arisen regarding the official and legal definition of the "point of supply" where the voltage has to be maintained by the supplier within statutory limits. The Electrical Working Sub-committee was unanimous in its decision that this was at the point where the electricity supply crosses the boundary of premises which is the point where the consumer's electrical installation is connected to the supply authority's main. This controversy arose out of the discussion on my paper on "Rational Norms for Electrical Distribution in Residential Township" presented at the AMEU Technical Meeting held in May 1982 in George.

Certain delegates supported the definition in the norms while others were emphatic that the "point of supply" should be an accessible point on the boundary or consumer's premises at which statutory voltage checks may readily be made and not at an inaccessible buried joint or point on the boundary where it is not possible to determine by measurement whether the voltage at the "consumer's terminals" as required by Section 24 (1)(a) of the Electricity Act is within statutory limits.

I consider this a very important point which needs to be resolved and would therefore appreciate some positive indication regarding the official publication of the Norms so that the proposed updating Committee may once again have a serious look at this situation to see whether a legal compromise on this definition can be achieved."

The following reply was received on 19 January 1983:

"Thank you for your letter, reference D/12C/83 of 12 January 1983.

As you are aware the Norms document was submitted some time ago to the HMCA and its publication is entirely in the hands of the Department of Community Development.

I believe that the Department has asked the different Provincial Administrations for their comments before submitting the document to the Housing Policy Council for final approval, and that no date has as yet been set for its publication.

Since the proposed updating committee is still to be constituted, the best that I can offer at this stage is to refer your letter to the Department for advice on how this matter of a legal definition of the "point of supply" can best be resolved."

It is therefore apparent that at the time of submitting this report to the Secretary by 30 March 1983 as requested in order to be in time for publication in the proceedings for the 1983 Convention, this whole project was being withheld pending official finalisation.

Concerning the National Standardised Specification for Electrical Engineering Construction the final amended versions of the Code of Practice (SABS 0150 Parts 1 to 5) and the Standardised Specification (SABS 1500 to 5F) have now been submitted to the South African Bureau of Standards. These versions are reaching finality with the translation but it is doubtful whether the Code and Specifications in both official languages will be ready for approval by the SABS Council before May 1983.

The proposal of the NBRI that a series of workshops be held at the major centres of the Republic in order to familiarise the electrical profession with the use of the Code and Specifications is also still under consideration.

As Chairman of the ad hoc Committee I am naturally very concerned at the long delay being experienced with the official publication of the Norms and the application thereof which in the end may defeat the original object of the whole exercise which was to reduce the overall cost of housing and associated engineering services within the shortest possible period.

## LEON GINSBERG - AFFILIATE

Ons is van mening dat sekere gedeeltes van die Norme nie oral in Suid-Afrika net so toegepas kan word nie. Die redes is as volg:

1. Die ontwerp data is gebaseer op 'n Britse verslag van 1966 wat nie op Suid-Afrika van toepassing is nie en 'n baie duur netwerk tot gevolg het.
2. Die verskillende klimaatstreek van Suid-Afrika met hulle verskillende maksimum aanvrae en diversiteits karakteristieke is nie in aanmerking geneem nie.

When studying the Norms we found that the calculated voltage drops on the low voltage system using the data within the Norms did not agree with the voltage drops indicated by utilising the charts.

We therefore examined the report upon which the Norms are based viz the British ACE Report No 13 of 1966, and found that the figures given in this report are based upon the use of electrically operated domestic storage heating supplying the 24 hour heat energy requirement within an 8 hour low tariff period in addition to any other domestic loads. This resulted in a loss of diversity between consumers, and when this is taken into consideration the voltage drops based upon the tables agrees with the voltage drops given on the charts.

Because neither this type of domestic central heating nor the low cost off-peak tariff that shortens the heating demand period are common in South Africa, the theory underlying the British data does not apply to South Africa and accordingly the data itself is not appropriate to this country.

We are most concerned that the data used for designing networks is correct for the particular situation. Too small a conductor size results in undervoltage and too large a conductor size results in an installation that is unnecessarily expensive.

We have therefore studied the various published curves and we present two diagrams to show the effect of using different design curves.

Figure 1 shows the percentage volt drops calculated using different design curves for a given cable size, BDMD and physical layout. The bottom curve shows the volt drops calculated using the parameters given in the 1st Draft of the AMEU Guide Lines for Electricity Services in Residential Townships with 25% allowance for unbalance. The next curve up utilises figures from Appendix F of SABS 0142, which we believe to be based on the work of Bary and Hamilton in the USA in the 1940's. The next curve up is that given by using the chart attached to the Rational Norms, while the second to top curve is the calculated volt drop based on the parameters given in the Norms. The top curve results if the Norms are amended as suggested in the British Report of 1966 to the lower ADMD of 2,5 kVA rather than the 6 kVA given in that report.

We are of course generally designing to a target volt drop on the low voltage cables, and in figure 2 we show the resulting cable sizes when designing to a specific voltage drop - in this case 4%, which is reasonably typical of such designs.

The number of consumers and physical layout is shown, and the standards to which the feeder is designed are arranged in the same sequence as that referred to in figure 1. We have used differing cable sections so as

to attain the 4% limit as closely as possible without exceeding it. If a uniform section were to be used it would be necessary to utilise the size of cable depicted on the supply end. Also shown are the cost implications of the choice of design parameters for this one cable alone.

In both these figures the designs are based upon the same BDMD of 6,575 kVA for illustrative purposes, but they apply similarly at any level of BDMD.

As can be seen there is a wide range of cable sizes and costs and one is forced to consider which, if any, is the most appropriate for a particular township. The parameters contained within the first draft of the AMEU Guidelines were available and have been used, we believe, for a number of townships. We do not know why these parameters were rejected in later drafts of the AMEU Guidelines, but we assume that this resulted from finding some shortcomings in the earlier parameters.

We believe that there is no single correct set of parameters, but that these must be chosen not only on the basis of income groupings, but also on the basis of climatic region, particular tariff structures, and modified for special circumstances such as holiday resorts or residential areas on the premises of a particular industry reserved for employees of that industry.

We are therefore of the opinion that the Rational Norms should not be made mandatory on any project at this stage, but that the choice of parameters be made after a careful consideration of each particular project. The next stage would be one of collection and analysis of data and, if necessary, the generation of new parameter sets for each major variable. We would suggest that the data be collected for each income group in three particular climatic regions:

Sub-Tropical of the Natal and Transkei coasts,

Dry cold winter regions of the interior and the

Wet cold winter regions of the South Western Cape.

This data could be collected by the AMEU, the NBRI or in any other way you may see as being the most appropriate and I and my colleagues would be happy to assist in correlating data or in its analysis.

Om op te som het ek die volgende genoem:

1. Die riglyne blyk nie van toepassing te wees op Suid-Afrikaanse toestande nie.
2. Die riglyne behoort om hierdie rede nie afgedwing te word nie.
3. Dit is nodig om die besondere eienskappe van 'n woongebied in aanmerking te neem en die ontwerpgegewens daarvolgens aan te pas waarna dit saam met die aanbevelings in die riglyne toegepas kan word.
4. 'n Navorsingsprojek, gerig op die insameling van realistiese ontwerpdata, behoort van stapel gestuur te word met inagneming van die leefwyses en veranderende verwagtinge van die inwoners van hierdie land.

Meneer die Voorsitter, deur die steun van die VME0 aan hierdie probleem te gee, is ek oortuig dat metodes aangeneem kan word wat beide aanvaarbaar en ekonomies gaan wees en wat tot eer van die VME0 sal strek.

# CSIR/NBRI SOLAR ENERGY AND ENERGY CONSERVATION (SEEC) STEERING COMMITTEE

## D.C. Palser - Representative

### 1. INTRODUCTION

Since my last report to the 47th Convention of the AMEU in Durban in May 1981, I have attended two further annual meetings of the SEEC Steering Committee as your official representative.

At the request of Mr. W. Barnard the Executive Council at its meeting on 1981-10-30 resolved to appoint in its stead Mr. J.K. von Ahlften as alternate member to myself on this committee.

During the period under review a number of matters of interest and concern to the AMEU were discussed. These matters are reviewed below under the relevant headings.

### 2. NBRI COMMENTS ON MY REPORT TO THE 47TH AMEU CONVENTION

Arising out of my report on the activities of SEEC Steering Committee submitted to the 47th Convention, the Chairman raised a number of points.

My statement concerning the reduction in maximum demand attributable to solar water heating was queried, namely that "generally speaking the reduction in demand will be greater in the summer, when the load is already relatively low, than in the winter". I replied that this applied mainly to the Cape and not necessarily the Transvaal. It was in-

tended, however, as a general observation applicable to areas where maximum demand peaked in cloudy and overcast months with little sun.

The Chairman also referred to the following paragraph in my report:

"The fact remains, though, that either with or without some form of load control, less energy will be sold by electricity undertakings when supplementary solar systems are employed. Consequently, any overhead costs, including any residual demand costs not directly recoverable, must be recovered indirectly through the sale of fewer units".

He expressed the view that although the statement was correct, it again referred back to the problem of the current two-block tariff rate applied by some electricity undertakings where the lower income groups were actually subsidising the high income group to some extent. I mentioned that in Cape Town a flat rate was applied to domestic consumers with the purpose of relieving the burden on the poorer consumers whose consumption was generally relatively low. Effectively, therefore, the high consumption (wealthy) consumers were subsidising the low consumption (poor) consumers.

The Chairman expressed the view that the following statement in my report was of the utmost importance:

"That as the electricity supply undertaking is acting in the interests of



the community it should act in the community's overall best interest and should not see solar energy, for instance, as a competitor. It is furthermore considered that electricity suppliers should rather see themselves in the role of energy suppliers, embracing not only the more effective utilization of natural energy resources but also the conservation of energy generally".

### 3. AMEU NOT OPPOSED TO SOLAR ENERGY

I again stressed that the AMEU was definitely not opposed to solar energy and that it did not see it as a threat to the economic viability of electricity undertakings, nor could it ever foresee it becoming such a threat.

### 4. RATING OF WATER HEATER ELEMENTS

A recent NBRI survey of domestic solar water heater installations revealed that 64% of households employed combination solar/electric tanks. The fact that 34% of these tanks had water heater elements rated at what was considered an unnecessarily high capacity of 4 kW was deemed to be a matter of some concern. To restrict maximum demand Mr von Ahlfen mentioned that a limit of 1.2 kW had been imposed in Australia. This was probably too low and a figure of 2 kW to 3 kW would probably be better suited to our conditions.

The rating of domestic appliances forms part of the present NBRI research programme. From discussions the NBRI had with the SABS it would appear that for most typical domestic appliances, which require a relatively high electrical rating, there are no requirements in respect of maximum rating.

As regards amendments to the requirements in respect of the rating of water heater elements, the SABS is prepared to consider the matter if a motivated request is received.

The opinion was also expressed that although this question of the maximum demand of domestic appliances had received the attention of certain individual local authorities, there was at this stage no co-ordinated programme at a national level to lower maximum demand. It was therefore considered that attention should be given to ways and means of improving load factors. I accordingly undertook to draw the attention of the AMEU to this whole question with a view to eliciting member's views on this subject, particularly the question of the maximum rating of water heater elements.

### 5. TIME SWITCHES AND RIPPLE CONTROL

A question was posed as to whether it would be of benefit if local authorities made the installation of time switches compulsory on new electrical installations to reduce maximum demands. For example, by the switching-off of water heaters during peak periods. Considerable discussion on this subject ensued, reference also being made to the role of ripple control, load limiting switches and time-of-day tariff rates. Although many local authorities had experimented with these concepts the view of the committee was that there was no overall nationally co-ordinated programme. It was generally agreed that unless the Government took the lead and laid down a definite policy very little would be achieved.

### 6. ELECTRICITY CONSUMPTION IN HOUSES

A survey of energy usage in houses has been undertaken by the NBRI and information obtained from 14 local authorities on the domestic consumption of electricity.

Data regarding the electricity consumption in 1 769 houses, divided into five income groups, was obtained and processed. Although it is known that other forms of energy, for example coal and petroleum products, are also used in houses, no detailed facts could be obtained. It was determined, however, that other fuels were being used progressively less and less in houses, particularly in the larger towns and cities where air pollution regulations were in force. The following tendencies were clearly noted:

- Electricity consumption decreases as the cost of electricity increases.
- Electricity consumption increases in relation to the value of the house and therefore apparently also as the income of the occupant.
- The unit cost of electricity is generally higher for the lower income groups than for the higher income groups, generally as a result of the fixed cost component in the tariff structure which increases the average unit cost of the small consumer.
- Electricity tariffs are determined by individual local authorities and large differences in the nature and structure of tariffs was therefore found. It was also clear that tariffs are not used as an incentive to save energy and to reduce peak loads.

Regarding the last two paragraphs above I drew attention to the Board of Trade and Industries investigation in 1979 (Report No. 1889: "Investigation into the tariff policy and tariff structure in respect of the supply of electricity in South Africa") in which it was recommended that there should be no cross-subsidization of tariff rates. It was considered that this implies that tariffs should not be artificially biased in favour of energy conservation or solar energy. An example of such bias, though,

is the flat rate domestic tariff which favours low consumption at the expense of high consumption users.

### 7. NBRI SURVEY OF DOMESTIC SOLAR WATER HEATERS

An NBRI survey of domestic solar water heaters revealed that horizontal storage tanks were dominating the market and that in the majority of systems use was made of combination solar/electrical tanks. The excessive rating of elements was most evident and it was considered that alternative arrangements would have to be sought with lower element ratings and greater water storage capacity. It was most disturbing to note that only 18 percent of the owners questioned could prove that the installation of the systems resulted in actual energy savings. Approximately 10 percent were actually unaware that their systems were even functioning correctly.

### 8. ECONOMICS OF SOLAR HEATING

A draft calculation sheet to assist prospective purchasers of solar installations to assess their economic viability was circulated by the NBRI for comment. Because of various complicating factors, however, this matter has not yet been resolved and there is accordingly no immediate plan to publish such a document.

One of the problems centres on the escalation in the cost of electricity. I mentioned that in an attempt to justify the costs of solar water heating, there was a tendency to base calculations on the current high rates of escalation in electricity costs. This was incorrect. The correct rate to employ was the estimated mean rate over the period under consideration.

### 9. LEGAL ASPECTS OF SOLAR ENERGY

The representative of the Department of Mineral and Energy Affairs reported that since there were virtually no laws in South Africa relating specifically to a person's solar rights, the Department had undertaken an extensive survey of the available literature on this subject. Based on information obtained mainly from the USA, which had extensive legislation pertaining to solar rights, a draft report has been compiled summarising the main aspects of solar law.

A small ad-hoc committee was appointed to study this report on behalf of the SEEC Steering Committee with a view to submitting its comments to the Department.

It was also suggested that various institutions, local authorities and municipalities should be approached to obtain their views and comments.

### 10. GOVERNMENT POLICY ON ENERGY CONSERVATION

As mentioned in my last report the Government at this stage does not see any conflict between the use of electricity sales as a source of income and the promotion of energy conservation and accordingly does not consider that the present electricity tariff structure in the country is wholly incompatible with the policy of energy conservation. It accordingly could not support the NBRI's request for tax concessions or other financial means as incentives to conserve energy.

Reference was made to the nine policy goals outlined in the recent annual report of the Department of Mineral and Energy Affairs, one of which was to maximize energy conservation. In this context the NBRI commented that many existing electricity tariff structures do not encourage energy conservation, as in many instances increasing consumption resulted in decreasing prices. Such tariff rates, however, were so structured as to reflect the actual cost of supply in each case. What is being suggested now is a form of cross-subsidization between tariffs or artificially biasing tariffs in favour of energy conservation.

On the discussion on this subject the representative of the Department of Mineral and Energy Affairs advised that it was the Government's intention to encourage energy conservation and that the question of incentives was being investigated.

### 11. CONCLUSIONS

The meetings attended have proved most interesting and informative. Of particular interest to the AMEU was the question of the various measures proposed to reduce peak loads, improve load factors and to encourage energy conservation through suitably structured tariffs.

Regarding the objection to high ratings for water heater elements, it would appear that this centres on their contribution to high group maximum demand. At the individual level or for small groups of consumers there is perhaps some justification in aiming for lower ratings. But for large groups or for the whole system, diversity should ensure that the maximum demand for the group is largely independent of rating. In practice, though, there might not be as great a degree of diversity as might be expected with the result that short and relatively sharp system peaks may be experienced.

I should be pleased to have the views of members on this question of the rating of water heater elements and their effect on system maximum demand to enable me to convey the view point of the AMEU to the SEEC Steering Committee.

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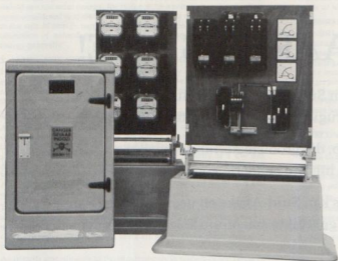
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# WNNR/NBNI-LOODSKOMITEE VIR SONENERGIE EN ENERGIEBEWARING (SEEB)

D.C. Palsler – Verteenwoordiger

## 1. INLEIDING

Sedert my laaste verslag aan die 47ste Konvensie van die VMEO in Mei 1981 in Durban, het ek nog twee jaarvergaderings van die SEEB-Loodskomitee as a smptelike verteenwoordiger bygewoon.

Op versoek van mnr. W. Barnard het die Uitvoerende Raad op sy vergadering op 1981-10-30 besluit om mnr. J.K. van Ahlften in eersgenoemde se plek aan te stel as alternatiewe lid saam met my op hierdie komitee.

gedurende die onderhawige tydperk is 'n hele aantal sake van belang vir die VMEO bespreek. Die sake word hieronder bespreek onder die toepaslike opskrifte.

## 2. NBNI-KOMMENTAAR OP MY VERSLAG AAN DIE 47STE VMEO-KONVENSIË

Voortspruitend uit my verslag oor die bedrywigheid van die SEEB-Loodskomitee, wat aan die 47ste Konvensie voorgelê is, het die voorsitter 'n paar punte geopper.

My stelling het ook na die vermindering in maksimumaanvraag weens sonwaterverhitting is bevestigende, naamlik dat "algemeen gesproke sal die vermindering in aanvraag groter wees in die somer wanneer die las reeds relatief laag is, as in die winter". Ek het geantwoord dat dit op die Kaap van toepassing was, en nie noodwendig op die Transvaal nie. Dit was egter 'n algemene opmerking bedoel wat van toepassing is op gebiede waar maksimumaanvraag 'n hoogtepunt bereik in bewolke en betrokke maande met min son.

Die Voorsitter het ook na die volgende paragraaf in my verslag verwys:

"Dis 'n voldoende feit egter, dat met of sonder een of ander vorm van las-beheer, minder energie verkoop sal word deur elektrisiteitsondernemings indien bykomstige sonstelsels aangewend word. Gevolglik moet enige oorhoofse koste, insluitende energie oorbyvoelende aanvraag-koste wat nie direk verhaalbaar is, indirek verhaal word deur die verkoop van minder eenhede".

Hy het die mening uitgespreek dat hoewel die stelling korrek was, dit weer terugverwys het na die probleem van die huidige tweekoer-tarief-koste wat deur sommige elektrisiteitsondernemings toegepas word waar die laer inkomstegroep as 'n ware die hoër inkomstegroep in 'n mate gesubsidieer het.

Ek het genoem dat 'n vaste tarief in Kaapstad op huishoudelike verbruikers van toepassing is met die doel om die las van die armer verbruikers, wie se verbruik relatief laag is, te verlig. Die uitwerking hiervan is dat die hoërverbruik-(vermoende) verbruikers die laer verbruik-(arm) verbruikers subsidieer.

Die Voorsitter het die mening uitgespreek dat die volgende stelling in my verslag van die allergroutste belang was:

"Dat aangesien die elektrisiteitsvoorsieningsonderneming in die belang van die gemeenskap optree, hy in die gemeenskap se algehele beste belang behoort op te tree en sonenergie nie byvoorbeeld as mededinger te beskou nie. Verder word dit beweer dat elektrisiteitsvoorsieners hulle eerder in die rol van "energievoorsieners" behoort te sien wat nie alleen die meer effektiewe aanwending van nasionale energiebronne omvat nie maar ook die besparing van energie in die algemeen".

## 3. VMEO NIE GEKANT TEEN SONENERGIE

Ek het dit weer beklemtoon dat die VMEO beslis nie gekant was teen sonenergie nie en dat dit sonenergie nie as 'n bedreiging vir die ekonomiese lewensvatbaarheid van elektrisiteitsondernemings sien nie, of kon voorsien dat dit ooit so 'n bedreiging sou word nie.

## 4. AANSLAG VAN WATERVERWARMINGSELEMENTE

'n Onlangse NBNI-opname oor huishoudelike sonwaterverhittingsinstallasies het getoon dat 64% van huishoudings saamgestelde son-/elektriese tenks gebruik. Dat 34% van hierdie tenks waterverhittingselemente gehad het wat op 'n onnodige hoë kapasiteit van 4 kW aangeslaan is, is as redelik sorgwekkend beskou. Mnr. van Ahlften noem dat 'n perk van 1,2 kW in Australië gestel is om maksimum aanvraag te beperk. Dit is waarskynlik te laag en 'n syfer van 2 kW tot 3 kW sou waarskynlik geskik wees in ons toestand.

Die aanslag van huishoudelike toestelle maak deel uit van die huidige NBNI-navorsingsprogram. Daar word gemeld dat dit uit samesprekings met die SABS blyk dat daar vir sommige van die tipiese huishoudelike

toestelle wat 'n aansienlike elektriese aanslag verg, geen vereistes ten opsigte van 'n maksimumaanslag bestaan nie.

Wat wysigings aan die vereistes ten opsigte van die aanslag van die waterverwarmingselemente betref, kan die SABS wel die saak oorweeg indien 'n gemotiveerde versoek ontvang word.

Die mening is ook uitgespreek dat, hoewel die kwesle van die maksimumaanvraag van alle huishoudelike toestelle die aandag van sekere individuele plaaslike owerhede geniet het, daar in hierdie stadium geen gekoördineerde program bestaan om maksimumaanvraag op nasionale vlak te verlaag nie. Aandag moet dus geskenk word aan metodes om lasfaktore te verbeter. Ek het dit dus op my geneem om die VMEO se aandag op hierdie hele aangeleentheid te vestig met die doel om lede se menings oor die onderwerp in te win, veral oor die kwesle van die maksimumaanslag van waterverhittingselemente.

## 5. TYDSKAKELAARS EN RIMPELBEHEER

Daar is gepraat van dit voordelig sou wees indien plaaslike owerhede die installering van tidskakeelaars op nuwe elektriese installasies verpligtend sou maak om spitslase te verminder; byvoorbeeld, die afskalking van waterverwarmers gedurende spitsyde. Heelwat bespreking oor die onderwerp het gevolg, en daar is ook verwys na die rol van rimpelbeheer, lasbesprekingskakeelaars en tariefkale wat gegrond is op die tyd van die dag. Hoewel talle plaaslike owerhede met hierdie idees geëksperimenteer het, was die komitee van mening dat daar geen totale nasionaal gekoördineerde program bestaan nie; Die konsensus was dat baie min bereik sou word tensy die Regering die leiding neem en 'n definitiewe beleid oor hierdie saak voorskryf.

## 6. ELEKTRISITEITSVERBRUK IN HUISE

Die NBNI het 'n opname van energieverbruik in huise gemaak en inligting oor die huishoudelike verbruik van elektrisiteit van 14 plaaslike owerhede verkry.

Data oor die elektrisiteitsverbruik in 1 769 huise, verdeel in vyf waargroepes, is verkry en verwerk. Alhoewel dit bekend is dat ander energievorme, soos bv. steenkool en petroleumprodukte, ook in huise gebruik word, kon geen gedetailleerde gegewens hieroor verkry word nie. Daar is egter vasgestel dat ander brandstowwe al minder in huise gebruik word, veral in die groot stede waar lugbesoedlingsregulasies van krag is. Die volgende tendense kon duidelik na vore:

- Elektrisiteitsverbruik verminder namate die koste van elektrisiteit toeneem.
- Elektrisiteitsverbruik neem toe in verhouding met die waarde van die huis en dus waarskynlik ook die inkomste van die inwoner.
- Die eenheidskoste van elektrisiteit is in die algemeen hoër vir die laer inkomstegroepes as vir die hoër inkomstegroepes, normaalweg as gevolg van die vastekostekomponent in die tariefstruktuur, wat die gemiddelde eenheidskoste vir die verbruiker wat min elektrisiteit gebruik, verhoog.
- Elektrisiteitstariese word deur individuele plaaslike owerhede vasgestel en groot verskille in die aard en orde van tariewe kom voor. Dit is ook duidelik dat tariewe nie gebruik word as aanspooring om energie te bespaar en om spitslas te verminder nie.

In verband met die laaste twee paragrawe hierbo het ek die aandag gevestig op die ondersoek deur die Raad van Handel en Nywerheid in 1979 (Verslag 1889), "Ondersoek na die tariefbeleid en tariefstruktuur ten opsigte van die voorsiening van elektrisiteit in Suid-Afrika" waarin voorgestel word dat daar geen kruis-subsidiering van tariewe behoort te wees nie. Die mening was dat dit impliseer dat daar nie krusmatige vooroordeel moet wees ten gunste van energiebewaring of sonenergie nie. Die vaste huishoudelike tarief is egter 'n voorbeeld van sodanige vooroordeel, waar lae-verbruik-verbruikers ten koste van hoër-verbruikers begunstig word.

## 7. NBNI-OPNAME VAN HUISHOUELIKE SONWATER-VERWARMERS

Luidens die NBNI het die opname aangetoon dat horisontale opgaar-tenks die mark domineer en dat in die meerderheid van stelsels van gekombineerde son-ektriese tenks gebruik gemaak word. Die aanslag van elemente was opvallend en daar sal gesoek moet word na alternatiewe met laer elementaanslae en groter wateropgaarinhoude. Dit is kommerwekkend dat slegs 18 persent van die eienaars kon bewys dat



die installing van die stelsels werklike energiebesparing meebring. Ongeveer 10 persent van die ondervraagdes was onbewus daarvan dat hul stelsels nie korrek gefunksioneer het nie.

#### 8. SONENERGIE-EKONOMIE

'n Konsepberkeningstaat om voornemende kopers van soninstallasies te help om hulle ekonomiese lewensvatbaarheid te bereken is deur die NBNI versprei vir kommentaar. As gevolg van verskeie kompliserende faktore is hierdie saak egter nog nie opgelos nie en is daar gevolglik geen onmiddellike planne om sodanige dokument te publiseer nie.

Een van die probleme sentreer om die eskalasië in die koste van elektrisiteit. Ek het genoem dat, in 'n poging om die koste van sonwaterverwarming te veragter, daar 'n neiging was om berekenings op die heersende hoë eskalasiëkoerse van elektrisiteitskoste te grond. Dit was nie korrek nie. Die korrekte koers om te gebruik was die beraamde gemiddelde koers oor die betrokke tipes.

#### 9. REGSASPEKTE VAN SONENERGIE

Die verteenwoordiger van die Departement van Minerale- en Energiesake het berig dat aangesien daar so te sê geen wette in Suid-Afrika bestaan wat spesifiek na 'n persoon se sonrege verwys nie, die Departement 'n uitgebreide ondersoek na die beskikbare literatuur oor hierdie onderwerp onderneem het. 'n Konsepverslag, gegrond op inligting wat hoofsaaklik van die VSA, wat omvattende wetgewing met betrekking tot sonrege het, verkry is, is opgestel wat die belangrikste aspekte van sonwetgewing opsom.

'n Klein ad hoc-komitee is aangestel om hierdie verslag te bestudeer namens die SEEB-Loodskomitee met die oog daarop om sy kommentaar aan die Departement voor te lê.

Daar is ook voorgestel dat verskillende instansies, plaaslike owerhede en munisipaliteite genader word om hul menings en kommentaar te verkry.

#### 10. REGERINGSBELEID OOR ENERGIEBEWARING

Soos in my laaste verslag vermeld is, sien die Regering nie in hierdie stadium enige teenstrydigheid daarin om elektrisiteitsverkope as bron van inkomste te gebruik terwyl energiebewaring bevorder word nie, en dus beskou die Regering nie die huidige elektrisiteitsverkoopstruktuur in die land as heeltemal omversoenbaar met die beleid van energiebewaring nie. Gevolglik kon dit nie die NBNI se versoek om belastingtoewegings of ander geldelike middelle as aansporings tot energiebewaring steun nie.

Daar is verwys na die nege beleidsdoelwitte wat in die Departement van Minerale- en Energiesake se onlangse jaarverslag uiteengesit is, waaronder een die bevordering van energiebewaring was. In hierdie verband het die NBNI verklaar dat talle bestaande elektrisiteitsverkoopstrukture nie energiebewaring aanmoedig nie aangesien stygende ver-

bruik in alle gevalle dalende pryse tot gevolg het. Sulke tariefskale word egter so opgestel dat dit in elke geval die werklike koste van voorsiening weergee. Wat nou voorgestel word is 'n soort kruis-subsidiëring tussen tariewe of die kunsmatige aanpassing van tariewe om energiebewaring te begunstig.

Met betrekking tot hierdie onderwerp het die verteenwoordiger van die Departement van Minerale- en Energiesake berig dat dit die Regering se voorneme is om energiebewaring aan te moedig en dat die moontlikheid van aansporings tans ondersoek word.

#### 11. GEVOLGTREKKINGS

Die vergaderings wat ek bygewoon het was baie interessant en leerzaam. Van besondere belang vir die VMEO was die kwessie van verskillende maaatreëls wat voorgestel is om spitslaste te verminder, om lasfaktore te verbeter en om energiebewaring deur behoorlik opgestelde tariewe aan te moedig.

Die beswaar teen hoë aanslae vir waterverhittingselemente berus blykbaar op die hidrae wat hoë aanslae tot 'n hoë maksimum-groepsaansvraag lewer. Op die individuele vlak of vir klein groepe verbruikers kan dit moontlik nog geregedig word om laer aanslae na te streef. Maar vir groot groepe of vir die hele stelsel behoort verskeidenheid te verseker dat die maksimumaansvraag vir die groep grotendeels onafhanklik van aanslae is. In die praktyk kan daar egter moontlik nie so 'n hoë mate van verskeidenheid wees nie met die gevolg dat kort en relatief skerp stelselspitse ondervind mag word.

Ek ontvang graag lede se menings oor hierdie kwessie van die aanslag van waterverwarmingselemente en hul uitwerking op stelselspitsaansvrae sodat ek die VMEO se oogpunt aan die SEEB-Loodskomitee kan stel.

#### K.J. MURPHY - SOMERSET WEST

1. The hot water elements should not be smaller than 2 to 3 kW, preferably 3 kW.
2. Where a load management system is in operation, the determination of hot water cylinder rating should be left to the Undertaking.
3. With the installation of a load management system in Somerset West we found that spec builders were installing very small hot water cylinders which lead to problems when the cylinders were switched off by the ripple control. We subsequently adopted a building regulation which specifies a minimum cylinder capacity of 200 litres for a normal dwelling.
4. Time switches and ripple control do not go well together. And with the upsets caused by low frequency or power failures problems are caused for which the supplier is held responsible. The introduction of time switches is thus not to be recommended.

## REPORT ON THE ACTIVITIES OF THE NBRI ADVISORY COMMITTEE DEALING WITH THE DRAWING UP OF STANDARD CONDITIONS OF CONTRACT FOR ELECTRICAL AND MECHANICAL ENGINEERING WORKS

### A.H.L. Fortmann - Representative

Emanating from the Committee charged with drawing up guidelines and standards for electrical services, it was felt that it would be desirable to also have standard conditions of contract for electrical and mechanical engineering works.

The AMEU Executive Council supported this suggestion and Messrs. J.A. Loubser and A.H.L. Fortmann were delegated to serve on the Committee to investigate this matter.

The bodies represented on this Committee are the following:

ECA; AMEU; SAACE; SEIFSA; SECC; ESCOM; NBRI and the Department of Community Development.

The first meeting was held on 3 June 1981 at the offices of The South African Association of Consulting Engineers in Rosebank, Johannesburg, under the chairmanship of Mr. C.F. Geyer and attended by eleven persons.

At this first meeting some of the matters discussed were the following:

1. It was confirmed that the purpose of the meeting was to attempt to set up a committee which could prepare a standard conditions of contract document for electrical and mechanical works, similar to the document already existing for civil engineering works, which could obtain wider recognition than the various standard documents

already in existence.

2. The circumstances that led to the formation of this Committee were explained: The SAACE, in conjunction with SEIFSA, prepared a standard document of which the second draft had been in use for a period of time. A sub-committee under the chairmanship of the National Building Research Institute of the CSIR was also in the process of preparing a similar document incorporating the SAACE document and various other documents. It further became apparent from comments received from certain contracting organisations that the SAACE/SEIFSA document did not appear to be totally suitable for industrial type projects. Discussions between various parties concerned led to a meeting at the CSIR where it was in principle decided to form a further committee which would have wider representation than the committees already in existence.
3. After lengthy discussions, the meeting agreed on the following:
  - 3.1 The SABS should be approached to act as author of the final document which would then give it much higher status as a standard document.
  - 3.2 The SABS should be provided with a draft document to initiate matters.

3.3 All members of this Committee would investigate the three documents brought to this meeting, viz.

3.3.1 The SAACE document prepared in conjunction with SEIFSA which has been in practical use for some time.

3.3.2 The fifth draft of the NBRI document which was submitted to the meeting.

3.3.3 The FIDIC (Federation Internationale Des Ingenieurs - Conceil) document with supplement as submitted to this meeting by the SEIFSA/SECC group.

3.4 Members of this Committee would then report back to the next meeting re the feasibility of using one of the above documents as a base and then incorporating the aspects of the other documents not covered, or alternatively, if this was not possible, suggestions of how a new basic document could be prepared before submission to the SABS.

At the second meeting held on 15 July 1981, the Committee agreed to use the FIDIC document as a starting base.

At the third meeting held on 2 September 1981, the Committee confirmed that the FIDIC document would be used as a basis in spite of all the hard work done by various other Committees on standard documents.

It was pointed out that the work done on other documents would not be fruitless, because the research and conclusions would be of substantial value in the compilation of the proposed new document.

The reason for using the FIDIC document as a basis was that the FIDIC document is already widely used internationally and the opinion was therefore that it must be a fairly acceptable document.

For practical reasons the Committee decided to appoint a small working Committee to prepare the first working draft document. This working Committee consists of the following persons:

Mr. A. Lap (Convener) NBRI  
Mr. K. McDonald SECC  
Mr. J. Nottingham SEIFSA  
Mr. D. Robb SAACE

The Working Committee has now - January 1983, fulfilled its task and completed the first working draft. Copies of this draft were circulated to members of the Main Committee for comments.

The draft document was set out in a format favoured by the SABS - this having been done as it is presumed that the final document will be published by the SABS.

The FIDIC document was used as a basis by the Working Committee as agreed by the Main Committee. It was endeavoured to retain the original as far as possible but certain amendments and additions were found inevitable in the South African context. The points that troubled the Working Committee apparently also worried engineering interests in the European Community, as the following extract from the October issue of NEC International would indicate:

"The pressure is now on to turn FIDIC into a document which will be more acceptable to construction interests in Germany, Italy and the rest of Europe.

One perennial problem is the position of the Engineer, as described by the ICE Conditions. The sweeping powers available to the Engineer worry both Contractor and Employer. The role of the Engineer in settling disputes prior to arbitration is also objected to."

The working draft was accordingly extended to detail the 'authority of the Engineer', whilst cognisance was taken of any dissatisfaction with an Engineer's decision.

Once the comments from the various Main Committee members have been submitted - which should be by 31 March 1983, the Working Committee will deal with the comments after which a date will be set for the Main Committee to re-convene.

## VERSLAG OOR DIE BEDRYGWIGHEDE VAN DIE NBRI ADVISERENDE KOMITEE BEMOED MET DIE OPSTEL VAN STANDAARD VOORWAARDES VAN KONTRAK VIR ELEKTROTEGNIËSE EN MEGANIESE INGENIEURSWESE

A.H.L. Fortmann - Verteenwoordiger

Voortvloeiend uit die komitee wat belas is met die opstel van riglyne en maatstawe vir elektriese-dienste is gevoel dat dit wenslik sal wees om ook standaard voorwaardes van kontrak vir die elektrotegniese en meganiese ingenieurswese te bekom.

Die VMEQ Uitvoerende Raad het hierdie voorstel ondersteun en mnr. J.A. Louber en A.H.L. Fortmann was afgevaardig om op die komitee te dien om die saak te ondersoek.

Die volgende verenigings word op die komitee verteenwoordig:

EKV; VMEQ; SAVRI; SEIFSA; SECC; EVCOM; NBRI en die Department van Gemeenskapontwikkeling.

Die eerste vergadering was op 3 Junie 1981 in die kantore van die Suid Afrikaanse Vereniging vir Raadgewende Ingenieurs te Rosebank, Johannesburg, onder voorsitterskap van mnr. C.F. Geyer gehou. Elf persone het die verrigtinge bygewoon.

Die volgende sake was op die vergadering bespreek:

1. Dit was bevestig dat die doel van die vergadering die samstelling van 'n komitee is om standaard voorwaardes van kontrak vir die elektrotegniese en meganiese Ingenieurs wese op te stel. Dit moet op die riglyne van die dokument wat reeds vir die siviele ingenieurswese bestaan, opgestel word om sodende groter erkenning te kry as wat huidige die geval is met die verskeie dokumente wat reeds bestaan.
2. Die toestande wat gelei het tot die vorming van hierdie komitee was bespreek: Die SAVRI in samewerking met SEIFSA het 'n standaard dokument opgestel waarvan 'n tweede konsep reeds vir 'n geruime tyd in werking is. 'n Sub-komitee onder voorsitterskap van die Nasionale Bou Navorsingsinstituut van die WNNR was ook besig om 'n eendse dokument, wat die SAVRI dokument en verskeie ander omvat, op te stel. Dit het ook duidelik uit opmerkings deur sekere kontrakteurs geword, dat die SAVRI/SEIFSA dokument nie altyd prakties op industriële tipe projekte toepasbaar is nie. Na besprekings tussen die verskeie betrokke groepe is 'n vergadering by die WNNR belê waar in beginsel besluit was om 'n verdere komitee, wat groter verteenwoordiging as die huidige komitees het, te vorm.
3. Na langdurige besprekings, het die vergadering oor die volgende saamgestem:

- 3.1 Dat die SABS moet genader word om 'n finale dokument op te stel wat dit dan ook heelwat meer aansien as 'n standaard dokument sal gee.

stel wat dit dan ook heelwat meer aansien as 'n standaard dokument sal gee.

3.2 Dat die SABS genader word met 'n konsepdokument om sake mee te begin.

3.3 Dat alle lede van hierdie komitee die drie dokumente wat by die vergadering voorgeleë is, sal ondersoek, naamlik

3.3.1 Die SAVRI dokument wat in samewerking met SEIFSA opgestel is en wat alreeds vir 'n tydperk in gebruik is.

3.3.2 Die vyfde konsepdokument van die NBRI wat aan die vergadering voorgeleë was.

3.3.3 Die FIDIC (Federation Internationale Des Ingenieurs - Conceil)-dokument met die aanhangsel soos deur die SEIFSA/SECC groep voorgeleë.

3.4 Lede van die komitee sou dan aan die volgende vergadering verslag doen oor die uitvoerbaarheid van die ingebruikneem van een van bogenoemde dokumente as basis met die invoeging van sekere aspekte van die ander wat nie gedek is nie, of, as dit nie moontlik was nie sou voorstelle ingedien word oor hoe 'n basis dokument saamgestel kan word vir voorlegging aan die SABS.

Met die tweede vergadering op 15 Julie 1981, is besluit om die FIDIC dokument as basis te gebruik.

Op 2 September 1981, met die derde vergadering het die Komitee bevestig dat die FIDIC dokument as basis gebruik sal word ten spyte van die harde werk wat ander Komitees met standaard dokumente gedoen het.

Dit was genoem dat die werk wat met die ander dokumente gedoen was nie verlore sal gaan nie, aangesien die navorsing en gevolgtrekkings van genoemde dokumente van groot waarde sal wees met die samstelling van die nuwe dokument.

Die rede vir die aanvaarding van die FIDIC dokument as basis was omdat dit reeds internasionaal gebruik word en daarom 'n redelik aanvaarbare dokument blyk te wees.

Die Komitee het besluit om 'n klein Werkekomitee aan te stel om die eerste konsepdokument op te stel. Die Werkekomitee bestaan uit die volgende persone:

Mnr. A. Lap (Sameroeper) NBNI  
Mnr. K. McDonald SECC  
Mnr. J. Nottingham SEIFSA  
Mnr. D. Robb SAVRI

Die Werkekomitee het nou – Januarie 1983, sy taak voltooi en die eerste konsepdokument opgestel. Afskrifte van die dokument is onder die lede van die Hoofkomitee versprei.

Die konsepdokument is op 'n wyse soos dit deur die SABS verkies word, opgestel omdat dit veronderstel word dat die SABS die finale dokument sal publiseer.

Die FIDIC-dokument is, soos ooreengekom deur die Hoofkomitee, as basis deur die Werkekomitee gebruik. Daar was gepepog om die oorspronklike dokument so ver as moontlik te behou, maar sekere veranderinge en byvoegings was noodsaaklik om by die Suid Afrikaanse toestande aan te pas. Die dele waarmee die Werkekomitee probleme ondervind het, is blykbaar dieselfde as waarmee belanghebbendes in

Europa probleme mee het, soos die volgende aanhangsel uit die Oktoberuitgawe van "NEC International" aandui:

"The pressure is now on to turn FIDIC into a document which will be more acceptable to construction interests in Germany, Italy and the rest of Europe.

One perennial problem is the position of the Engineer, as described by the ICE Conditions. The sweeping powers available to the Engineer worry both Contractor and Employer. The role of the Engineer in settling disputes prior to arbitration is also objected to."

Die konsepdokument was ooreenkomstig uitgebrei om die 'Magte van die Ingenieur' te omvat, terwyl kennis van enige oortredendeheid met 'n Ingenieur se besluit ook geneem was.

Nadat volledige kommentaar teen om en by 31 Maart 1983 van die Hoofkomitee ontvang is sal die Werkekomitee die kommentaar verwerk en 'n datum bepaal wanneer die Hoofkomitee weer byeenroep sal word.

## SOUTH AFRICAN ELECTROLYTIC CORROSION COMMITTEE : REPORT ON ACTIVITIES 1981/82

### G.J. Nortje – Representative

Two meetings of the S.A. Electrolytic Corrosion Committee were held during the period under review, under the chairmanship of Mr. L.H. James, Rand Water Board, (1981) and Mr. E.F. Raynham, Escom, (1982).

#### REGIONAL FIELD COMMITTEES

The Committee considered reports from the Chairmen of the 4 regional Field Committees. These Committees are coping adequately with their tasks, and problems arising due to electrolytic corrosion are generally under control.

#### CODES OF PRACTICE

The Main Committee is represented by Mr. C.J. van Rooy (SATS) on the following SABS working groups, preparing Codes of Practice.

COP 5029 : Earthing  
COP 5030 : High-Voltage System Earthing  
COP 5031 : Low-Voltage System Earthing  
COP 5032 : EHV System Earthing

It was reported that the SABS has disbanded the working group on COP 5032, and intended to disband the working groups on COP 5030 and 5031, and to accept the AMEU Code of Practice for the Application of Neutral Earthing on Low Voltage Distribution Systems. The committee has reservations regarding the acceptance of the AMEU Code of Practice, as the practice of multiple earthing of the neutral conflicts with the requirements for electrolysis mitigation, and could cause electrolysis problems in future. The Committee is of the opinion that a Code of Prac-

tice for System Earthing should provide for flexibility so that departures from the practice of multiple earthing are permitted where electrolytic corrosion can be expected to be severe.

#### AC CORROSION

The S.A. Transport Services have only experienced one instance where the possibility of AC electrolytic corrosion had been reported. It was pointed out that the combination of AC and DC does result in more severe electrolytic corrosion than in the presence of DC only.

#### APOLLO EARTHING SYSTEM

Because of difficulties experienced with the earth electrode for the Cabora Bassa DC Supply, Escom investigated alternative sites for the electrode which is presently located near the Apollo converter station. A suitable site has been procured at Zwavelpoort, approximately 17 km North East of Apollo. The existing electrode will be retained for security reasons, and the two electrodes will probably be operated in parallel. The electrode current at Apollo will then be reduced to below 600 amps, from the present 1800 amps during mono-polar operation. (The two Cabora Bassa lines are designed to operate in the bi-polar mode, with no earth return current. Mono-polar operation is resorted to if one line is out of operation).

Escom has devised a new type of earth electrode for use at Zwavelpoort. The electrode comprises of a pipe with copper strips down each side, immersed in a graphite-saturated tar compound in a hole 60 metres deep. Tests have revealed that this electrode has a very low resistance.

## SUID-AFRIKAANSE ELEKTROLITIESE KORROSIE KOMITEE : VERSLAG OOR BEDRYGWIGHEDE 1981/82

### G.J. Nortje – Verteenwoordiger

Two vergaderings van die S.A. Elektrolitiese Korrosie Komitee is gedurende die onderhawige tydperk gehou, onder die voorsitterskap van mnr. L.H. James, Randse Waterraad, (1981) en mnr. E.F. Raynham, Evkom, (1982).

#### STREEKVELDKOMITEES

Die komitee het verslae deur die voorsitters van die 4 streekveldkomitees oorweeg. Hierdie komitees kwyt hulle goed van hulle taak, en probleme te wyte aan elektrolitiese korrosie is oor die algemeen onder beheer.

#### GEBRUIKSKODES

Die hoofkomitee word deur mnr. C.J. van Rooy (S.A. Vervoerdienste) verteenwoordig op die volgende SABS werkgroepe wat sekere Gebruikskodes opstel:

Gebruikskode 5029 : Aarding  
Gebruikskode 5030 : Hoogspanningstelselaarding  
Gebruikskode 5031 : Laagspanningstelselaarding  
Gebruikskode 5032 : Ekstrahoogspanningstelselaarding

Daar is gerapporteer dat die SABS besluit het om die werkgroep vir Gebruikskode 5032 te ontbind, en ook beoog om die werkgroepe vir Gebruikskodes 5030 en 5031 te ontbind, en om die VMEO se Gebruikskode vir die Toepassing van Neutraal Aarding op Laagspanningsverspreidingsnetwerke te aanvaar. Die komitee het bedenkinge in verband met die aanvaarding van die VMEO se Gebruikskode, aangesien die praktyk van menigvuldige aarding van die neutraalgeleier in konflik is met die vereistes vir vermindering van elektrolitiese korrosie, en kan veroorsaak dat probleme te wyte aan elektrolitiese korrosie in die toekoms vererger. Die komitee is van mening dat 'n Gebruikskode vir Stelselaarding voorsiening moet maak vir buigbaarheid sodat afwykings van die praktyk van menigvuldige aarding toegelaat word in gevalle waar ernstige elektrolitiese korrosie verwag kan word.

#### WISSELSTROOMKORROSIE

Die S.A. Vervoerdienste het tot dusver nog net een geval teegemoet waar die moontlike bestaan van wisselstroomkorrosie gerapporteer is. Daar is uitgewys dat die kombinasie van wisselstroom en gelykstroom meer ernstige elektrolitiese korrosie tot gevolg het as net gelykstroom.

## APOLLO AARDINGSTELSE

As gevolg van probleme wat ondervind is met die aardingelektrode vir die Cabora Bassa gelykstroomtoevoer, het Evkom ondersoek ingestel na 'n alternatiewe terrein vir die elektrode wat huidige naby die Apollo omsitter geleë is. 'n Geskikte terrein is nou bekom by Zwavelpoort, ongeveer 17 km noordoos van Apollo. Die bestaande elektrode sal behou word vir sekuriteitsdoelindes, en die twee elektrodes sal waarskynlik in parallel gekoppel word. Die elektrode stroom by Apollo sal dan verlaag tot onder 600 amp, vanaf die huidige 1800 amp,

gedurende eenpolige werking. (Die twee gelykstroomgeleidings vanaf Cabora Bassa is ontwerp vir tweepolige werking, met geen aardstroom nie. Eenpolige werking ontstaan egter wanneer een van die twee geleidings buite werking is).

Evkom het 'n nuwe tipe aardelektrode ontwikkel vir gebruik by Zwavelpoort. Die elektrode bestaan uit 'n pyp met koper stroke aan weerskante, wat omring is deur 'n grafiet-versadigde teermengsel in 'n 60 meter diep gat. Toets het aangedui dat die weerstand van hierdie elektrode besonder laag is.

# WITWATERSRAND REGIONAL ELECTROLYTIC CORROSION FIELD COMMITTEE : REPORT ON ACTIVITIES 1981/82

G.J. Nortje – Representative

The Witwatersrand Regional Electrolytic Corrosion Field Committee holds meetings during January and July of each year.

At the meeting held on 13 January 1982, Mr. J.M. Lamprecht (Rand Water Board) was elected Chairman in succession to Mr. D.G. Kotzke (Sasol/Gascor).

A large number of applications for drainage bonds were processed, the majority for the Rand Water Board pipes.

The committee took note of the establishment of a new earth electrode site for the DC electricity supply from Cabora Bassa. This should greatly simplify the measures for combating electrolytic corrosion on the part of the Rand Water Board and SATS Pipeline Authorities during monopolar operation of the supply.

A private 3 kV DC railway line was commissioned by a platinum mine in

the Rustenburg area during February 1982. This railway line is connected to the 25 kV AC SATS railway line. There is therefore a strong likelihood that electrolytic corrosion will be experienced in the affected area.

During the period under review no problems concerning electrolytic corrosion were referred to the Committee by members of the AMEU. Considering the extent of DC electrification in the Witwatersrand and surrounding areas, and the undoubtedly very large number of instances where member's cables run in close proximity to or cross, electrified railway lines, and pipelines bonded to railway lines, it would be unrealistic to assume that no problems exist. It appears more likely that cases of electrolytic corrosion of cables armouring, buried earth wires, earth electrodes and even steel poles do occur, but are not detected or identified as such.

# WITWATERSRANDSE ELEKTROLITIESE KORROSIE STREEKVELDKOMITEE

G.J. Nortje – Verteenwoordiger

Die Witwatersrandse Elektrolitiese Korrosie Streekskomitee vergader gedurende Januarie en Julie van elke jaar.

Tydens die vergadering op 13 Januarie 1982 is mnr. J.M. Lamprecht (Randse Waterraad) verkies tot Voorsitter in opvolging van mnr. D.G. Kotzke (Sasol/Gaskor).

'n Groot aantal aansoek om dreineringsaansluitings is deur die komitee oorweeg, waarvan die meerderheid vir pype van die Randse Waterraad was.

Die komitee het kennis geneem van die vestiging van 'n nuwe aardingelektrode vir die gelykstroomtoevoer vanaf Cabora Bassa op 'n ander terrein. Hierdie stap behoort die voorsorgmaatregte wat deur die Randse Waterraad en S.A. Vervoerdienste se Pyplynoutoriteite getref moet word om elektrolitiese korrosie gedurende enkelpoligewerking van die toevoer, aansienlik te verenvoudig.

'n Privaat 3 kV gelykstroom spoorlyn is deur 'n platinamyn naby Rus-

tenburg in werking gestel gedurende Februarie 1982. Hierdie spoorlyn verbind met die 25 kV wisselstroom spoorlyn van die S.A. Vervoerdienste. Daar bestaan dus 'n sterk moontlikheid dat elektrolitiese korrosie in hierdie omgewing sal voorkom.

Gedurende die onderhawige tydperk is geen probleme in verband met elektrolitiese korrosie deur lede van die VMEO na die komitee verwys nie. Indien in aanmerking geneem word dat daar 'n uitgebreide gelykstroom ge-elektrofiseerde spoorwêreld in die Witwatersrand en omringende gebiede bestaan, en daar ongetwyfeld 'n groot aantal gevalle is waar lede se kabels spoorlyne of ander pyplyne wat aan spoorlyne gekoppeler is, kruis of naby daaraan geleë is, sou dit onrealisties wees om te aanvaar dat geen probleme bestaan nie. Dit is meer waarskynlik dat gevalle van elektrolitiese korrosie van kabelpantering, ondergrondse aardeleiers, aardingelektrodes en selfs staal pale wel voorkom, maar nie opgespoor of as sulks geïdentifiseer word nie.

# REPORT ON THE NATAL ELECTROLYTIC CORROSION REGIONAL FIELD COMMITTEE

E.G. Davies – Representative

This report covers the activities of the Natal Electrolytic Corrosion Regional Field Committee for the two years 1981 and 1982.

The meetings were well attended and in general representatives from the following organisations were present at the meetings:

South African Transport Services

Sasol and S.F.F.

Oil Industry Corrosion Control

General Post Office

Durban Corporation

Umgeni Water Board

Escom

Corrosion Control Group

Pinetown Regional Water Services Corporation

Department Environment Affairs – Directorate of Water Affairs

A list of applications in respect of encroachments over property administered by the South African Transport Services was submitted at

the meetings and covered such diverse fields as underground electric cable and overhead mains crossings, water, sewer and stormwater pipeline crossings, nitrogen and oxygen pipelines, and even a cattle route.

An arrangement has been made with the South African Transport Services to provide all members with details of any changes to traction substations, and members were in agreement that the information being provided was very useful.

The Post Office had experienced corrosion problems with cables in the Stamford Hill area. A bond had been installed and the situation was now under control, but would continue to be monitored.

The Committee agreed that although the Umgeni Water Board's steel water pipelines were generally in fairly remote rural areas it was nevertheless important that all members be notified of any electrically conducting underground installations which might cause changes in underground currents.



# ELECTROLYTIC CORROSION : NORTHERN CAPE REGIONAL COMMITTEE : BIENNIAL REPORT

N.S. Botha – Representative

Two meetings, following closely on the meetings held by the Main Committee, are normally convened yearly during the months of April and October. The meeting scheduled for April 1982 had to be cancelled for lack of a quorum.

Over the past two years the following matters received attention:

## 1. THE MASTERPLAN

The colour code, symbols and format of the masterplan have been finalised. The plan, available to all members of the Regional Committee, was drawn up and will be maintained by personnel of the South African Transport Services and is kept in the office of the Sectional Electrical Engineer at Kimberley.

## 2. RIVERTON – NEWTON WATER PIPE-LINE : MUNICIPALITY OF KIMBERLEY

Clear signs of electrolytic corrosion of the pipe-line were noticed a few years ago. Upon advice from the regional committee a system of protection was developed and implemented with test points installed over the whole length of the pipe-line that are regularly monitored. At this stage the measures taken seem to be reasonably successful.

Peculiar markings were noticed on the impellers and other parts of the water pumps at Riverton. It was later established that these marks could not be ascribed to electrolysis but resulted from poor manufacturing techniques.

## 3. CABORA BASSA HIGH TENSION D.C. TRANSMISSION LINE

Cognisance was taken of the contents of a study compiled on the effects of electrolytic corrosion of underground pipe-lines in the vicinity of the earth electrodes of the Songo Apollo Station when the line is operated in the mono-polar state.

## 4. ELECTROLYTIC CORROSION OF PIPE-LINE STEEL AS A RESULT OF ALTERNATING CURRENT SYSTEMS

Cognisance was taken of a report on the abovementioned subject compiled by the test laboratory of the South African Transport Services. Special attention had been given to this report since the South African Transport Services operate a single phase A.C. traction system in this region.

## 5. THE REPLACEMENT IN DWELLINGS OF WATERPIPES WITH COPPER PIPES

Cognisance was taken of a letter by the Chief Electrical Engineer of the South African Transport Services to the Sectional Manager of Durban. Special attention was given to the following paragraph:

"There appears to be growing tendency amongst plumbers to replace corroded house water-piping with copper piping. The houses referred to in report E.LAB.21/75 is one example of this. Since copper is not resistant to electrolytic corrosion, municipalities should be requested to advise plumbers under their jurisdiction not to replace corroded galvanised piping with copper piping unless the cause of the corrosion has been clearly established".

## 6. VAAL-GAMAGARA WATER PIPE-LINE : DEPARTMENT OF WATER AFFAIRS

Protection of this pipe-line is now completed. Problems experienced with the erection and maintenance of the system of protection high lighted certain matters. The regional committee made certain recommendations to the main committee regarding the physical placing and painting of railway connections, to minimise likely damage to it, during maintenance of the railroad.

# ELEKTROLITIESE KORROSIË : NOORD-KAAP STREEKKOMITEE : TWEEJAARLIKSE VERSLAG

N.S. Botha – Verteenwoordiger

## INLEIDING

Normaalweg word twee vergaderings per jaar gehou gedurende April en Oktober net na die vergaderings van die Hoofkomitee. Die vergadering van April 1982 kon nie gehou word nie omdat 'n kworum nie verkry kon word nie.

Die volgende sake is gedurende die afgelope twee jaar bespreek:

### 1. DIE MEESTERPLAN

Die kleurkode, simbole en formaat van die meesterplan is nou gefinaliseer. Die plan is opgetrek en word deur die personeel van die Suid-Afrikaanse Vervoerdienste instand gehou en is in die kantoor van die Afdelings elektrotegniese Ingenieur, Suid-Afrikaanse Vervoerdienste, Kimberley, beskikbaar vir alle lede van die Streekkomitee.

### 2. RIVERTON-NEWTON WATERPPLEIDING : KIMBERLEY MUNICIPALITEIT

Enkele jare gelede is duidelike tekens van elektrolitiese korrosie aan die pyplydings opgemerk. Met advies van die Streekkomitee is 'n beskermingsstelsel ontwikkel en in werking gestel met toetspunte oor die hele lengte van die pyplyding wat gereeld gemonitor word. Op hierdie stadium blyk die maatreëls redelik suksesvol te wees.

Eienaardige merke is opgemerk aan die impellers en ander onderdele van die waterpompe by Riverton. Later is vasgestel dat dit nie aan elektrolitiese gewyt kan word nie, maar die gevolg is van swak vervaardigings- tegnieke.

### 3. CABORA BASSA H.S.G.S. TRANSMISSIELYN

Kennis is geneem van 'n studiestuk wat handel oor die effek van elektrolitiese korrosie van ondergrondse pyplydings en die nabyheid van die aardelektrode van die Songo Apollo Stasie wanneer die transmissie-

lyn in die monopolêre stand bedryf word.

### 4. ELEKTROLITIESE KORROSIË VAN PYPLEIDINGSTAAL AS GEVOLG VAN WISSELSTROOMSTELSELS

Kennis is geneem van 'n verslag wat deur die toetslaboratorium van die Suid-Afrikaanse Vervoerdienste opgestel is in verband met bogenoemde aspek. Besondere aandag is daaraan geskenk aangesien die Suid-Afrikaanse Vervoerdienste 'n enkelfase W.S. trakstelsel deur hierdie streek bedryf.

### 5. VERVANGING VAN WATERPYPPE IN WOONHUISE MET KOPERPYPPE

Kennis is geneem van 'n brief van die Hoof Elektrotegniese Ingenieur van die Suid-Afrikaanse Vervoerdienste aan die Afdelingsbestuurder van Durban. Besondere aandag is aan die volgende paragraaf gegee:

"There appear to be a growing tendency amongst plumbers to replace corroded house water-piping with copper piping. The houses referred to in report E.LAB.21/75 is one example of this. Since copper is not resistant to electrolytic corrosion, municipalities should be requested to advise plumbers under their jurisdiction not to replace corroded galvanised piping with copper piping unless the cause of the corrosion has been clearly established".

### 6. VAAL-GAMAGARA WATERPPLEIDING : DEPARTEMENT WATERWESE

Die beskerming van hierdie pyplyding is nou afgehandel. Probleme wat ondervind was met die oprigting en instandhouding van die beskermingsstelsel het enkele sake uitgelik. Die Streekkomitee het aanbevelings aan die Hoofkomitee gemaak oor die fisiese plasing en verf van spoorverbindings om die beskadiging daarvan, tydens die instandhouding van die spoorbaan, te verminder.

# REPORT : CAPE WESTERN ELECTROLYTIC CORROSION REGIONAL FIELD COMMITTEE

Ken Murphy – Representative

Annual Report of the AMEU Representative on the Cape Western Electrolytic Corrosion Regional Field Committee for the two years ending 31st December 1982.

Six meetings of the Regional Field Committee were held during 1981/82 and the minutes of these meetings were circulated to all members of the Good Hope Branch of the AMEU together with the minutes of the AMEU branch meetings.

Subjects which appeared on the agenda of the Regional Field Committee and which have a bearing on the distribution systems of supply authorities are listed below:

1. The Steenbras pipe lines which pass through the Strand and Somerset West municipal areas.
2. Earthing in relation to the new code of Practice dealing with PME and MEN systems. In this respect the Committee was advised that

provision will be made in the code to restrict stray current pick up and consequent discharge via water pipes and electrode systems.

3. Alternating current corrosion referred to by the Cape Northern Regional Committee.
4. Earthing of transmission lines as referred to by the Natal Regional Committee.

In addition copies of a paper read before the East Anglican Sub-Committee of the Institute of Electrical Engineers (British) in March 1957 and dealing with the theory and practice of the method of corrosion mitigation, was made available to all members of the Good Hope Branch.

Although retired from municipal service Mr. R.R. Gilmour continued to fill the position of Chairman in the competent manner to which the Cape Western Electrolytic Corrosion Regional Field Committee, during his term of office, has grown accustomed.

## SOUTH AFRICAN NATIONAL COMMITTEE OF THE WORLD ENERGY CONFERENCE (SANCWEC)

D.C. Palser – Representative

Since the last Convention of the AMEU in Durban in 1981 there have been three meetings of the South African National Committee of the World Energy Conference (SANCWEC). The meetings were held at Escom's Megawatt Park and were chaired by Mr. Jan Smith, Chairman of Escom.

Apart from Escom and the AMEU, the following bodies are represented on SANCWEC.

Department of Mineral and Energy Affairs  
Department of Manpower  
Council for Scientific and Industrial Research  
Atomic Energy Corporation  
Chamber of Mines  
Transvaal Coal Owners' Association  
Sasol  
South African Institute of Electrical Engineers  
South African Institute of Mechanical Engineers  
South African Institute of Chemical Engineers  
Energy Research Institute, University of Cape Town  
Institute for Energy Studies, Rand Afrikaans University  
South African Committee on Large Dams

It may be of general interest to restate the aims and objectives of the World Energy Conference (WEC).

The World Energy Conference (WEC) is an international non-governmental organisation which was formed in London in 1924 and now has a membership of around 80 countries. Each country is represented by a National Committee composed of representatives from various scientific, technical and industrial organisations concerned with energy matters.

The objects of the WEC are to promote the development and peaceful use of energy resources to the greater benefit of all, both nationally and internationally. The organisation is further committed to doing everything possible to stimulate and promote activities aimed at the economic development and peaceful use of energy resources throughout the world. Its objects are entirely non-political. Members of National Committees attend as individual participants and not as delegates of their respective countries.

At the three meetings of SANCWEC referred to earlier various energy-related matters were discussed.

Of interest was a report by Mr. Jan Smith following on an overseas trip to the USA where he visited a number of electric utilities. Mr. Smith reported that these electric utilities operated under a number of constraints. Major problems included a very low return on their investments, high interest rates, delays and restrictions on construction projects of any kind and long lead times as a result of such restrictions. The new governmental administration, however, had taken certain steps to

expedite projects. The utilities were also confronted with problems concerning the high sulphur content of much of their coal deposits. Energy wastage in earlier years was now being curtailed and this was providing some breathing space for the utilities, as did the high plant margins in most cases.

Another important matter discussed was the question of sponsoring a South African energy conference to consider the strategic and economic factors affecting supply and demand in the country. It was considered that any papers should deal with the present position and future prospects of the various energy sectors and make recommendations on any action required to ensure a plentiful supply of energy in the future.

It was accordingly resolved that SANCWEC would organise such a conference, the organising committee being headed by Prof. R.K. Dutkiewicz of the Energy Research Institute of the University of Cape Town. The conference, with the theme "South African Energy in Perspective", was held in the CSIR Conference Centre, Pretoria, on the 24-25 January 1983.

The President, Mr. D.H. Fraser, and myself attended this conference as the official representatives of the AMEU, as authorised by the Executive Council. A report on this conference is annexed to this report.

Discussions were also held at the various SANCWEC meetings on the likelihood of representatives from South Africa being granted visas to attend the next (12th) Congress of WEC in New Delhi in September 1983. It would appear that for political reasons attendance by South African delegates will not be possible.

Dr. R.H. Scott, Director, Energy, Department of Mineral and Energy Affairs, advised that SANCWEC was invited to make any submission on energy matters to the Energy Policy Committee which reported direct to the Cabinet.

The National Institute of Coal Research (NCIR) is to be replaced by a new body known as the Fuel Research Institute under the CSIR.

A report by a joint UNIPED/WEC Committee on Availability of Thermal Generating Plant was made available to SANCWEC members. This report deals with unavailability factors of thermal generating plant and availability statistics for the period 1977 to 1980.

The determination of the unavailability factors is necessary in order to estimate the reserve capacity required in generating and transmission systems as compensation for the total unavailable capacity in all generating plants. Any errors made in assessing the amount of reserve capacity required result either in excessive capital investment or in shortfall in supplies to consumers. The terms "availability factor" and "unavailability factor" are complementary to 100%.

For large thermal generating units in excess of 100 MW the report indicated that the unavailability factors ranged generally between 20% and 30%, the higher figure applying to the large units, that is those of 400 MW.

# SUID-AFRIKAANSE NASIONALE KOMITEE INSAKE DIE WERELD-ENERGIEKONFERENSIE (SANKWEK)

D.C. Palser – Verteenwoordiger

Sedert die laaste Konvensie van die VMEQ in Durban in 1981, is drie vergaderings van die Suid-Afrikaanse Nasionale Komitee insake die Wêreld-energiekonferensie (SANKWEK) gehou. Die vergaderings is by Evkom se Megawatt-park gehou en mnr. Jan Smith, voorsitter van Evkom, het as voorsitter opgetree.

Bewens Evkom en die VMEQ, word die volgende liggame in SANKWEK verteenwoordig:

Departement van Minerale- en Energiesake  
Departement van Mannekrag  
Wetenskaplike en Nywerheidsnavorsingsraad  
Atoomenergiekorporasie  
Kamer van Mynewese  
Transvaalse Steenkoolenaarsvereniging  
Sasol  
Suid-Afrikaanse Instituut van Elektriese Ingenieurs  
Suid-Afrikaanse Instituut van Meganiese Ingenieurs  
Suid-Afrikaanse Instituut van Chemiese Ingenieurs  
Energie navorsingsinstituut, Universiteit van Kaapstad  
Instituut vir Energiestudie, Randse Afrikaanse Universiteit  
Suid-Afrikaanse Komitee oor Groot Damme

Die sou moontlik van algemene belang wees om die doelstellings en oogmerke van die Wêreld-energiekonferensie (WEK) weer te noem.

Die Wêreld-energiekonferensie (WEK) is 'n internasionale nie-staats-organisasie wat in 1924 in Londen gestig is en nou 'n ledetal van omtrent 80 lande het. Elke land word verteenwoordig deur 'n Nasionale Komitee wat bestaan uit verteenwoordigers van verskeie wetenskaplike, tegniese en nywerheidsorganisasies wat by energiesake betrokke is.

Die WEK se oogmerke is om die ontwikkeling en vreedsame gebruik van energiebronne nasionaal en internasionaal tot almal se voordeel te bevorder. Die organisasie is ook daartoe gebonde om alles moontlik te doen om aktiwiteite te stimuleer en bevorder wat gemik is op die ekonomiese ontwikkeling en vreedsame gebruik van energiebronne darsdeur die wêreld. Die WEK se oogmerke is ook heeltemal nie-politiek van aard. Lede van Nasionale Komitees woon vergaderings as individuele deelnemers, en nie as afgevaardigdes van hul onderskeie lande nie.

By die drie SANKWEK-vergaderings wat vroeër genoem is, is verskeie energieverwante sake bespreek.

'n Verslag deur mnr. Jan Smith na 'n besoek aan die VSA waar hy 'n aantal elektrisiteitsnuttuutsmaatskappye besoek het, was van belang. Mnr. Smith het berig dat hierdie elektrisiteitsnuttuutsmaatskappye onder 'n aantal beperkings bedryf word. Van die groot probleme is 'n baie lae rendement op hul investeringe, hoë rentekoerse, vertraginge en beperkings op bouprojekte van enige aard en lang aanvoorte as gevolg van sodanige beperkings. Die nuwe staatsadministrasie het egter sekere stappe gedoen om projekte te bespoedig. Die nutsmaatskappye het ook te kampe gehad met probleme rakende die hoë swawelinhoud van baie van hul steenkoolafsettings. Energievermorsing in die verlede word nou beperk en dit, soos die hoë toerustingbesikbaarheid in die meeste

gevalle, gee die nutsmaatskappye 'n bietjie blaaskans.

Nog 'n belangrike aangeleentheid wat bespreek is, was die kwessie van die borg van 'n Suid-Afrikaanse energiekonferensie om die strategiese en ekonomiese faktore te bespreek wat vraag en aanbod in die land raak. Die algemene mening was dat enige referate oor die huidige posisie en toekomstvoorsigte van die verskillende energiesektore moes handel en aanbevelings moes maak oor enige optrede wat nodig is om 'n oorvloedige energievoorraad vir die toekoms te verseker.

Daar is dus besluit dat SANKWEK so 'n konferensie moes reël, en dat die reëlingskomitee deur prof. R. K. Dutkiewicz van die Energie navorsingsinstituut van die Universiteit van Kaapstad gelei sou word. Die konferensie, met "Suid-Afrikaanse Energie in Perspektief" as tema, is op 24-25 Januarie 1983 in die WNNR-Konferensieentrum in Pretoria gehou.

Ek en die President, mnr. D.H. Fraser, het hierdie konferensie as amptelike afgevaardigdes van die VMEQ bygewoon, gemagtig deur die Uitvoerende Raad. 'n Verslag oor hierdie konferensie word by hierdie verslag aangeheg.

By die verskillende SANKWEK-vergaderings is daar ook besprekings gehou oor die moontlikheid dat Suid-Afrikaanse verteenwoordigers visums sal ontvang om die volgende (12de) WEK-kongres in September 1983 in Nieu-Delhi te woon. Om politieke redes sal die teenwoordigheid van Suid-Afrikaanse afgevaardigdes blykbaar onmoontlik wees.

Dr. R.H. Scott, Direkteur : Energie, Departement van Minerale- en Energiesake, het berig dat SANKWEK versoek is om enige voorlegging oor energiesake aan die Energiebeleidingskomitee te doen, wat regstreeks aan die Kabinet verslag doen.

Die Nasionale Instituut van Steenkoolnavorsing (NISN) gaan vervang word deur 'n nuwe liggame, die Brandstofnavorsingsinstituut, wat onder die WNNR sal val.

'n Verslag deur 'n gesamentlike UNIPED/WEK-komitee oor Besikbaarheid van Termiese Opwekkingsaanlegte is aan SANKWEK-lede beskikbaar gestel. Hierdie verslag handel oor onbesikbaarheidsfaktore van termiese opwekkingsaanlegte en beskikbaarheidsstatistiek vir die tydperk van 1977 tot 1980.

Die bepaling van die onbesikbaarheidsfaktore is nodig om die reserwekapasiteit te beraam wat nodig is in opwekkings- en geleidingsstelsels om te vergoed vir die totale onbesikbare kapasiteit in alle opwekkingsaanlegte. Enige foute wat gemaak is in die beraming van die hoeveelheid reserwekapasiteit wat nodig is, het of oormatige kapitaal-investering of tekorte in die voorsiening aan verbruikers tot gevolg. Die terme "besikbaarheidsfaktor" en "onbesikbaarheidsfaktor" is aanvullend tot 100%.

Vir groot termiese opwekkingsseenhede van meer as 100 MW het die verslag aangedui dat die onbesikbaarheidsfaktore gewoonlik tussen 20% en 30% gewissel het, en dat die hoër syfer van toepassing is op die groter eenhede, nl. die van meer as 400 MW.

## SOUTH AFRICAN ENERGY IN PERSPECTIVE CONFERENCE ORGANISED BY SANCWEC CSIR CONFERENCE CENTRE, PRETORIA : 24-25 JANUARY 1983 REPORT BY EXECUTIVE COUNCIL DELEGATES

D.H. Fraser – President  
D.C. Palser – Executive Council Member

The Executive Council authorised the President, Mr. D.H. Fraser, and Mr. D.C. Palser to attend the abovementioned conference as the AMEU's official delegates.

The conference, which was chaired by Mr. Jan Smith, Chairman of SANCWEC and Escom, was officially opened by the Honourable P.T.C. du Plessis, Minister of Mineral and Energy Affairs.

In his opening address the Minister outlined the government's energy policy, the basic tenets of which were three-fold, as follows:

- (i) to ensure an economical supply of energy to all sectors of the economy,
- (ii) to optimise the utilization of energy resources to obtain the maximum social benefits, and
- (iii) to consider the energy needs and requirements of surrounding countries and the country's trading partners.

Referring to the recently announced coal export ceiling of 80 million tons a year, it was stressed that this represented a very small percentage

of our coal heritage and that we can safely export such quantities without harm to the country.

The Minister also referred to the poor quality coal and coal discards which are accumulating at prodigious rates and stated that it was a problem which had to be solved. The government had taken steps in this direction by funding a fluidised bed combustion facility at the CSIR to demonstrate the utilization of coal discards. The plant was expected to be commissioned during 1984.

The government was also encouraging private industry to participate in future synthetic fuel projects and the Minister stated that he hoped to make an announcement in this regard in the not too distant future.

Two overseas keynote speakers then presented their papers. The first paper, entitled "World Energy Prospects", was presented by Mr. E. Rutley, the Secretary-General of the World Energy Conference (WEC). The second was delivered by Dr. P.H. Frankel and was entitled "Global Prospects for Oil". Dr. Frankel is one of the world's top oil economists. Both papers were extremely interesting and well presented.

After the addresses by the two keynote speakers the following papers were presented over the two day session.

1. Energy Policy Formulation and Administration in South Africa (Mr. S.J.P. du Plessis, Director-General, Department of Mineral and Energy Affairs).
2. Aspects of Energy Policy in South Africa: The Role of the State in Coal Affairs. (Dr. D.C. Neethling, Chief Director: Energy, Department of Mineral and Energy Affairs).
3. Coal and the Mining Industry. (Mr. S.P. Ellis, Chief Executive of Coal, GENCOR).
4. Prospects for Nuclear Power. (Dr. J.W.L. de Villiers, Executive Chairman, Atomic Energy Corporation).
5. Uranium Enrichment. (Dr. W.L. Grant, Managing Director, Uranium Enrichment Corporation).
6. Electricity Supply in South Africa: A Strategy for Electric Utilities. (Mr. Jan Smith, Chairman, Escom).
7. Energy Requirements in Mining. (Dr. A. Granville, Head: Mineral Fuels Section, Minerals Bureau).
8. Transport Fuels in South Africa. (Dr. R.H. Scott, Director for Energy Planning, Department of Mineral and Energy Affairs).
9. Oil and Gas Exploration in South Africa. (Dr. P.J. van Zijl, Managing Director, SOEKOR).
10. Alternative Energy Options. (Dr. K.F. Bennett, Chief Research Officer, Energy Research Institute, University of Cape Town).
11. South African Energy in Perspective. (Prof. R.K. Dutkiewicz, Director, Energy Research Institute, University of Cape Town).

A number of interesting points emerged from the various papers presented, as follows.

#### 1. DR. D.C. NEETHLING

(i) Distribution of South African coal consumption sectors for 1981 (%)	
Electricity .....	46
Synfuels and Chemicals .....	15
Metallurgy .....	7
Exports .....	23
Others .....	9
	<u>100</u>

"Others" includes industry, commerce, transport, mining and households.

#### 2. MR. S.P. ELLIS

- (i) Escom's electricity sales are expected to grow to the end of the century at an average rate of some 7% per annum, before tapering off towards the end of the period as electricity demand in the gold mining sector starts declining.
- (ii) Escom's present installed generating capacity of some 20 000 MW is expected to reach 37 000 MW by 1990 and almost double to 71 000 MW by the year 2000. Of this capacity, about 60 000 MW will consist of large coal-fired base load stations, generating approximately 90% of the total electricity demand. The balance will consist mainly of small peak load stations scattered around the country. The improvements in boiler efficiency achieved by Escom over the past few years will be offset in future as power stations are progressively supplied with coal of lower heat content than at present.

- (iii) South Africa's coal reserves are now estimated at 110 billion tons in situ, of which 51 billion tons are regarded as extractable under current economic and technological conditions. At the projected rates of production it is estimated that about 5.5 billion tons, or some 11% of the economically recoverable reserves will have been depleted by the year 2000.

#### 3. DR. J.W.L. DE VILLIERS

- (i) At present, the Western Cape is the only region where nuclear and coal based electricity can in any way be considered comparable in cost. It was stated that it is inconceivable that a coal-fired power station comparable in size to Escom's Koeberg nuclear station will ever be built in the Western Cape. The cost to transport about 16 000 tons of coal per day over some 1 600 kilometres would be prohibitive.
- (ii) Escom will have to install some 50 000 MW of generating capacity between now and the turn of the century. With the Cape Western load accounting for nearly 10% of the total capacity and the Cape Eastern and Natal loads for a further 15%, it was not unreasonable to expect that a part of these loads will in future be supplied by nuclear stations. Of the 25%, or around 12 000 MW, needed in the coastal areas the view was furthermore expressed that "one can expect that a few more nuclear stations the size of Koeberg will be built in this period".
- (iii) Because of the high cost of transmitting large blocks of load from inland coal-fired power stations to coastal areas, it was considered that nuclear power could become competitive with coal in the coastal areas during the coming decades.
- (iv) South Africa has adequate uranium reserves to support a relatively large nuclear power programme and has the technological capability of becoming completely self-sufficient if required to do so.
- (v) A 1 000 MW nuclear reactor produces some 2 cubic metres of high level radioactive waste per annum. If the fuel is reprocessed to remove the long-lived transuranium elements which can be used to fuel fast breeder reactors, the remaining waste, if stored safely for about 600 years, would decay to the same level of radioactivity as the uranium ore which was mined originally. No reason was seen why such amounts of waste cannot be stored safely for such a period.

#### 4. MR. JAN SMITH

- (i) Over the past 30 years the growth rate in Escom electricity sales has averaged 8.8% per annum. In 1982, however, growth in sales registered in all-time low of under 3%.
- (ii) Since the middle of the 1970's a number of forces have emerged which collectively have resulted in rising electricity prices, the main factors being the following:
  - (a) persistent high rate of inflation
  - (b) high cost of finance
  - (c) declining cost benefits of technological advances
  - (d) plant cost benefits have stabilized since the country's basic electricity infrastructure has been completed.
  - (e) cost of increasing need for environmental protection
  - (f) decreasing advantage of economies of scale
  - (g) increasing incremental capital cost of expansion to meet growth.
- (iii) There are indications that reliability of supply is being threatened, and in the longer term electricity shortages are not a remote possibility.
- (iv) Escom is fully aware of the fact that the solution to the problem of rising costs is not merely to increase the price of electricity. Escom will continue with its objective of providing an abundant and reliable supply of electricity at cost wherever it can be used for the economic advantage of South Africa and to this end will rely on sound business principles, coupled with the advantages of a state monopoly, to keep down costs.

#### 5. DR. K.F. BENNETT

- (i) Basis of South Africa's primary energy requirements (%)
 

Coal .....	75
Crude oil .....	24
Hydro-electric .....	1
	<u>100</u>
- (ii) Alternative energy sources under consideration include the following:
  - (a) Solar
  - (b) Biomass
  - (c) Hydro
  - (d) Wind
  - (e) Wave



- (f) Ocean thermal energy conversion
  - (g) Tidal
  - (h) Fusion
  - (i) Geothermal
  - (j) Hydrogen
  - (k) Fuel cells
- (iii) Solar insolation levels over South Africa are generally favourable having an annual mean daily radiation level of about 5,5 kW.h/m<sup>2</sup>. The efficiency with which this incident solar energy can be utilized depends to a large extent on the time and quantity of water drawn out of the system and can vary from 20% to 50%. Hence, the average amount of energy that can be obtained ranges between about 1,1 and 2,8 kW.h/m<sup>2</sup> daily.
- (iv) A common size for a domestic solar installation is 4m<sup>2</sup> at a cost currently ranging between R1 500 and R2 000.
- (v) South Africa has relatively poor hydro-electric resources. Two rivers which do have potential, however, are the Orange and the Tugela. 540 MW of generating capacity is already installed on the

Orange river and plans have been put forward for 3 400 MW on the Tugela river. It is unfortunate that political and other considerations have prevented the development of an integrated Southern and Central African electricity grid extending up to Zaire, since the last 200 km of the Zaire river has the potential to provide 32 000 MW.

(vi) Fuel cells produce electrical energy directly from the controlled electrochemical oxidation of fuel without any intermediate heat cycle. A 4,8 MW installation is operating in New York. Although expensive at the moment research is aimed at developing less expensive electrodes. If costs can be significantly reduced there is considerable potential for widespread application.

The abovementioned points are merely a few of the many raised in the most interesting papers presented at the conference. Overall the papers were of a very high standard being presented by eminent authorities in their respective fields.

The conference concluded with an address by Prof. Dutkiewicz entitled "South African Energy in Perspective" which effectively summarised the two day conference.

## SUID-AFRIKAANSE ENERGIE IN PERSPEKTIEF KONFERENSIE GEREËL DEUR SANKWEK WNNR-KONFERENSIESENTRUM, PRETORIA : 24-25 JANUARIE 1983 VERSLAG DEUR AFGEVAARDIGDES VAN UITVOERENDE RAAD

**D.H. Fraser – President**  
**D.C. Palser – Lid van die Uitvoerende Raad**

Die Uitvoerende Raad het die President, mnr D.H. Fraser, en mnr. D.C. Palser gemagtig om bogenoemde konferensie by te woon as die VMEO se amptelike afgevaardigdes.

Die konferensie, met mnr. Jan Smith, Voorsitter van SANKWEK en EVKOM, as voorsitter, is amptelik deur Sy Edele P.T.C. du Plessis, Minister van Minerale- en Energiesake, geopen.

In sy openingsrede het die Minister die regering se energiebeleid geskets. Hierdie beleid berus op die volgende drie basiese beginsels:

- (i) om 'n ekonomiese energietoevoer na alle sektore van die ekonomie te versker,
- (ii) om die optimale benutting van energiebronne te bewerkstellig om die maksimum maatskaplike voordeel te verkry, en
- (iii) om die energiebehoefes en vereistes van buurlande en die land se handelsvennoot te oorweeg.

Met verwysing na die onlangs aangekondigde steenkooluitvoerplafon van 80 miljoen ton per jaar is daar klem gelê op die feit dat dit 'n baie klein persentasie van ons steenkoolerfenis uitmaak en dat ons met veiligheid sulke hoeveelhede kan uitvoer sonder dat die land enige skade lei.

Die Minister het ook verwys na die steenkool van swak gehalte en afvalsteeenkool wat teen 'n gewelddige tempo ophoop, en het gesê dat dit 'n probleem is wat opgelos moet word. Die regering het stappe in hierdie rigting gedoen deur 'n fluïdbedverbrandingsaanleg by die WNNR te finansier om die benutting van afvalsteeenkool te demonstree. Die aanleg sal na verwagting in 1984 in gebruik geneem word.

Die regering moedig ook private nywerhede aan om aan toekomstige sintetiese brandstofprojekte deel te neem, en die Minister het gesê dat hy hoop om binne afsienbare tyd 'n aankondiging in hierdie verband te doen.

Twee buitelandse sleutelsprekers het daarna hul referate gelewer. Die eerste referaat, met die opskrif "World Energy Prospects" (Vooruitsigte vir Wêreldenergie) is gelewer deur mnr. E. Rutley, die Sekretaris-Generaal van die Wêreldenergiekonferensie (WEK). Die tweede is gelewer deur dr. P.H. Frankel en het "Global Prospects for Oil" (Wêreldvooruitsigte vir Olie). Dr. Frankel is een van die wêreld se voorste olie-ekonomie. Beide referate was uiters interessant en is goed aangebied.

Na die sleutelsprekers se toesprake, is die volgende referate tydens die tweede daagse konferensie gelewer:

1. Energiebeleidsformulering en -administrasie in Suid-Afrika (mnr. S.J.P. du Plessis, Direkteur-Generaal, Departement van Minerale- en Energiesake).
2. Aspekte van die Energiebeleid in Suid-Afrika : Die Rol van die Staat in Steenkool sake. (dr. D.C. Neethling, Hoofdirekteur : Energie, Departement van Minerale- en Energiesake).

3. Steenkool en die Mynwese. (mnr. S.P. Ellis, Hoof-Uitvoerende Beampte vir Steenkool, GENCOR).
4. Vooruitsigte vir Kernkrag. (dr. J.W.L. de Villiers, Uitvoerende Voorsitter, Atoomenergie-korporasie).
5. Uraanverryking. (dr. W.L. Grant, Besturende Direkteur, Uraanverrykingskorporasie).
6. Elektriesiteitsvoorsiening in Suid-Afrika : 'n Strategie vir Elektriesiteitsmaatskappye. (mnr. Jan Smith, Voorsitter, EVKOM).
7. Energiebehoefes in die Mynwese. (dr. A. Granville, Hoof : Seksie Minerale Brandstowwe, Minerale-buro)
8. Vervoerbrandstowwe in Suid-Afrika. (dr. R.H. Scott, Direkteur vir Energiebeplanning, Departement van Minerale- en Energiesake).
9. Olie en Gasnavorsing in Suid-Afrika. (dr. P.J. van Zijl, Besturende Direkteur, SOEKOR).
10. Ander Energiemoontlikhede. (dr. K.F. Bennett, Hoof-Navorsingsbeampte, Energieneavorsings-instituut, Universiteit van Kaapstad).
11. Suid-Afrikaanse Energie in Perspektief. (prof. R.K. Dutkiewicz, Direkteur, Energieneavorsingsinstituut, Universiteit van Kaapstad).

Die verskillende referate wat gelewer is het 'n aantal interessante punte opgelewer, te wete:

### 1. DR. D.C. NEETHLING

(i) Verspreiding van Suid-Afrikaanse steenkoolverbruikersktore in 1981 (%)	
Elektrisiteit .....	46
Sintetiese brandstowwe en chemikalieë .....	15
Metallurgie .....	7
Uitvoer .....	23
Ander .....	9
	100

"Ander" sluit in nywerheid, handel, vervoer, mynwese en huishoudelike verbruik.

### 2. MNR. S.P. ELLIS

- (i) Evkom se elektrisiteitsverkoop sal na verwagting tot die einde van die eeu teen 'n gemiddelde koers van sowat 7% per jaar groei, voor dit teen die einde van die tydperk begin afneem soos die vraag na elektrisiteit in die goudmynsktor begin afneem.
- (ii) Evkom se huidige aangelegde opwekkingsvermoë van ongeveer

20 000 MW sal na verwagting teen 1990 37 000 MW bedra, en teen die jaar 2000 byna verdubbel het tot 71 000 MW. Hiervan sal omtrent 60 000 MW groot steenkool-basisstasies wees wat sowat 90% van die totale benodigde elektrisiteit sal opwek. Die res sal meestal verspreide klein spitsstasies oor die hele land wees. Die verbeterings in keteldoeltreffendheid wat Evkom oor die afgelope paar jaar bereik het sal in die toekoms geneutraliseer word soos kragstasies in toenemende mate voorsien word van steenkool met 'n laer hitte-inhoud as wat tans die geval is.

(iii) Suid-Afrika se steenkoolreserwes word tans op 110 biljoen ton in tuis bereken, waarvan 51 biljoen ton in die huidige ekonomiese en tegnologiese omstandighede as ontginbaar beskou word. Teen die beraamde produksiekoerse sal ongeveer 5,5 biljoen ton, of sowat 11% van die ekonomiese ontginbare reserwes, na raming teen die jaar 2000 uitgeput wees.

### 3. DR. J.W.L. DE VILLIERS

(i) Die Wes-Kaap is tans die enigste streek waar kern- en steenkool-energie enigens wat koste betref as vergelykbaar beskou kan word. Daar is gesê dat "dit ondenkbaar is dat 'n steenkoolkragstasie vergelykbaar in grootte met Evkom se Koeberg-kernkragstasie ooit in die Wes-Kaap gebou sal word. Die koste om ongeveer 16 000 ton steenkool per dag sowat 1 600 kilometer te vervoer sal verbiedend wees".

(ii) Tussen die hede en die eeuwending sal Evkom ongeveer 50 000 MW opwekkingskapasiteit moet installeer. Met die Wes-Kaapse las wat sowat 10% van die totale kapasiteit uitmaak, en die Oos-Kaapse en Natalse laste 'n verdere 15%, sou dit nie onredelik wees om te aanvaar dat 'n deel van hierdie laste in die toekoms deur kernkragstasies voorsien sal word nie. Omtrent die 15%, of omtrent 12 000 MW, wat in die kusegebiede nodig is, is die mening ook uitgespreek "dat mens kan verwag dat nog 'n paar kernkragstasies so groot soos Koeberg in hierdie tydperk gebou sal word".

(iii) Weens die hoë koste om groot lasblokke van binnelandse steenkoolkragstasies na kusegebiede te gelei, was die mening dat kernkrag in die volgende dekades in die kusegebiede mededingend met steenkool sou word.

(iv) Suid-Afrika het toereikende uraanreserwes om 'n relatief groot kernkragprogram in stand te hou en het die tegnologiese vermoë om indien nodig heeltemal selfonderhoudend te word.

(v) 'n Kernreaktor van 1 000 MW produseer omtrent 2 kubieke meter hoëpelig-radioaktiewe afval per jaar. Indien die brandstof oorverwerk word om die langlewetransuranelemente te verwyder wat gebruik kan word om snelwekkereaktors van brandstof te voorsien, sou die oorblywende afval, indien dit ongeveer 600 jaar lank veilig geborg word, versoer tot dieselfde viak van radioaktiwiteit as die uraanerts wat oorspronklik ontgin is. Geen rede is gevind waarom sodanige hoeveelhede afval nie vir sodanige tydperk veilig geborg kan word nie.

### 4. MNR. JAN SMITH

(i) Oor die afgelope 30 jaar was die groei koers van Evkom se elektrisiteitsverkope gemiddeld sowat 8,8% per jaar. In 1982 het die toename in verkope egter 'n laagtepunt van minder as 3% bereik.

(ii) Sedert die middel van die sewentigerjare het 'n aantal noodsaake verrys wat gesamentlik stygende elektrisiteitspryse veroorsaak het. Die belangrikste faktore was die volgende:

- 'n volgehoue hoë inflasiekoers
- hoë koste van finansiering
- dalende kostevoordele van tegnologiese vooruitgang
- aanlegkostevoordele het bestendig geword sedert die land se basiese elektrisiteitsinfrastruktuur voltooi is
- die koste van die toenemende vraag na omgewingsbeskerming
- afnemende voordeel van kapasiteitsbesparing
- stygende meerkeppalkoste van uitbreiding om aan groei te voldoen.

(iii) Daar is aanduidings dat betroubaarheid van voorsiening bedrieg word, en op die lange duur is elektrisiteitskortere nie 'n geringe moontlikheid nie.

(iv) Evkom is ten volle bewus daarvan dat die oplossing vir die probleem van stygende koste nie bloot daarin lê om die prys van elektrisiteit te verhoog nie. Evkom sal voortgaan met sy beleid om 'n ruim en betroubare elektrisiteitvoevoer teen inkoopprys te voorsien waar dit vir die ekonomiese voordeel van Suid-Afrika gebruik kan word en met hierdie doel voor oë sal hy op gesonde sakebeginsels, gepaard met die voordele van 'n staatsmonopolie, staatmaak om uitgawes laag te hou.

### 5. DR. K.F. BENNETT

(i) Basis van Suid-Afrika se primêre energiebehoefes (%)

Steenkool	75
Ru-olie	24
Hydro-elektries	1
	100

(ii) Onder andere word die volgende moontlike energiebronne oorsien:

- Sonkrag
- Biomassa
- Hidro
- Windkrag
- Golfkrag
- Termiese energie-omsetting in die see
- Getykrag
- Smelting
- Geotermiese krag
- Waterstofkrag
- Brandstofselle

(iii) Inasielvialke oor Suid-Afrika is oor die algemeen gunstig met 'n jaarlikse gemiddeld daaglikse bestralingsvlak van ongeveer 5,5 kW.h/m<sup>2</sup>. Die doeltreffendheid waarmee hierdie invallende sonenergie benut kan word hang grootliks af van die tyd en hoeveelheid water wat uit die stelsel onttrek word en kan van 20% tot 50% wissel. Die gemiddelde hoeveelheid energie wat verkry kan word wissel dus tussen sowat 1,1 en 2,8 kW.h/m<sup>2</sup> per dag.

(iv) 'n Algemene grootte vir 'n huishoudelike sonkraginstallasie is 4m<sup>2</sup> teen 'n koste wat tans tussen R1 500 en R2 000 wissel.

(v) Suid-Afrika het relatief arm hidro-elektriese hulpbronne. Twee riviere wat egter moontlikheid het is die Oranjerivier en die Tugela. 540 MW opwekkingskapasiteit is reeds aan die Oranjerivier aangebring, en planne is voorgestel vir 3 400 MW aan die Tugelariivier. Ongelukkig het politieke en ander oorwegings die ontwikkeling van 'n gefintegreerde Suider- en Sentraal-Afrikaanse elektrisiteitsnetwerk wat strek tot by Zaire, aangesien die laaste 200 km van die Zaire-rivier potensieel 3 200 MW kan verskakel, verhoed.

(vi) Brandstofselle lewer elektriese energie direk uit die beheerde elektrochemiese oksidasie van brandstof sonder enige tussen-bitesiklus. 'n 4,8 MW-aanleg is in New York in werking. Hoewel dit tans duur is, is navorsing daarop gemik om goeikooper elektrodes te ontwikkel. Indien kostes beduidend verlaag kan word, is daar aansienlike moontlikhede vir wyd verspreide toepassing.

Bogenoemde punte is slegs 'n paar van die baie wat geopper is in die uiters interessante referate wat by die konferensie gelewer is. Oor die algemeen was dit referate van hoogstaande gehalte wat gelewer is deur voor-aanstaande kenners op hul onderskeie terreine.

Die konferensie is afgesluit met 'n toespraak deur prof. Dutkiewicz met die titel "Suid-Afrikaanse Energie in Perspektief", wat die tweedaagse konferensie effektief opgesom het.

## REPORT ON THE HIGH VOLTAGE COORDINATING COMMITTEE FOR THE PERIOD 1981/82

W. Barnard – Representative

This Committee meets twice a year and its main purpose is to review, coordinate and publicize research in all fields of electric power engineering. All branches of industry, the State and the universities are represented on the Committee. Certain aspects receive special attention through the appointment of Working Groups, and there are at present five such groups, each reporting regularly on progress in its particular

field. Recently it was considered that the work of the Committee was not as well known to the electrical engineering profession as it should be and its activities have been receiving some publicity through the Transactions of the S.A. Institute of Electrical Engineers (in particular in the November 1981 issue).

Much of the work covered by this Committee has international signifi-

cance and a number of members attended the 1982 Session of CIGRE, held in Paris, as delegates or members of CIGRE Working Groups. The activities of the Working Groups are summarized below:

### 1. EARTHING

Work and investigations into earthing methods and problems arising therefrom are proceeding all over the Republic and the production of coordinated recommendations on earthing is an objective of this Working Group. The publication of a Code of Practice for Neutral Earthing by the AMEU is acknowledged as a useful contribution towards this goal. Other work on earthing shortly to be published includes the design of earth electrodes and neutral earthing of industrial systems.

Mr. J.C. van Alphen of the S.A. Bureau of Standards is the convener of this Working Group.

### 2. SYSTEM DISTURBANCES

This group is presently concerned with gaining general acceptance of quality standards for maximum unbalance in the voltages of three phase supplies and the permissible harmonic content of power supplies. Its recommendations have been incorporated in a proposed amendment to SABS 1019 - "Standard Voltages, Currents and Insulation Levels", which will shortly be published.

Work is also proceeding on voltage variations and suppression of over-voltages in supply to electric motors.

The convener of this Working Group is Mr. E.F. Raynham, Chief Electrical Engineer of ESCOM.

### 3. INSULATION

This working group covers an extremely wide field which for convenience is subdivided into (a) External Insulation and (b) Internal Insulation.

#### (a) External Insulation

Flash over of insulators of outdoor equipment is a major cause of supply failure and not only ESCOM but all the larger municipalities are assisting in investigation of this problem. A particularly difficult aspect for which an answer is being sought is how to obtain correlation between artificial tests under controlled conditions and field behaviour of insulators of all types.

Another problem receiving attention is the difference in performance between insulators on AC lines and DC lines which has a

bearing on ESCOM supplies from Cabora Bassa and is of international interest.

#### (b) Internal Insulation

This group has been involved for some time in the problem of insulation breakdown in large rotating machines and analysis of its causes. The local manufacture and performance of crosslinked polyethylene high voltage cable is now also receiving attention. The group has reported on the potential dangers due to toxicity of "PCB" liquids used to insulate some transformers.

Convener: Professor J.P. Reynders, University of the Witwatersrand.

### 4. LIGHTNING

This working group is continuing its work on charting lightning flash density in the Republic and neighbouring states, and in conjunction with ESCOM is involved in studies of lightning protection of 11 kV overhead lines. These studies cover all aspects of overhead line performance, such as fuses, earthing, insulation puncture and radio noise, and are of interest to many municipalities.

Basic work on the nature of lightning discharges and thunderstorms is conducted in collaboration with the National Institute for Telecommunications Research (NITR) the National Physical Research Laboratory (NPRL) and other organisations.

The convener of this working group is Dr. R.B. Anderson of the National Electrical Engineering Research Institute who has, however, just retired. A new convener has not yet been appointed.

### 5. PUBLICATIONS OF THE CO-ORDINATING COMMITTEE'S ACTIVITIES

The Committee decided to distribute information regarding its activities more regularly and more extensively and the first two such documents were published in March 1983.

These were the Committee's Progress Report for 1982 and the System Disturbance's Working Group's recommendations for unbalanced voltage limits for motors and in supply systems. The latter defines unbalanced voltage and provides a diagram for determining the voltage ratios, balance based on the measurement of individual phase voltage ratios. Both publications are available from the National Electrical Engineering Research Institute, P.O. Box 395, Pretoria (reference HVCC 1 and HVCC 2 respectively).

## S.A. TELECOMMUNICATIONS AND ELECTRICAL POWER SUPPLY AUTHORITY (SATEPSA)

### P.J. Botes - Representative: Main Committee

The South African Telecommunications and Electrical Power Supply Authority was formed in 1976 under the Chairmanship of a member of the South African Defence Force. SATEPSA is vested with very wide ranging powers in the event of a state of emergency being declared, and seeks to stimulate and co-ordinate the preparation of contingency plans in order to minimize the disruption of essential services in the event of an emergency situation of any kind.

Its objectives are to formulate policies, co-ordinate planning, document resources and prepare contingency plans relating to:

- Procedures and lines of communication;
- Telecommunication facilities;
- Standby power supplies for telecommunication facilities;
- Supply of power in emergencies.

Basically SATEPSA is involved in establishing an Emergency Power Plan for the whole country.

The AMEU became involved in 1979 following a report by Mr. W. Barnard who was approached by the UME to represent the UME on the National Committee. Eventually Mr. Marloth of Johannesburg was appointed to the National Committee to represent the UME. Messrs. Botes and Marloth were appointed to represent the AMEU on the Main Committee. Various members appointed by the branches are representatives on the Regional Committees.

ESCOM representatives Chair the Main and Regional Committees.

The main objective, namely: how electricity will be distributed over the first 48 hours of an extensive power failure, was handled as follows:

- Obtaining a consumers priority list. (Form "B" filled in by consumers who wish to be placed on the priority list).
- Determination of quota. (By means of the priority schedule obtain-

able from the Regional Chairman).

- Acceptance of the Emergency Power Plan for the whole country by the National Committee.
- Preparation of plans as to how consumers will be supplied.
- Thereafter the plans are to be tested by means of paper exercises. (Some tests have been conducted already).

Due to personnel changes in Escom and in certain municipalities, certain communication links were broken, and to ensure proper communication lines, I was asked to visit branches of the AMEU to establish communication links.

It has been my pleasure to attend the meeting of the Good Hope Branch held in Mosselbay and the meeting of the Cape Eastern Branch in Despatch, and the Highveld Branch was visited by the Chairman of the Main Committee, Mr. F.H.D. Conradie of Escom. I have still to attend meetings of the O.F.S., the Northern Cape and the Natal branches.

I have found that fairly good co-operation exists and that, barring a few misunderstandings, the majority of engineers did submit their lists to the regional committees.

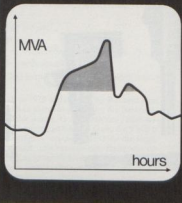
The practicability of the priority list and the implementation thereof however were the main concern of the engineers and this matter will again be discussed at the next meeting of the Main Committee.

It must be clearly understood that the consumer gets the quota and not the municipality. Some municipalities did not apply for emergency power for their essential services, such as water and sewerage pumping stations.

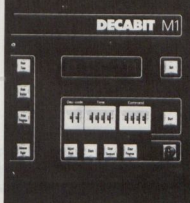
ESCOM have an I.C.L. programme available to assist in determining the priorities.

Further developments will be sent direct to the branches by myself as

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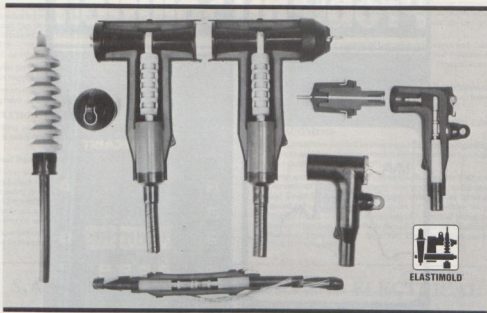
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the representative of the AMEU on the Main Committee. There are a lot of problems in store, and these cannot be ironed-out if municipalities do not take part in the paper exercises. An appeal is made to you all to participate and to bring all the problems to the attention of the regional representative.

Consideration was given to other matters such as a stockpile of certain sizes of power transformers.

The question of standardization of equipment was discussed and consi-

dered not to be possible or feasible at all. In the case of power transformers a list of the standard capacities used by Escam was distributed to all AMEU members with the request to use the list when selecting transformer sizes.

The question of laying down a code of practice as a guidance for the erection of electrical reticulation systems was discussed, the idea being to establish circuits controlling only certain types of consumers. A subcommittee was established to investigate whether such a guide was necessary at all, as it is clear that enormous costs could be involved.

## S.A. TELEKOMMUNIKASIE EN ELEKTRIESE KRAGVOORSIENINGSGESAG (SATEKG)

### P.J. Botes – Verteenwoordiger: Hoofkomitee

Die Suid-Afrikaanse Telekommunikasie en Elektriese Kragvoorsieningsgesag (SATEKG) is in 1976 onder die voorsitterskap van 'n lid van die Suid-Afrikaanse Weermag in die lewe geroep.

Baie wye magte gedurende 'n noodtoestand is aan SATEKG toegeken, en stimuleer en koördineer die daarstelling van noodplanne om die minimale onderbreking te verseker in geval van 'n onderbreking van die noodsaaklike dienste wanneer 'n noodtoestand van enige aard sou plaasvind. Die doelwitte van SATEKG is om beleid te bepaal, beplanning te koördineer en dit te boekstaaf asook om noodplanne voor te berei met betrekking tot:

- Prosedures en kommunikasie kanale;
- Telekommunikasie fasiliteite;
- Bystand van kragtoevoere vir telekommunikasie fasiliteite, en
- Kragvoorsiening gedurende noodtoestande.

Dit kom daarop neer dat SATEKG betrokke is in die daarstelling van 'n noodkragplan vir die hele land.

Die VME0 het betrokke geraak in 1979 nadat mnr. W. Barnard deur die VMB genader is om die VMB te verteenwoordig by die Nasionale Komitee van SATEKG. Uiteindelik is mnr. G. Marloth van Johannesburg aangestel om die Nasionale Komitee van SATEKG om die VMB te verteenwoordig. Die verteenwoordigers van die VME0 op die Hoofkomitee is mnr. Marloth en myself. Die verskillende takke van die VME0 het verskeie lede aangestel as verteenwoordigers op die Streekskomitees. Verteenwoordigers van Evkom dien as Voorsitters op die Hoofkomitee en die Streekskomitees.

Die hoof doelwit n.l. hoe elektrisiteit versprei sal word gedurende die eerste 48 uur van 'n uitgebreide kragonderbreking, is as volg benader:

- Die verkryging van 'n verbruikers prioriteitslys (vorm "B" wat deur die verbruikers ingevul moet word wat op die voorkeurlys geplaas wil word).
- Vasstelling van die kwota (deur middel van 'n lys van voorkeure wat verkrygbaar is van die Streeksvoorsitter).
- Aanvaarding van die noodkragplan vir die hele land deur die Nasionale Komitee.
- Die daarstelling van planne oor hoe die verbruikers bedien sal word.
- Die toets van planne deur middel van papier oefeninge (versekte toetse is alreeds uitgevoer).

As gevolg van personeel veranderings by Evkom en by sekere

munisipaliteite is die kommunikasielyne by tye verstoort, en om hierdie kommunikasielyne te probeer herstel, is ek geva om die versekte takke van die VME0 te besoek. Dit was dan my voorreg gewees om vergaderings van die Goeie Hoop Tak te Mosselbaai en die Ooskaaptak op Despatch te kon bywoon. Die Hoëveldtak was deur die Voorsitter van die Hoofkomitee, mnr. F.H.D. Conradie van Evkom besoek. Ek sal nog vergaderings van die Vrystaat- en Noordkaaptak asook die Natal-tak probeer bywoon.

Tydens die besoeke is gevind dat redelike goeie samewerking bestaan, en as 'n paar misverstande oorgesien word, het die meeste van die ingenieurs hul lysse ingedien. Die praktiese uitvoerbaarheid van die prioriteitslys en die implementering daarvan is deur lede gekritiseer en hierdie aangeleentheid sal weer deur my by die Hoofkomitee aanhangig gemaak word by die eersvolgende vergadering.

Dit moet duidelik verstaan word dat die kwota aan die verbruikers toegeken word en nie aan die munisipaliteit nie. Sekere munisipaliteite het nie aansoek gedoen vir noodkrag vir noodsaaklike dienste soos by water en rioolpomptasies nie.

Evkom het 'n I.C.L. program beskikbaar wat hulp kan verleen in die vasstelling van die voorkeure.

Verdere afwykings sal deur myself as 'n verteenwoordiger van die VME0 by die Hoofkomitee aan die takke oorgedra word. Daar is heelwat probleme wat nie oorbrug kan word indien munisipaliteite nie deel neem aan die papieroefeninge nie. 'n Beroep word dus gerig aan almal om deel te neem en om sodoende al die probleme tot die aandag van die Streeksverteenwoordiger te bring.

Anders sake soos die aankoop van krag transformatore van sekere groottes wat gedurende sabotasie-aanslae beskadig kan word, is aandag aan gegee.

Die standersering van toerusting was bespreek en daar is gevind dat dit nie moontlik en wenslik is nie. In die geval van krag transformatore is 'n standaard lys van transformator kapasiteite soos deur Evkom gebruik versprei onder al die lede van die VME0 met die versoek dat die lys gebruik word wanneer transformator groottes bepaal word. Die daarstelling van 'n gebruikskode wat sal dien as 'n gids vir die oprigting van elektriese retikulasie sisteme word ondersoek. Die gedagte is om sekere stroombane, sekere tipe verbruikers te laat bedien. 'n Subkomitee is aangestel om te bepaal of so 'n gebruikskode nodig is aangesien dit duidelik is dat die kost verbonde aan sulke elektriese stelsels baie hoog sal wees.

## REPORT ON THE SOUTH AFRICAN NATIONAL COMMITTEE ON ILLUMINATION

### A.H.L. Fortmann – Representative

This report covers the activities of SANCI for the two years 1981 and 1982.

Twenty-Eighth Annual General Meeting And Congress – 1981:

The 28th Annual General Meeting and Congress was held in the Civic Centre, Cape Town from 12 to 14 October, 1981.

The theme for the Congress was "Lighting For The Community".

The President, Mr. L.O. Foster, was in the chair and welcomed the guest speakers, the Honourable D.W. Steyn, Deputy Minister of Finance and Industries, Commerce and Tourism; His Worship the Mayor of

Cape Town, Councillor M.J. van Zyl and Mr. R.M.O. Simpson.

The Mayor welcomed delegates while the opening address was conducted by the Honourable Deputy Minister, D.W. Steyn.

The presidential address was delivered by Mr. L.O. Foster.

The following papers were read and discussed:

- "Laser in working life: Safety aspects" by Mr. A. Stenow, Asea A B, Västerås, Sweden.
- "Street lighting: No light problem for the Town Electrical Engineer" by Mr. J.J. Boshoff, Town Council of Vanderbijlpark.

- "Visuele waarnemingsvertoning van Suid-Afrikaanse studente" by Mr. F.W. Leuschner, University of Pretoria.
- "Mitchells Plein : Lighting for the community" by Mr. H. Wood, City Council of Cape Town.
- "A review of lighthouse illumination in South Africa" by Mr. H.A. Williams, South African Railways (SATS).
- "Problems in control room lighting" by Mr. M.J. Dempster, ESCOM.
- "Group testing for colour deficiency" by Dr. H.D. Einhorn and Dr. M.J. Case, University of Cape Town.
- "TV Colour production of different lamps" by Mr. A.N. Chalmers, University of Natal.
- "Reflection properties of South African road surfaces" by Mr. W.H.J. Sator and Mr. F.R. del Mistro, CSIR.
- "Lighting in the South African Defence force" by Comdt. W.J. Bergman, South African Defence Force.
- "Illumination in South African gold mines" by Mr. R. Hemp, Rand Mines.

At the election of office bearers, Mr. C.J. Kok was elected President on a nomination by the Executive Sub-Committee.

Mr. J.J. Boshoff, Town Electrical Engineer of Vanderbijlpark was elected to the Executive Sub-Committee.

Twenty-ninth Annual General Meeting And Congress - 1982:

The 29th Annual General Meeting and Congress was held in Kimberley from 1 to 3 September 1982.

This was arranged to coincide with the centenary celebrations of the Kimberley street lighting installation and therefore carried the appropriate theme, "A Century Of Light".

On Wednesday 1 September 1982, His Worship the Mayor of Kimberley, Councillor L.J. Botha, welcomed the delegates, after which the General Manager of De Beer's, Mr. L.K. Hartley presented the opening address.

Mr. C.J. Kok, President of SANCI delivered his presidential address, followed by an address by Professor J.B. de Boer from the Netherlands and President of CIE (Commission Internationale De L'Eclairage or International Commission on Illumination).

Two papers were read on the same day - one by Mr. J.W. Smit from the South African Bureau of Standards, titled "South African National Standards In The Lighting Field", and the other by Mr. C. Prinsloo, City Electrical Engineer of Kimberley, titled "The Centenary of Electric Street Lights In Kimberley".

On Thursday 2 September 1982, the following papers were presented: "Glass And The Lampmakers" by Mr. B. Rowell from Thorn Lighting. "Colorimetric Performance Of A Television System" by Messrs. A.N. Chalmers and P.A. Tolman from the Natal University.

"New NPRL Facility For The Calibration Of Small Luminous Flux Standard Lamps" by Messrs. L.A.G. Monard, Dr. F. Hengstberger, C.J. Kok, J. Appenroth and M.E. Thain from the National Physical Research Laboratory of the CSIR.

"Colour Vision, Ancient And Modern" by Professor D.K. Turnbull from the Durban-Westville University.

"Photometric Data As Applied To Exterior Lights" by Mr. L.J. van Maltitz from Barrow Litecraft.

"The Evolution Of Interior Lighting" by Mr. A. Richards from S.A. Philips.

Besides the abovementioned papers, the Executive and Technical Committee reports were submitted.

On the evening of 2 September 1982, at the City Hall, the ceremonial switching on of street lights by the Mayor of Kimberley was an event attended by many residents of Kimberley.

On Friday 3 September 1982, two papers, "The Application Of Fibreglass In The Lighting World" by Mr. J.S. Scheritzko from Beka and "Security Lighting Today And Tomorrow" by Mr. G. Bell from Chubb were presented and a Forum covering various aspects of lighting was held.

Mr. C.J. Kok was again elected President, while Mr. S.N. Hamerslag, Town Electrical Engineer of Bedfordview was elected to the Executive Sub-Committee.

Both Congresses were very well organised and were well worth attending.

## VERSLAG OOR DIE SUID-AFRIKAANSE NASIONALE KOMITEE VIR VERLICHTING

A.H.L. Fortmann - Verteenwoordiger

Hierdie verslag dek die bedrywigheid van SANKV vir die twee jaar 1981 - 1982.

Agt-en-twintigste Algemene Jaarvergadering en Kongres - 1981:

Die agt-en-twintigste Algemene Jaarvergadering en Kongres was in die Burgersentrum, Kaapstad, vanaf 12 tot 14 Oktober 1981 gehou.

Die tema van die Kongres was "Lighting For The Community".

Die President, mnr. L.O. Foster, het voorgesit en die sprekers, Sy Agbare D.W. Steyn, Adjunk Minister van Finansies en Industrië, Handel en Toerisme; die Agbare Burgemeester van Kaapstad, Raadslid M.J. van Zyl en mnr. R.M.O. Simpson verwelkom.

Die Burgemeester het die afgevaardigdes verwelkom en die openingsrede is deur Sy Agbare Adjunk Minister, D.W. Steyn gelewer.

Die Presidentsrede is deur mnr. L.O. Foster gelewer.

Die volgende lesings was voorgelees en bespreek:

- "Laser in working life : Safety aspects" deur mnr. A. Stenow, Asea A B, Västerås, Sweden.
- "Street lighting : No light problem for the Town Electrical Engineer" deur mnr. J.J. Boshoff, Stadsraad van Vanderbijlpark.
- "Visuele waarnemingsvertoning van Suid-Afrikaanse studente" deur mnr. F.W. Leuschner, Universiteit van Pretoria.
- "Mitchells Plein : Lighting for the community" deur mnr. H. Wood, Stadsraad van Kaapstad.
- "A review of lighthouse illumination in South Africa" deur mnr. H.A. Williams, Suid-Afrikaanse Spoorweë (SAVD).
- "Problems in control room lighting" deur mnr. M.J. Dempster, EVKOM.
- "Group testing for colour deficiency" deur dr. H.D. Einhorn en dr. M.J. Case, Universiteit van Kaapstad.
- "TV Colour production of different lamps" deur mnr. A.N. Chalmers, Universiteit van Natal.

9. "Reflection properties of South African road surfaces" deur mnr. W.H.J. Sator en mnr. F.R. del Mistro, WNNR.

10. "Lighting in the South African Defence force" deur Komdt. W.J. Bergman, Suid-Afrikaanse Weermag.

11. "Illumination in South African gold mines" deur mnr. R. Hemp, Rand Mines.

Met die verkiesing van ampsdraers was mnr. C.J. Kok na 'n benoeming deur die Uitvoerende Onderkomitee tot President verkies.

Mnr. J.J. Boshoff, Elektrotegniese Stadsingenieur van Vanderbijlpark, was as lid van die Uitvoerende Onderkomitee gekies.

Nege-en-twintigste Algemene Jaarvergadering en Kongres - 1982:

Die 29ste Algemene Jaarvergadering was in Kimberley vanaf 1 tot 3 September 1982 gehou.

Die vergadering was gereël om met die viering van Kimberley se eeu van straatverligting saam te val en het daarom die gepaste tema "n Eeu Se Lig" gedra.

Op Woensdag 1 September 1982, het Sy Agbare die Burgemeester van Kimberley, Raadslid L.J. Botha, die afgevaardigdes verwelkom, waarna die Hoofbestuurder van De Beers, mnr. L.K. Hartley, die openingsrede gelewer het.

Mnr. C.J. Kok, President van SANKV, het sy presidentsrede gelewer, gevolg deur 'n toespraak deur Professor J.B. de Boer van Nederland en President van CIE (Commission Internationale De L'Eclairage of Internasionale Kommissie van Verligting).

Twee referate was dieselfde dag gelewer, deur mnr. J.W. Smit van die Suid Afrikaanse Buro van Standaarde, met die tema "South African National Standards In The Lighting Field", en die ander deur mnr. C. Prinsloo, Elektrotegniese Stadsingenieur van Kimberley, met die tema "The Centenary of Electric Street Lights In Kimberley".

Op Donderdag 2 September 1982, was die volgende lesings voorgele:

"Glass And The Lampmakers" deur mnr. B. Rowell van Thorn Lighting.

"Colorimetric Performance Of A Television System" deur mnr. A.N. Chalmers en P.A. Tolman van die Universiteit van Natal.

"New NPRL Facility For The Calibration Of Small Luminous Flux Standard Lamps" deur mnr. L.A.G. Monard, dr. F. Hengstberger, C.J. Kok, J. Appenroth en M.E. Thain van die Nasionale Fisiese Navorsingslaboratorium van die WNNR.

"Colour Vision, Ancient And Modern" deur Professor D.K. Turnbull van die Durban-Westville Universiteit.

"Photometric Data As Applied To Exterior Lights" deur mnr. L.J. van Maltitz van Barrow Litcraft.

"The Evolution Of Interior Lighting" deur mnr. A. Richards van S.A. Philips.

Behalwe bogenoemde referate was ook oor die verslae van die Uitvoerende en Tegniese Komitees verslag gedoen.

Die seremoniële aansakeling van die straatligting deur die Burgemeester van Kimberley, op die aand van 2 September 1982 by die Stadsaal was deur baie van Kimberley se inwoners bygewoon.

Op Vrydag 3 September 1982, was twee referate. "The Application Of Fibreglass In The Lighting World" deur mnr. J.S. Schleritzko van Beka en "Security Lighting Today And Tomorrow" deur mnr. G. Bell van Chubb, gelewer. 'n Forum wat die verskeie aspekte van verligting dek, was gehou.

Mnr. C.J. Kok is weer tot President verkies en mnr. S.N. Hammer-slag, Elektrotegniese Stadsingenieur van Bedfordview, is tot die Uitvoerende Onderkomitee verkies.

Beide Kongresse was goed ge-organiseer en 'n waardevolle ondervinding.

## REPORT ON THE ACTIVITIES OF THE AMEU/ILESA/SANCI STREET LIGHTING ADVISORY COMMITTEE

### A.H.L. Fortmann – Representative

This report covers the activities of the AMEU/ILESA/SANCI Street Lighting Advisory Committee.

On 28 February 1978 a symposium entitled "Practical and Economical Road Lighting" was held in Johannesburg. This symposium was a joint project of the AMEU, ILESA and SANCI. During the discussion period it became evident that the participants felt that a lot of common problems could be alleviated if a special committee could be formed to investigate these problems. As a result two members of each of the three organisations were appointed to form the new "Street Lighting Advisory Committee". The appointed members are as follows:

AMEU Messrs. J.K. van Ahlften and A.H.L. Fortmann  
ILESA Messrs. J. Grundy and R. Yates  
SANCI Messrs. H. Steyn and A. Claassen

At its first meeting, the committee agreed to draw up guidelines on all aspects of street lighting for the benefit of its members. The guidelines would be compiled with the assistance of outside experts in the various fields and published as and when they were completed.

The guidelines are split up into ten projects, as follows:

- Project 1 : Poles
- Project 2 : Luminaires
- Project 3 : Lamps and Control Gear
- Project 4 : Maintenance
- Project 5 : Incentive and Economics
- Project 6 : Reticulation
- Project 7 : Personnel and Safety Requirements
- Project 8 : Training
- Project 9 : Design Parameters
- Project 10 : Vehicles and Plant in Use on Street Lighting

The majority of the projects have been completed and published in "Vector".

Due to certain difficulties, "Project 1 : Poles" was only completed early in 1983 and is expected to be published soon.

With regard to "Project 9 : Design Parameters", the Committee decided not to proceed with its compilation because the SABS Code On Street Lighting is considered to be in need of revision as it is not appropriate for today's approach to street lighting design. Project 9 will therefore be temporarily shelved.

Since the 1981 AMEU Convention when it was reported that the guidelines consisted of nine projects, a further project, "Project 10 : Vehicles and Plant on Use in Street Lighting", was added to the guidelines.

Mr. Ray Beaumont, of "Vector" has undertaken to publish all the completed projects and to make copies available, complete with suitable binders at reasonable cost – the cost will depend on the number of copies likely to be ordered, however, is expected to be in the region of R5,00 per copy.

An appeal is made to members of the AMEU and other interested parties to order copies of the guidelines as they are considered to be invaluable to engineers, middle management, electricians and street lighting attendants employed by local authorities.

For the benefit of AMEU members who do not receive "Vector", the following address is provided:

P.O. Box 311  
KLOOF  
3640

## VERSLAG OOR DIE BEDRYGWIGHEDE VAN DIE VMEO/IVISA/SANKV STRAATVERLIGTING ADVISERENDE KOMITEE

### A.H.L. Fortmann – Verteenwoordiger

Hierdie verslag dek die bedrygwighe van die VMEO/IVISA/SANKV Straatverligting Adviserende Komitee.

'n Simposium, getitel "Practical and Economical Road Lighting" was op 28 Februarie 1978 in Johannesburg gehou. Dit was 'n gesamentlike projek van die VMEO, IVISA en SANKV. Tydens die besprekings het dit duidelik geword dat die deelnemers die mening toegedaan is dat 'n spesiale komitee, wat vir die doel saamgestel behoort te word, baie van die probleme kan ondersoek en op die manier die taak vergemaklik. Gevolglik was twee lede van elk van drie organisasies aangestel om die nuwe "Straatverligting Adviserende Komitee" te vorm. Die aangeselde lede is soos volg:

VMEO Mnr. J.K. van Ahlften en A.H.L. Fortmann  
IVISA Mnr. J. Grundy en R. Yates

SANKV Mnr. H. Steyn en A. Claassen

By die eerste vergadering het die komitee ooreengekom om riglyne oor alle benaderings in verband met straatverligting, tot die voordeel van sy lede op te stel. Die riglyne sou met behulp van buitestaande deskundiges in die verskillende rigtings saamgestel word en wanneer dit gereed is, gepubliseer word.

Die riglyne is in tien projekte soos volg opgedeel:

- Projek 1 : Pale
- Projek 2 : Lanterns
- Projek 3 : Lampe en Beheertoerusting
- Projek 4 : Instandhouding
- Projek 5 : Aansporing en Besparing
- Projek 6 : Benetting



Projek 7 : Personeel en Veiligheidsvereistes  
Projek 8 : Opleiding  
Projek 9 : Ontwerpparameter  
Projek 10 : Voertuie en Toerusting in Gebruik by Straatverligting

Die meerderheid van die projekte is voltooi en in "Vector" gepubliseer.

Weens sekere probleme kon "Projek 1 : Pale" eers vroeg in 1983 voltooi word en dit word verwag om binnekort gepubliseer te word.

"Projek 9 : Ontwerpparameter" se samestelling is voorlopig gestaak aangesien die SABS Kode oor Straatverligting volgens mening hierin moet word aangesien dit nie van pas is op vandag se benadering van straatverligting nie. Projek 9 is voorlopig op die langebaan geskuif.

Sedert die 1981 VMEQ Konvensie was besluit om 'n verdere projek by die bestaande 9 projekte te voeg; "Projek 10 : Voertuie en Toerusting in gebruik by Straatverligting".

Mnr. Ray Beaumont, van "Vector", het onderneem om al die voltooiende projekte te publiseer en afskrifte beskikbaar te stel, met geskikte binders en teën 'n redelike prys. Die prys sal bepaal word deur die aantal afskrifte wat bestel word, dit word egter verwag om in die omgewing van R5,00 per afskrif te wees.

'n Versoek word aan VMEQ gelede en ander belangstellendes gerig om afskrifte van die riglyne te bestel. Die riglyne bevat waardevolle inligting soos wat deur ingenieurs, middelbestuur, elektrisiërs, en straatligbedieners van plaaslike owerhede gebruik kan word.

Vir die VMEQ gelede wat nie "Vector" ontvang nie, word die volgende adres verskaf:

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## REPORT OF THE AMEU/ECA LIAISON SUBCOMMITTEE

J.K. von Ahlften – Convener

The main function of this Subcommittee is to maintain a close liaison between the electrical contracting industry and the suppliers of electricity on matters concerning the Wiring Code, statutory regulations for electrical installations and matters relevant thereto.

The AMEU members are Messrs. J.K. von Ahlften (Convener), W. Barnard and A.H.L. Fortmann. ESCOM is represented by Messrs. Ackermann and Haasbroek, and the ECA by Messrs. V.A.H. McDonald, D.F. Kneale and R. Wilkin and the Department of Manpower by Mr. L. Stewart.

The main items for discussion centred around the requirements and interpretation of the SABS Wiring Code and the new regulations for electrical installations which became effective on 1 March 1982 details of which are given elsewhere in these proceedings under the appropriate reports.

The Executive Council of the AMEU at its meeting held in George 1982 however resolved that this Committee investigate the possibility of a once-only registration of electrical contractors on a national basis as opposed to the individual registration by each and every supplier in the Republic of South Africa as required by law at present. Mr. C. Venter and Mr. Eugene Pretorius were specifically co-opted to the subcommittee to assist with this task.

After many discussions and in depth consideration of a comprehensive memorandum submitted by Mr. McDonald on behalf of the ECA in this respect the AMEU members on the committee came to the following conclusion:

The Chief Inspector of Factories has made it abundantly clear in a written comment that he has no intention of changing the provisions of regulation C179(1) in as far as it requires an electrical contractor to be registered with different suppliers in the particular areas in which the contractor intends operating.

He expressed the opinion that each supplier should know the contractors working in his area and should be able to establish the bona fides of such contractors without automatically accepting the registration approved by another supplier. Endorsement of a home town certificate of registration as envisaged by the Committee to avoid the contractor having to produce a multitude of certificates of registration issued by suppliers can lead to automatic acceptance in certain cases which defeats the object of registration as envisaged in the new regulations and this is not acceptable to the Chief Inspector.

However the Chief Inspector will have no objection to and in fact strongly advocates the central registration or licensing of contractors

which is done on an inter-industry basis as is the case with the National Inspection Council for the electrical contracting industry in the U.K. which assures the contracting members wide preference and publicity and whose bona fides would then be automatically acceptable by suppliers for statutory registration.

The AMEU should support such a Council if it were based on the U.K. principle, but the South African electrical contracting industry itself should take the initiative in creating such a body on a broader based national level with the AMEU as one of the interested parties involved. The AMEU representing suppliers could most certainly not take the initiative as the statutory testing and approval authorities for electrical installation work in this Country.

The co-opted members of the AMEU on this committee would therefore appear to have fulfilled their task, as it must now be accepted that the present legislation, in as far as it requires a contractor to be registered with each supplier in whose area he intends operating, will not be changed.

In conclusion it is nevertheless recommended that an AMEU/ECA Liaison Subcommittee be maintained for co-ordination between contractors and suppliers especially if a National Inspection or Registration Council for the electrical contracting industry in the Republic of South Africa should become a reality in the near future.

### J.K. VON AHLFTEN – SPRINGS

The AMEU's proposal of a once-only registration of electrical contractors as proposed by Eugene Pretorius to the Executive Council, has not been accepted as the Chief Inspector of Factories has made it quite clear that he has no intention of changing the provisions of the existing regulations.

Regarding the possible creation of a National Inspection Council for the Electrical Contracting Industry in South Africa as proposed by the ECA, the AMEU Executive Council decided to give consideration to the creation of such a Council should it prove to have merit once the ECA has formulated a definite base for discussion.

Mr WEICH commenting on central registration stated that the old Act had never called for central registration and the national interest would not be served by making this a requirement in the new Regulations.

However, he was not against central registration done by the industry itself. Indeed he would like to see central registration on the lines of the Inspection Council in the United Kingdom.

## BESKERMING VAN OORHOOFSE LAAGSPANNINGSLYNE

P.J. Botes – Roodepoort

Op 8 Januarie 1982 het 'n swaarvoertuig in die dorpsgebied Davidsonville, Roodepoort agteruit in 'n paal, wat 'n soliede draad oorhoofse geleiers ondersteun, vasgery, met die gevolg dat een van die geleiers gebreek en op die gas draal het. Hierdie geleier het vir 24 uur lewendig gebly totdat twee jong kinders in die draad vasgehardloop het en gevolglik ernstige brandwonde aan die hande en op die maag skoek opgedoen het.

Regulasie C.56(i) van die regulasie uitgevaardig onder die Wet op Fabriek, Masjinerie en Bouwerke, lees soos volg:

"Die gebruiker moet elke elektriese installasie en kraglyn voorsien van geskikte beheeruitrusting en beskermende toestelle wat vir suwer doeleinde in staat moet wees om die kragtoevoer outomaties te isoleer ingeval 'n defek ontwikkel in die installasie of kraglyn en so iniger moet wees dat dit die maksimum veiligheid van persone verseker".

In die geval van 'n gebreke geleier van 'n laagspanningsoorhoofselyen kan die interpretasie van hierdie regulasie tot die uiterste betekenis gevoer word as iemand die uiterste betekenis aan die woorde "sover as doenlik" en "maksimum veiligheid" toeken. Gevolglik kan ons dan in die vooruitstel stel dat baie duur kraglykonstruksies nodig sal wees en dat dit 'n oortreding aan die kant van die gebruiker is indien hierdie duur beskermings maatreëls nie aangebring word nie.

By die daaropvolgende ondersoek van die bogenoemde geval deur 'n Inspekteur van Fabriek is die bestaande sienswyse deur die Inspekteur gehuldig.

Die Hoofinspekteur van Fabriek het Evkom en die VME0 genader vir die daarstelling van 'n Werkskomitee om 'n gebruikskode vir laagspanningsoorhoofse lyne op te stel om hierdie spesifieke aspek te dek. Gevolglik is hierdie komitee in die lewe geroep en die verteenwoordigers van die VME0 is mnr. Botes, van Abhiten asook mnr. McIntosh van Johannesburg. Hierdie komitee het reeds eenkeer byeengekomen waar dit besluit was om die sienswyse van die Uitvoerende Bestuurslede van die VME0 asook die sienswyse van die verskillende streke van Evkom. Al die sienswyse is nou ontvang en dit sal bespreek word tydens die volgende vergadering van hierdie komitee.

Die Komitee het die volgende maontlike oplossings van die probleem wat maontlik oorweeg kan word, voorgestel:

- Die installering van sensitiwe aardlek-opsoring en afskalkrelërs.
- Die installering van geskikte aardstawe, boë, vangnette of dergelyke toestelle onderkant 'n fasegeleier waarmee 'n gebreke fasegeleier mee kontak kan maak en dus 'n kortsluiting kan veroorsaak wat die beheertoerusting sal laat uitskakel.
- Kaal oorhoofse geleiers kan vervang word deur 'n geïsoleerde gebondelde tipe geleier. As alternatief kan 'n ondergrondse kabel sisteem oorweeg word.
- Geleiers kan in 'n vertikale konfigurasie opgerig word met die geleier en aardgeleier direk onderkant die fase geleiers geplaas. Hierdie ranskikking kan versterk word deur die toevoeging van aardeleistamme en gesplete geleiers om te verseker dat 'n fasegeleier 'n kortsluiting veroorsaak indien dit sou breek.

#### E. DE C. PRETORIUS - POTCHEFSTROOM

Metode 1 wat aanbeveel word, d.w.s. vertikale konfigurasie met 'n gesplete neutraal anderkant die fase - en straatgeleiers, word die afgelope 23 jaar in Potchefstroom aangewend.

Die gesplete neutraal het 'n horisontale konfigurasie, met die twee geleiers sowat 435 mm uitmeekaar. Drie koppelstukke wat sowat 150 mm by die twee geleiers verbysteek, word tussen die twee geleiers aangebring, een in die middel van die span en die ander twee sowat twee meter van die twee pale van die span.

Waar staalpale gebruik word, word die pale solied met die gesplete neutraal verbind. Daar word dus nie van 'n spesiale aparte aardgeleier gebruik gemaak nie.

Die deursnitoppervlakte van die elemente van die gesplete neutraal is minstens 50% van dié van die fasegeleiers.

Hierdie stelsel is baie doeltreffend soos ons ondervinding telkens bewys het.

Metode C, d.i. geïsoleerde bondelgeleiers, het meriete maar wanneer 'n bondelgeleier breek, wat nie vergesog is nie, is daar geen manier waarop die beveiliging sal werk nie en dan is die ontblote metaal van die fasegeleiers by die breek lewendig.

Ek wil net daarop wys dat as dit vereis sou word om bestaande luglyne wat nie "veilig" is nie, te beveilg, dit die land miljoene Rande gaan kos. Ek hoop nie perspektief gaan sneuwel nie.

#### B. DUDLEY - AFFILIATE

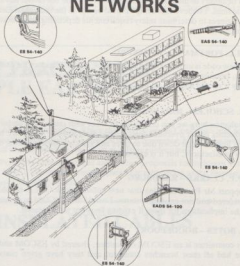
With reference to the incident in Davidsonville, Roodepoort, described by Mr Botes and to the use of Bundled Conductor Systems as a possible safety measure, I would like to relate an incident which occurred only a month ago in Kaya-Mandi just outside Stellenbosch, where a pole was hit by a vehicle. As the brackets are mechanically fused, the pole was released as it fell to the ground, leaving the bundled conductors suspended intact with an increased sag in that particular span of only about 1 m. The pole was discovered about 3 days later and there had been no interruption in supply and no conductors on the ground.

#### D.C. PALSER - CAPE TOWN

In Cape Town over the past 20 years there have been only four deaths attributable to broken overhead conditions and, in each case, the cause was a motor vehicle colliding with a pole or stay.

I doubt whether the national average for electrical fatalities is more than 100 a year at the most. And of this number, I would imagine that no

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- Bundled conductor consists of 3-phase cores, 1 lighting core, 1 neutral/catenary core
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more than a handful are attributable to broken conductors. Against this low figure consider the 8 000 odd motor fatalities in South Africa each year!

An underground system has been suggested as a safer alternative to overhead conductors. But deaths have resulted from the vandalism of street furniture on underground systems. Even insulated conductors do not guarantee safety, since insulation can deteriorate in time.

The construction of overhead lines in accordance with the provisions of the existing regulations under the Factories Act leaves a degree of design flexibility to the user. I personally therefore do not favour any rigid guide lines. I believe that design should be left to the individual electrical engineer to determine safety requirements depending upon local circumstances.

#### A.H.L. FORTMANN – BOKSBURG

If a new code is introduced, it must not be made obligatory for existing lines, because this would cost the country millions of Rands but certainly it should apply to all new overhead lines.

#### MR. SCHOLES – JOHANNESBURG

In Johannesburg we run double earth wires with cross-bows under the conductors on all overhead lines, particularly in busy areas. We have many lines brought down due to trees and vehicles and this system does work satisfactorily, but it is expensive.

#### M.P.P. CLARKE – RANDBURG

I support Mr Pretorius' plea that new constructions ONLY should be considered and not existing systems. I would ask ESCOM to comment on the implications for them if existing lines are to be treated.

#### P.J. BOTES – ROODEPOORT

This committee is an ESCOM committee, chaired by ESCOM and we have had all their branches comment and they have given costs in-

volved. In Johannesburg, when you have reconstructed a line, do you test the breakers to ensure that they trip if you have a fault at the remote end?

#### W. BARNARD – PRESIDENT

We do a loop impedance test to check that the impedance is low enough to ensure that our protection operates.

#### E.G. DAVIS – PIETERMARITZBURG

I do not see that fitting earth leakage relays will be a solution but rather a hindrance. By introducing earth conductors and bows below the lines you tend to create a hazard for the electrician working on the overhead line.

#### A.A. WEICH – CHIEF INSPECTOR OF FACTORIES

We would like guidelines on what is considered reasonable in all cases. We would not ask for all lines to be altered once the guidelines are introduced, but there are lines in certain areas where something will have to be done. Obviously this cannot be done overnight, but I insist on having guidelines. We will have to differentiate between urban and rural areas. Although costs are important, people will not understand the equating of costs with safety.

Let us have a reasonable guideline that is clearly spelt out and let us apply it slowly but purposefully. It might take 25 years but do let us make a start. Obviously we will have to use our discretion as to where we are to apply new practices to existing lines.

#### D.H. FRASER – DURBAN

Is it not possible for us to study overseas practices to see how we relate to them? I agree with Mr Davies that the introduction of earth conductors below the phase wires will possibly expose our own employees to additional hazards. A fallen wire in a remote area where there is no pedestrian traffic may present a greater danger than one in an area where it is more likely to be seen and reported.

## AMEU CODE OF PRACTICE FOR THE APPLICATION OF PROTECTIVE MULTIPLE EARTHING TO LOW VOLTAGE DISTRIBUTION SYSTEMS (Previously Neutral Earthing)

E.H. Scholes – Johannesburg

This Code of Practice was first published in the Proceedings of the 47th Convention held in Durban, and was intended as a guide for the many small and some large municipalities who see advantages in multiple earthing for low voltage distribution systems. Low voltage distribution is not only undertaken by municipalities and the view was expressed that a national Code of Practice is desirable. However, the Earthing Committee of the S.A. Bureau of Standards consider inter alia that some requirements of the original AMEU Code are not generally acceptable.

In June 1982, the Chief Inspector of Factories called a meeting at Megawatt Park to discuss implementation of Regulation C56(i) of the Factories Act. At this meeting the AMEU's Code of Practice for Neutral Earthing was also discussed. It appeared that the main objections to general acceptance of the AMEU's Code of Practice centred mainly around three provisions of the original Code. These were:

#### Clause 4.1(b) which stated:

"Where the HV Equipment Earth exceeds 1 ohm the LV neutral shall be earthed at a minimum distance of 6 metres from the HV Equipment Earth".

#### Clause 4.1(c) which stated:

"Where transformers are associated with HV overhead lines, it is good practice to separate the HV and LV earth electrodes".

#### Clause 4.1(d) which stated:

"The overall resistance to earth of the neutral of the distribution system must not exceed 10 ohms".

Earth resistance (or more accurately, earth impedance) varies considerably from place to place and also with time, according to moisture content of the ground, surface and geological features and the presence of conducting objects in the vicinity of the test site. It cannot be measured

accurately and consistently and mandatory values should therefore not be set down in the Code. Guide values only should be given, and more emphasis placed on effective earthing and protection which will operate without fail to disconnect supply when possibly dangerous conditions arise.

An amended version of the Code of Practice was drafted to take account of these objections and criticisms, and was circulated for comment to members of the AMEU Executive Council earlier this year. The Code of Practice for the Application of Protective Multiple Earthing – note, the amended title – is the result and replaces the previous Code of Practice for the Application of Neutral Earthing. It is hoped that this version will be acceptable to all engineers involved in low voltage distribution.

In the amended Code, the requirements of Clause 3.1(b) replace those of Clause 4.1(b) and (c) in the previous code. The LV neutral earth may now be connected to the HV equipment earth provided the latter is effectively earthed in terms of the definition of effective earthing in Appendix B of the Code. Guidance of effective earthing for underground systems is given, and it should be emphasised that the value of ONE OHM for earthing resistance is only attainable with a very comprehensive cable earthing system from the main substation earth. This is not usually possible with overhead HV systems, and in such cases the supplier now has three options;

- either (a) To obtain an effective earth by means of earth mats, earth electrodes, connections to water mains etc. This is only possible in damp areas of low ground resistance;
- or (b) to equip his HV system with sensitive earth leakage protection which will cause the HV switch to trip immediately there is an earth fault, say between the transformer HV winding and the tank;

or (c) to separate the LV neutral earth from the HV equipment earth. The actual separating distance is left for the engineer to decide according to the circumstances affecting each installation. In Britain, a separating distance of 3 metres is stipulated but this is considered unnecessarily rigid for variable South African conditions.

Clause 3.1(d) of the new code replaces Clause 4.1(d) of the old code. It is suggested in the new clause that an earth resistance of 20 ohms for the LV neutral earth is adequate for 6,6 and 11 kV systems, but that the actual maximum value be determined by calculation, as demonstrated by Mr. J.C. von Alphen in his valuable contribution to the discussion on the Code of Practice for Neutral Earthing in the Proceedings of the 47th Convention.

In addition to making the changes referred to above, the amended Code has been redrafted in a more concise manner suitable to form the basis

of a national code, some definitions have been brought into line with those used in the Wiring Code, and the title changed to "Protective Multiple Earthing" instead of "Neutral Earthing". Because the "Protective Neutral Bonding" system included in the original code does not require multiple earthing, it has been excluded from the amended code. A new clause has also been added at the request of the S.A. Electrolytic Corrosion Committee drawing attention to the possible risks of increased electrolytic corrosion with multiple earthing of the neutral.

Mr. Barnard, Chairman of the Earthing Sub-committee, and I would like to thank those members of the AMEU who sent in useful comments on the first version of the amended code of practice, also officials of ESCOM's staff who contributed their views and colleagues in our Department who took an interest in the new Code even though we do not have any PME systems in Johannesburg.

## COMMENTS - CODE OF PRACTICE FOR PROTECTIVE MULTIPLE EARTHING

MR VAN ALPHEN : SABS stated that within the next few weeks the S.A. Bureau of Standards will be issuing for comment a draft Code of Practice for the Design and Installation of Earthing Electrodes. Some of the points covered in the proposed PME Code will then fall away as they will be covered in the above Code.

The Bureau has done no work on the PME Code of Practice since the

47th AMEU Convention. Once the AMEU reach Consensus and produce its final document, the Bureau will, if requested, handle the matter and ultimately produce the Code as a Bureau document.

The President then asked that any further proposals for inclusion in the final AMEU document being prepared for submission to the Bureau be forwarded to Mr Scholes.

## EXPERIENCE WITH SOLID INSULATED CABLES

### A.H.L. Fortmann - Boksburg

"Solid insulated cables" presumably implies, for this discussion, cross-linked polyethylene insulated cables, used mainly in the high voltage and extra high voltage range. There are of course other solid insulated types of cables available at various voltages.

Cross-linked polyethylene insulated (XLPE) cables in the 11 kV range came into the South African market in 1967.

The insulating material was cross-linked in the 1950's and was soon to become a popular cable insulating medium in Japan, the United States of America and some European countries.

In South Africa, XLPE insulated cable has been the topic of many controversial discussions between those supporting its use and those against its use.

Boksburg was one of the first users of this cable at 11 kV soon after its appearance on the South African market, first in the smaller conductor-0,04 sq. inch size. It was not long before Boksburg switched over to its exclusive use in the 11 kV range.

In 1973, when 132 kV cable was to be used for the first time in Boksburg, a thorough investigation was instituted into the possible use of 132 kV XLPE cable as opposed to conventional oil-filled cable, as the use of 11 kV cable had indeed been promising.

The results of the investigation were positive and 20 445 metres of 132 kV XLPE cable were installed and put on load during 1977.

In 1977 some 33 kV XLPE cable was also installed.

The 132 kV cable has after six years of operation given trouble-free service except for minor damage to the outer PVC sheath, which was detected through annual serving tests and on about four occasions when the cable was damaged by heavy mechanical machinery.

I have brought along a piece of 132 kV cable core, for anyone interested to see, badly damaged by a mechanical excavator but which did not fail. The damage was detected when the annual serving tests were carried out.

Without doubt, had this damage been on oil-filled cable, failure would almost certainly have been immediate.

The 33 kV XLPE cable, installed in 1977 was of the triplex type - three single cores twisted together to form a type of three-core cable, with a conductor size of 400 mm<sup>2</sup>.

Because of the triplex lay-up and no armour sheath, it was thought wise at the time to use high density polyethylene as an outer sheath for stronger protection. This decision turned out not to have been a wise one. Some three or four years after installation a premature failure

occurred just below one of the sealing ends.

The matter was taken up with the manufacturers who established the cause and took certain counter-measures.

After careful investigation the following conclusion was reached:

Due to the difference in the coefficients of expansion of the high density polyethylene and XLPE insulation, the copper tape in between is subject to stresses which lead to splitting of the copper tape.

Longitudinal shrinkage of high density polyethylene sheath and consequent slipping of the copper tape caused a break in the copper tape just below the sealing end.

At this point partial discharges occurred due to the induced voltage difference in the gap between the split copper tape and this in turn caused a reduction in insulation thickness and eventual breakdown.

Satisfactory counter-measures were taken by the manufacturers to avoid any further problem in this regard.

Other than this the 33 kV cable has been operating satisfactorily.

Daarna, om en by 1979, is verdere 33 kV kabel geïnstalleer. Dié kabel was eger 'n enkleer kabel wat klavervormig gelê is. Elke aar is met 'n swart PVC omhulsel bedek en geen probleme is tot dusver ondervind nie.

Met die meer algemene gebruik van 11 kV kruisgebonde poliëteleen-geïsoleerde kabel in Suid-Afrika het dit in die laaste paar jaar duidelik geword dat 'n standaard spesifikasie vir XLPE kabel nodig is. SABS '1339 is toe opgestel vir kabels tot en met 33 kV.

Voer die opstel van bogenoemde was daar geen geskikte standaard nie en elke vervaardiger was aangewese op sy eie idees oor vervaardigingsstandaarde. Dit het eger gelei tot probleme en onvoldoende standaarde van die kabels wat vroeër beskikbaar was.

Een van die grootste "gebreke", volgens my mening, was die los aanskerk van sommige van die eerste 11 kV kabels, waarvan Boksburg 'n redelike hoeveelheid aangekoop het.

'n Los aanskerk veroorsaak gedeeltelike ontleding en waar hierdie ontleding van 'n genoegsame waarde is, sal dit uiteindelik onderbrekings tot gevolg hê.

Onderbrekings het as gevolg hiervan in Boksburg voorgekom. Dit, meen ek, is een van die hoofredes vir die "onverklaarbare" onderbrekings van 11 kV kabels by sekere gebruikers en ook die rede waarom sommige ingenieurs so heftig teen die gebruik van die kabels gekant is.

Dit wil voorkom dat dit kabel is wat gedurende die laat sestigerjare en



vroec sewentigerjare vervaardig is wat hoofsaaklik die gebreke in ontwerp en vervaardiging het en die gevolglike aanhoudende onderbrekings tot gevolg het wat ingenieurs teen die gebruik van XLPE kabela beïnvloed het.

Nou, na die ingebruikneming van SABS 1339 spesifikasie, behoort hierdie ingenieurs hul teesem met die gebruik van die kabel te heroorweeg. Dit is my beskoude mening dat die nuwe SABS spesifikasie het opgelos al hierdie probleme – I would hasten to add that these problems were already known to the manufacturers and that most, if not all, had already been resolved even prior to the introduction of the SABS specification.

It is my view that XLPE cable, well designed and manufactured will not easily be surpassed by other types of cable and its robustness and ease in handling can only be a boon to engineers.

A brief word about through-joints.

Generally through-joints on 11 kV XLPE cable operate satisfactorily provided they are properly made.

Some problems have been experienced with transition joints, viz., from XLPE to paper insulated cable. With this joint, special care must be taken in its making.

With 33 kV and 132 kV XLPE through-joints no problems have been encountered.

Mr. President, I trust that these few comments and thoughts on XLPE cable will stimulate discussion on this subject.

Thank you Mr. President.

#### H.F. FORSYTH – AFFILIATE

The topic for discussion is "Experience with Solid Insulated Cables". There is another type of solid insulated cable which I am sure was not really intended to be included in this topic, but which nevertheless has given us many years of service with outstanding reliability. I refer of course to the MIND impregnated paper insulated cable.

Paper cables have been available since the turn of the century, and were first made in South Africa, not many miles from here, just before the Second World War. Their utter reliability is well known. Today, after 15 years experience with XLPE, 70% of the 11 kV cable going into the ground in this country is still paper insulated.

In 1970, an alternative to the standard Paper/Lead cable was introduced in the U.K. It had a corrugated aluminium sheath instead of a lead sheath. This cable, known locally as PICSA, is now manufactured in South Africa and has the following attributes:

1. It is much lighter than the conventional Paper/Lead cable
2. It has a high earth fault rating
3. It can be safely spiked
4. It is cheaper than the Paper/Lead armoured cable and in fact is comparable in price with the cheapest XLPE 3 core cable, the type B to SABS 1339.

Up to the metallic sheath, the PICSA cable is identical to the Paper/Lead cable to SABS 97. It is available as standard in both single core and three core constructions in the voltage range 6,6 kV to 33 kV.

The sheath is the standard corrugated seamless aluminium sheath which has been used on super-tension XLPE and oil-filled cables for many years, except that the corrugations comprise a series of discrete rings instead of a spiral helix.

The space between the core, or laid-up core assembly, and the sheath is filled with a specially developed MIND compound to prevent moisture ingress should the sheath suffer mechanical damage. The sheath itself is protected by a bitumen compound containing a corrosion inhibitor over which is applied an extruded PVC sheath.

A range of accessories for PICSA cable is available from GEC-Henley which make jointing and terminating as easy as that claimed for XLPE, but you can of course use the standard Paper/Lead cable accessories. The Henley joint can be used in addition as a transition joint between PICSA and Paper/Lead or XLPE.

#### M.A.I. LANG – AFFILIATE

African Cables will shortly be starting manufacture of cable for Boksburg Municipality to extend the 132 kV cable ring commissioned six years ago.

Our super-tension systems design department handles many enquiries at the feasibility study stage of a project. Many of these enquiries concern methods of installation of single core cables, particularly whether or not the system should be cross bonded.

I would like to consider briefly the economics of cable installation, as value for money in terms of R/MVA/m is the criterion by which the overall installation will be judged.

Cross bonding or sometimes for very short runs, single point bonding, is

used as a means of eliminating circulating currents in the metallic sheaths of the cables. Clearly if we can eliminate the sheath losses we can achieve a higher current rating for the cables as shown in Figure 1. For example at 132 kV we could carry 130 MVA with three 500 mm<sup>2</sup> cables installed in close trefoil and solid bonded or with three 500 mm<sup>2</sup> cables installed flat spaced and cross bonded. Typical trench cross sections for the two configurations are shown in Figure 2. To minimise sheath circulating currents cables solid bonded are laid in close trefoil. Cables cross bonded can be laid flat and spaced to achieve better heat dissipation, but this takes up greater space which may be a problem in congested areas and is certainly more expensive in trench width related costs.

Up to 130 MVA the saving in cable cost is more than offset by increased trenching costs and the provision of link boxes.

From 130 – 145 MVA a saving of R15/m may be effected and from 145 – 160 MVA the saving is likely to be of the order of R50/m.

Above 160 MVA where, to achieve the required rating, solid bonded, two cables per phase will be necessary, the saving resulting from cross bonding will be of the order of R180/m.

Most tables of current ratings assume the cables to be laid flat, spaced one cable diameter or at a centre line spacing of 2d. At increased spacing, a higher current rating can be obtained as can be seen in Figure 3, but this can only be achieved at increased trenching cost (Figure 4) and with a higher standing voltage per kilometre (Figure 5). With a limit to standing voltage of 50 V or 55 V, this can affect the maximum length of a minor section for the larger conductor sizes. In practice, when the overall installation cost is considered there is rarely any advantage to be gained from spacing the cables more than the standard 2d quoted in the current rating tables.

The overall cost per MVA per metre, assuming machine excavation, falls with increasing system voltage as indicated below:

SYSTEM VOLTAGE kV	OVERALL COST R/MVA/m
33	3,9
42	3,0
66	2,4
88	2,2
132	1,9

A brief word on our manufacturing experience over the past few years. Anyone who has visited Japan and has seen their super-tension cable factories cannot but be impressed by the standard of cleanliness evident throughout the plant. To say that they are more like hospitals than cable factories is not too much of an exaggeration. This was not too easy to achieve under "local conditions". The extruder room at the top of the tower which you can see in the aerial photograph, has to be air conditioned and supplied with filtered air under a slight positive pressure. The handling of the raw material, both the insulating and the semi-conducting grades, has received much attention. A new XLPE store which can hold over 500 tons of the material has been built and a superclean laboratory included for inspection of all incoming XLPE materials.

Many of you have visited our HV laboratory complex. In the routine test screened room cables up to 132 kV are tested at twice working voltage for 10 minutes both at core stage and final stage. In neither test must the partial discharge magnitude exceed three pico-coulombs.

The type test laboratory is equipped with a 300 kV a.c. supply and a million volt impulse generator. Type tests are carried out on a complete installation comprising cable and any accessories to be used with the cable. In these tests we have learnt a lot about cable joints and terminations – details not included in the standard jointing instructions.

A normal type test will include a load cycling test, where the installation is subjected to a daily heating and cooling cycle which takes the cable conductor to between 5 and 10°C above its normal operating temperature. During the test, which may take 30 days or 100 days depending on the applied voltage, an alternating voltage of 2 E<sub>0</sub> or 1,73 E<sub>0</sub> is applied continuously. If we consider the so-called ninth power law, (ref. Figure 6, which has been widely accepted) 40 years at working voltage E<sub>0</sub> is equivalent to 30 days at twice working voltage or 100 days at 1,73 times working voltage. If it can be demonstrated that the installation can withstand an over-voltage for a limited time in accordance with this ninth power law, then we can have confidence in its ability to withstand 40 years at working voltage.

Whether or not we can test at 2 E<sub>0</sub> depends on the accessories included. At 132 kV cable and terminations are normally free of partial discharge at twice working voltage as indicated in Figure 7. When a taped joint is included however, discharges do occur at voltages above line voltage to earth as shown in Figure 8. We have found that, when load cycled at 2 E<sub>0</sub>, such a joint will fail after 21 days of load cycling. At 1,73 E<sub>0</sub> it will withstand 100 cycles. This is our main objection to tests like the 2,5 E<sub>0</sub>, 4 hour test. At voltages of this magnitude, the system may well be discharging and thus fail prematurely, whereas at a reduced over-voltage it

may safely withstand the voltage for an extended period.

The type test includes an impulse voltage test on the same installation. It is customary to carry out a high voltage d.c. test on the completed site installation. Typical voltage levels are twice line voltage d.c. for 15 minutes. A d.c. test is employed because of the impracticability until very recently of carrying out a high voltage a.c. test. An a.c. test of say line voltage at earth would require, at 132 kV, a test set of capacity about 10A per kilometre of cable or 1,3 MVA per kilometre.

Now, with the advent of series resonant a.c. tests sets, it is possible to undertake a high voltage a.c. test on the completed installation. The 132 kV Umgeni Power Station to Frametex Substation cables were tested at 132 kV a.c. to earth for 10 minutes.

As many of you know, Sasol 2 had some unhappy experiences on their 132 kV installation. Every circuit was d.c. tested at 264 kV for 15 minutes and yet early failures of joints, terminations and in one instance cable also, occurred. As a result of this experience, they purchased for Sasol 3 installation two series resonant test sets, one capable of testing up to 150 kV, the other up to 50 kV. It was the larger of these sets we used for the Durban test.

We carried out a series of tests in our HV laboratory to see how effective or otherwise the d.c. test is in revealing gross defects in a supertension XLPE cable. We drove a hardened steel pin about 1,5 mm in diameter through the aluminium sheath of a 132 kV cable and into the XLPE insulation and then withdrew it. We found we could pass the 264 kV d.c. test after the pin had been driven in to a depth of 9 mm, almost half the insulation thickness. It failed at working voltage a.c. after 5 minutes.

So much for the d.c. test.

All supertension XLPE cable installations should be tested a.c. As the number of such installations is increasing rapidly, the SABS should equip themselves, as Sasol has done, to carry out all such testing on behalf of Municipalities and ESCOM and other major users of supertension cable.

#### W.G. STEWART - AFFILIATE

Op die grondslag van wêreldwye navorsing en sowat 25 jaar se aangeleende werkstelling, stem ek sonder huiwering saam met mnr Fortmann se stelling: "Goed ontwerpte en vervaardigde XLPE-kabel sal nie maklik deur ander tipe kabel oorskadu word nie..." Seer seker het die koms van SABS 1339 vervaardigingsdisipliene en gehalte vir plaaslike geproduseerde kabels in Suid-Afrika bewerkstellig. Maar mnr Fortmann, soos sommige ander ondernemings en kontrakteure, moet gesien wees met 'n goed gemotiveerde en onderlegde kabellê- en kabelspanpersoneel, aangesien by geen melding maak van die veldprobleme wat ek in verskeie dele van Suid-Afrika en Europa teëgekomp het nie.

Onverskillig en sorgelose installering van XLPE-kabel, en swak vakmanskap by die lassing daarvan, het etlike lasfalings maar betreklik makke kabelfalings tot gevolg gehad. Skade aan die buiteste PVC-omhulsel tydens installering veroorsaak dat water die ruimte onder die buiteste omhulsel binnedring, en dan migreer die water deur kapillêre werking of weens die helling na die ent van die kabel en vul die endop, of veroorsaak dat 'n nat waterfilm as gevolg van oppervlakspanning gedurende die laswerk aan die are kleef. Hierdie waterfilm word deur die isoleerband vasgekeer, wat tot spoedige lasfaling lei. Die water in die endop kan op langer termyn, maar baie korter as die verwagte lewensduur, kabelfaling veroorsaak indien die water deur kapillêre werking tot binne in die stringe van die geleier kom. 12 navorsers het getoon dat "water in die geleier gevaarliker is as water buite die aar".

Oms kan dus die volgende stelling voeg by mnr Fortmann se aanhaling wat vroeër genoem is: "Goed ontwerpte en vervaardigde XLPE-kabel, sal indien dit behoorlik geïnstalleer en gelas word, nie maklik deur ander tipe kabel oorskadu word nie..."

The problems mentioned have been discussed at symposia in the United Kingdom and Europe, and the consensus appears to be that when shoddy and indifferent installers and joiners are on your staff, then longitudinal water blocking of the XLPE cable is necessary to prevent water ingress due to damaged sheaths. In Germany, water blocked XLPE cables are often used particularly in wet environments.

The trend today, with regard to jointing, is to move towards a joint design that minimises the amount of expertise required to make off the joint. In Europe, joints have been developed that need no taping or pencilling, by virtue of the use of prefabricated stress cones, and a high dielectric strength filling compound which also serves to water block the joint. This design is gradually gaining acceptance.

It would appear that with the apparent diminishing of craftsmen joiners and installers worldwide, cable researchers are forced to design cables and joints to cater for the many indifferent installers and joiners to ensure the life performance expected from a cable system, and this problem of indifference is also manifesting itself in paper/lead cables. Hopefully the installation problems will be reduced once the SABS code of practice "for the selection and installation of electric cables" is finally issued. Good jointing requires personnel training and motivation.

#### J.E. TOMS - NEERI

I wish to make comment regarding the jointing of extruded dielectric cables. At the lower voltages, that is less than 33 kV, it is not usual to supply such cables with an overall metal sheath, and jointing is often achieved by the use of cold pour thermosetting compounds such as polyurethane, acrylic, or epoxy using various fillers to reduce their cost. At the outset, it should be realised that some of these cause toxicological and sensitisation problems when their vapours are inhaled or in contact with the skin.

I have been associated with a series of experiments designed to investigate the properties and behaviour of different jointing resins.

Table 1 shows the physical properties of the various compounds and I would like to draw your attention to the wide differences in the physical properties of similar compounds, for example, the tensile strengths of the two polyurethanes, the viscosities and gel times of the pitch epoxies.

To prevent the ingress of moisture to a joint, it is essential that the jointing compound forms a watertight interface with the cable sheath and the dielectric. A lap adhesion test was devised in which two samples of cable material were bonded together with jointing compound and then pulled apart as shown in Figure 1, the tension at failure being divided by the bonded area to yield a failure shear stress.

Table 2 shows the values obtained at 25°C and those at 75°C. There are several notable features of these results:

1. Adhesion to metals is stronger than to plastics.
2. There is a serious reduction in the adhesion at 75°C.
3. One compound showed no adhesion to cross-linked polyurethane.

It was also found that contamination of the plastic with bitumen or die lubricant fluids significantly reduced the adhesive strength.

All cold pour resins shrink in curing, and therefore exert a radial force on the cable sheath, which, in my opinion, assisted by the low adhesive force, creates a mechanical seal which initially prevents the ingress of moisture.

Stress relaxation and thermomechanical forces act to destroy this seal and allow moisture into the conductor zone.

These observations are not intended to discourage the use of solid dielectric cables, but to emphasize the need to select a cold pour compound whose properties are known and suited to the purpose of jointing.

TABLE 1  
PHYSICAL PROPERTIES AT 25°C

Compound	Poly-urethane	Pitch Epoxy	Epoxy	Pitch Epoxy	Acrylic	Poly-urethane	Units	Test Method
Tensile Strength	16	12.5	71	16	14.8	2.9	N/mm <sup>2</sup>	B.S.2782 method 991 B-31
Elongation at break	100	21	16	30	19	30	%	2782 method 991 B-31
Thermal conductivity	0.46	0.47	0.47	0.24	0.24	0.24	W/m°C	B.S.674
Viscosity before cure	10	100	90	10	10	10	poise	ISO/CI 541548
Coefficient of Expansion	100.0	12.0	12.0	26.2	19.0	19.0	per deg.C x 10 <sup>-3</sup>	ASTM D664-52
Gel Time	20	34	30	30	30	minutes		2872 method 111D

TABLE 2  
ADHESION AT 25 AND 75°C

Compound/Substrate	Poly-urethane	Pitch Epoxy	Epoxy	Pitch Epoxy	Acrylic	Poly-urethane
PVC	25°C	0.06	0.01	0.26	0.26	>1
	75°C	0.09	0.34	0.34	0.11	>1
XLPE	25°C	0.02	0.40	0.40	0.42	0
	75°C	0.20	0.27	0.27	0.21	0
Aluminium	25°C	7.05	2.0	4.33	3.06	0.05
	75°C	0.02	1.20	4.32		
Lead	25°C	>2.2	1.47	1.46	1.75	1.35
	75°C	0.76	0.75	1.25		

All Epoxies Nitro<sup>o</sup> on 25 mm square lap joint, surfaces degreased.  
 \*Greater than" sign means that specimens broke outside the bonded area.

#### F.J. PRINS - DEPT. COMMUNITY DEVELOPMENT

1. My Department has a parallel line of two 11 kV paper insulated cables, approximately 8 km long, with a total of 56 joints. The joints were of the epoxy type, very badly made, porous and with flimsy ferrules, 1 1/2 inch long, with a tiny indent on each end. In one case that I examined, the indent at one end of a ferrule did not lock the conduct-

tor but pushed it into the mouth of the ferrule. By appearance I would not have given the joint a life of more than a few months, yet the first joint only failed after about two years and now, after about 7 years, 26 joints and the 4 terminations have failed.

In another instance, XLPE cables with loose core screens operated for about 7 years before failure set in and after 11 years some are still operating. It is now well known that a loose core screen is one of the worst situations you could have in an XLPE cable.

I can recount a number of other instances of similar nature. The first point I want to make is, therefore, that a badly manufactured cable or a badly installed cable can operate for many years before the latent defects show up and one must be careful not to compliment oneself too quickly on a sound cable installation.

2. Another point concerns the expected life of an XLPE cable. Any solid electric cable carries the germ of its own destruction, i.e. partial discharges. The moment voltage is applied, the breakdown process is initiated, and these partial discharges lead to tracking. The basic design, stress level, degree of cleanliness in the manufacture of the cable and how it was handled and installed, will then determine the eventual life of the cable. From the foregoing it is clear that you can never equal the life of a paper-insulated cable, which is self-healing.

#### S.G. HANCOCK — AFFILIATE

Investigations such as those described by Mr J.E. Toms on the mutual

adhesion of various components involved in the construction of joint systems play an important part in the understanding of basic physical mechanisms. However, it does not follow necessarily that the results of such experiments can be extrapolated towards the performance of completed cable joints under service conditions. It is well known for example that cross-linked polyethylene, like its thermoplastic parent, has very poor adhesive characteristics to other materials, as shown by Mr Toms' quantitative values. It might be inferred from this that acrylic resin joints are inappropriate for service with XLPE insulated cables, but the designers of such systems usually make provision for overcoming this apparent shortcoming. Thus in a type of acrylic resin filled joint with which my Company is associated, a tightly fitting mask is applied over the prepared core insulation to resist any longitudinal penetration of moisture into the joint, and is of a material to which the acrylic resin insulating filling adheres strongly and with no disadvantage to the overall performance of the joint.

In evaluating resin filled jointing systems for polymeric insulated cables, what is important is the type testing of the completed joint against an appropriate specification making provision for mechanical impact, electrical heat cycling with immersion in water to simulate flooded service conditions, and resistance to penetration of water through damage to the cable sheath outside the joint. In the course of such a test sequence, appropriate test voltages are applied and measurements made of the insulation resistance between the various conducting components.

## THE USE OF AERIAL CABLES

### M.P.P. Clark — Randburg

I offer the following contribution to open the discussion on the above matter:

"From the very earliest days of the supply industry distribution engineers have used the insulating value of air to facilitate transmission of electrical energy between points of generation and consumption".

The basic requirements for any system using this characteristic are simply a series of structures to support the conductors out of reach of normal ground-level hazards of whatever type and, insulating devices arranged in a suitable configuration at each of these support points to keep the conductors fixed mechanically in a predetermined alignment and electrically insulated from the structure.

While each of these two elements become highly complex when the transfer takes place at elevated voltages, the components are relatively unsophisticated and inexpensive on the normal 220/380 volt systems traditionally encountered in most South African reticulation networks.

This being so the uninitiated might reasonably ask why alternative forms of energy transfer devices are even considered, let alone actually developed and used?

It will be appropriate to reflect on some of these reasons for a moment with particular reference to reticulation network conditions in the lower voltages.

These include the following:

1. Curved roads introduce problems of sideways stabilizing of structures and result in additional costs if overhead lines are required to be erected.
2. Narrow servitudes resulting from buildings or other above ground obstructions often restrict routes and the spacing and sideways movement of conductors to impracticable or uneconomic limits.
3. In built-up areas, particularly where curved street designs exist, it is sometimes difficult to make practicable support arrangements for terminal poles or structures because of driveways or other features.
4. By virtue of their exposed situation, the conductors are liable to interference and damage through man-made, climatic and various natural agencies including birds, animals, trees, etc.
5. An element of danger always exists on these systems under broken conductor conditions or by accidental contact to the conductors resulting from abnormal conditions.

No doubt many others could be added to this list and of course examples relating to each of them in turn could fill many volumes.

Stemming from these difficulties and coupled to the development of manufacturing techniques for fully insulated conductors arranged in "cable" form and suitable for burying, more and more use was made of underground cables for reticulation purposes.

Even though first costs were invariably higher than the equivalent overhead wire system in urban areas of high load density, complex road systems, etc., underground cable networks were — and still are the only practical method of distributing electrical energy.

The advent of what was a relatively inexpensive insulant namely PVC gave impetus to the changes and this was assisted by the Town Planners who seemed to have decided that the almost traditional straight streets in a grid-iron pattern for township layouts was "out" and curved streets were "in"!

We also began to recognise that as labour rates increased repair and maintenance costs on overhead networks were no longer small items in our budgets. More and more engineers began to study and predict long term costs, to capitalize their figures and thereby find increasing support for installing underground systems.

But in a world wherein nothing is certain except that there will be change, we are again having to re-examine our thinking and ideas. New materials and techniques are continually being developed and tested and while we will always retain much of the tried and proved methods of yesterday it is necessary for us all to re-examine ourselves and our thinking from time to time.

And so it is that "bundled" insulated conductors (aerial cables) have been found to have areas of application in overhead networks to an increasing extent.

There is little doubt that the total dependence of our 20th century civilization on electricity in all its forms, the increasing need for great reliability in the form of minimum-break supplies for sophisticated electronic equipment, or the practical and economic difficulties or providing alternative supplies to TV sets, microwave equipment and many other everyday devices in homes, commerce and industry make it necessary for us as engineers to be sure that we are doing everything possible — and in the most cost effective ways that we can devise — to distribute electrical energy where it is required, when it is required.

The fact that "bundled" insulated conductors have been used for some years in various parts of South Africa, including a significant installation in Johannesburg using locally manufactured conductor, and on a large scale in overseas countries, means that increasing attention must be given to this distribution form.

It is incumbent on us all to remain sensitive to this and any other developments which may benefit our networks, to study them and then apply them whenever we can justify them for the total benefits they will bring to our consumers and networks, including safety, economy, reliability and practicability.

I advocate no head-long rush into the unknown, only that we all keep ourselves up to date, keep investigating, keep analysing and keep trying.

#### V.A. RAYNAL : AFFILIATE

I shall confine my comments to the application of aerial cables and the financial aspects of their use.

We recently conducted a feasibility study where the costs of a fully underground cable reticulation system in a new residential township were compared with an equivalent aerial cable system.

The results of this study may be of interest to AMEU members who are considering the use of aerial cable systems and, in the interests of brevity, I have set out my comments in question and answer form:

#### THE GREATEST COST BENEFITS TO BE DERIVED FROM THE USE OF AERIAL CABLES ARE:

1. In a residential township for middle and low income group consumers where the after diversity maximum demand (ADMD) per erf is 5 kVA or less.
2. Where the cost of township engineering services i.e. roads, water, sewerage and electricity is a significant proportion of the selling price of the erf.
3. Where it is undesirable or impractical to allow underground cables to "share" trenches with other services e.g. the water reticulation system in the township.
4. Where streetlighting will be installed.

#### ORDER OF COST SAVING ONE CAN EXPECT BY USING AERIAL CABLES:

Following are the typical costs of a middle-income group residential township of 300 erven with average erf areas of 600 m<sup>2</sup>, and an ADMD of 5 KVA per erf.

Aerial cable with separate neutral and catenary conductors (recommended) and a streetlighting core was considered.

#### \* NOTE: THERE WERE NO SHARED TRENCHES

#### SYSTEM COSTS R

	Aerial Cable	Fully Underground
HV reticulation (minisubs and UG cables)	180 000	180 000
LV reticulation (UG cables and LV kiosks)	35 000	160 000
LV reticulation (aerial cables)	85 000	-
Streetlighting system	20 000	60 000
Other costs, GST etc	50 000	50 000
<b>TOTAL</b>	<b>370 000</b>	<b>450 000</b>

In this case, an aerial cable system would effect an estimated saving of R80 000,00 i.e. 18%. With shared trenches and no street lighting, however, this saving would be reduced to an estimated R20 000,00 i.e. 4,5%.

From this we can deduce that the relatively high cost of a fully underground distribution system is not the cost of the cable, which is practically on a par with equivalent size aerial cable, but the high cost of excavation.

By permitting "shared" trenches, the costs of underground distribution are significantly reduced.

#### WHY MEDIUM AND LOW-INCOME GROUP TOWNSHIPS ARE MORE SUITABLE FOR AERIAL CABLE SYSTEMS THAN HIGH-INCOME GROUP TOWNSHIPS:

Purely from the economic point of view. Costs of engineering services in modern townships today depend on several factors and can vary from about R4 000 to as much as R10 000 per erf.

Township development is generally a high-risk business where profits are seriously eroded by high interest rates, inflation and other factors. The profit margin on medium to low-income group property will therefore depend, to a large extent, on keeping down the cost of engineering services.

This is where aerial cable systems can make a significant contribution. On the other hand, where erven sell for R30 000 and more, the cost saving on an aerial cable system becomes insignificant compared to the land purchase price, and aesthetics are of prime consideration.

#### WHY SUPPLY AUTHORITIES SHOULD BE CONCERNED IN KEEPING DOWN THE CAPITAL COST OF RETICULATION SYSTEMS:

1. We have been urged by the Government to take whatever steps possible to keep down the costs of providing engineering services in new townships. This is in the national interest.
2. Keeping down capital costs of township establishment will encourage private business to undertake more development and thereby alleviate the present critical housing shortage.
3. One must bear in mind that township developers play a vital role in bringing growth and prosperity to our cities and, if township development becomes unprofitable, they will obviously invest their capital elsewhere.

In conclusion, one can learn a lesson from Johannesburg's experience

with aerial cables. There are over 10km of aerial cable in this city, mainly in the well-wooded suburbs where they are difficult to see because they blend in with the trees.

An ideal situation would result if municipalitis reverted to the practice of afforestation of pavements simultaneously with the erection of aerial cables.

In time, the utilitarian appearance of these cables would be hidden by trees and Parks Departments would create beautiful suburbs like we have here in Johannesburg.

#### E.B. MARTIN - AFFILIATE

There seems to be widespread confusion regarding bundle conductor systems and I would like to try and clear up some of the misunderstandings which have arisen.

Firstly, what is a bundled conductor? It is a number of insulated conductors not necessarily all the same size which are not laid up in a geometrical pattern like the strands of a cable as this would make it difficult to pull out one of the cores where one wishes to make electrical or mechanical connections.

Secondly, the idea of bundled overhead conductors is not new. It was already being widely used in North America 25 years ago under the name of Triplex or Quadruplex. These conductors were bundled around a steel supporting conductor and great stress was laid on the fact that midspan tap-offs and service connections were possible. Most of the special fittings developed were for this purpose and more or less conventional fittings were used elsewhere. Conventional fittings can of course be used with bundled conductors but this results in losing most of the special advantages of security and speed of erection which are the main advantages of this system.

Bundled conductors were used sporadically in this manner in a number of countries until about 15 years ago when the Electricite de France known as the EDF, who are the sole generators and suppliers of electricity in France, decided to adopt bundled conductors and refine them as their standard method for low voltage overhead reticulation.

They were faced with having to upgrade their LV system and today approx. 70% of their LV open lines have been replaced with bundled conductors.

After detailed study the EDF laid down certain basic requirements for this system including the following:

1. The bundle would be supported from the neutral which would be of aluminium alloy of 54,6 sq mm cross section and having a breaking load of from 2 to 4 times that of the pure aluminium phase conductors, depending upon size which could be from 35 to 95 sq mm. This meant that only one size of fitting would be used for strain clamps, suspension clamps and supporting brackets.

Incidentally the EDF are at present studying the use of larger conductors and it is likely that the range will be extended to 150 sq mm with a 70 sq mm aluminium alloy neutral carrier.

It may be argued that it is hazardous to carry all the conductors from the neutral and that the phase conductors should also be made to carry their own weight. This can be done, and in fact this system is used in some countries, but I do not think that it results in a safer system. Consider the situation with a fully 3 phase maximum load; the phase conductors will get hot and expand while the unloaded neutral will remain cold and would end up carrying the full weight of the 3 phase conductors. The neutral could break under this condition as it is made of pure aluminium and not high strength aluminium alloy.

2. The system should be "fail safe" against broken conductors - particularly the neutral - in the event of trees falling on the line or poles being broken. This was achieved by an extremely rigid specification for the aluminium alloy supporting brackets as regards both minimum and maximum breaking loads to ensure that brackets would always break before the conductor. The conductor bundle and fittings, being completely insulated, would be safe lying on the ground.
3. The system would be completely insulated and suitable for hot-line work so that no consumer should be without power for more than 2 hours when changing over from the old open wire system to the new. For additional safety all components of strain and suspension clamps in contact with the conductor insulation would be of plastic and all electrical connectors should be insulation piercing suitable for both aluminium and copper service connections. Midspan joints and terminal lugs should be pre-insulated and crimped through the insulated covering so that the application of a separate insulated covering would not be necessary.
4. It should be possible to erect this system safely and speedily from existing poles carrying open wire lines and to dismantle the latter safely.



5. Finally, the installed cost should be less than open wire lines. This has been achieved by streamlining erection procedures and the overall cost saving is now about 10%.

To implement these proposals the EDF drew up their own specifications for both conductors and fittings and called upon private industry to submit their designs for approval. In due course three manufacturers of fittings and several manufacturers of cable were approved and permitted to place the relevant EDF reference number on their products. This gives complete interchangeability between all makes of equipment carrying the same EDF reference numbers. Incidentally, there is no single approved manufacturer producing both the fittings and the bundle conductor.

The French call this method of distribution "insulated preassembled aerial networks". However, the terminology used in Britain is rather less cumbersome and I suggest we adopt their description which is "aerial bundled conductors" or "A-B-C" for short.

Then, as far as specifying one's requirements, if you want to install an ABC system, I suggest that the easiest, most precise and elegant way of doing this is to simply call for conductor and fittings which have received AMEU approval. This has already been granted to three local suppliers. AMEU approval basically requires conductors and fittings to have EDF approval but also makes provision for an SABS certificate of compliance for locally manufactured items.

Incidentally it should be noted that no supplier can claim "SABS Approval". SABS approval is only given if the product conforms to an SABS specification and in this case there is no SABS specification. In terms of the standards act it is in fact a criminal offence to claim that a product has SABS approval when it does not.

It should also be noted that the AMEU approvals certificate states, in-ter-alia, "All components supplied by the importer must carry the EDF reference Number." If components are manufactured locally to the EDFD and French National specification, they must also be provided with an SABS certificate of compliance. Thus if any supplier claims that an item for a bundled conductor system is made locally then one must demand from him an SABS certificate of compliance.

This is a far better safeguard of quality than making a long description of the various components of the system because one ends up with a product description and not a specification. A specification is concerned with tests and measurements, not cosmetic descriptive details. The proper specification has been written by the EDF. The AMEU has accepted them and there will only be confusion if one tries to add to them or qualify them. Unfortunately this has already happened and as a result a minor amendment will shortly be made to the AMEU approval certificates.

#### E.H. SCHOLE - JOHANNESBURG

The Johannesburg Electricity Department has been experimenting with aerial cables as a substitute for bare overhead conductors in suburbs where trees in streets and on the street boundaries of private residences are giving rise to maintenance problems. Because of the load of private residences in most of these suburbs is exceptionally high, we have found it necessary to develop a special cable using 150 sq millimetre aluminium for the phase conductors and 70 sq millimetre copper for the neutral.

These conductors, together with a 70 square millimetre earthing conductor and a 35 square millimetre street lighting supply conductor are wrapped round a galvanized steel supporting cable using a 1.5 metre lay. The supporting cable is protected against corrosion and mechanical damage with a 2 millimetre thick covering of PVC, and current carrying conductors are insulated with XLPE to the I.E.C. 502 standard.

We also use a smaller self supporting aerial cable for some streetlighting applications.

Before deciding on the present design we experimented with many different designs of aerial cable, and have made a number of small trial installations. Development work is still proceeding and we are currently experimenting with different methods of suspension and investigating clamps with high current carrying capacities which are suitable for making off service connections without it being necessary to strip the conductor insulation.

#### S.G. HANCOCK AFFILIATE

Aerial bundled conductors constitute an intermediate technical phase between bare conductors and buried insulated cable, where the security level is inevitably higher.

Economically, their total cost "as installed" will be controlled by the configuration of the specific articulation design and the relationship between distributors and service connections. There is strong emphasis on pavement-mounted service control and metering, so that buried service cables feature strongly against the continuation of pole fuses and overhead service drops.

Usually, there must initially be a conflict vis-a-vis underground cable, which can only be resolved under local environmental considerations.

Local promotion of ABC has figures strongly round a neutral supported system in which the neutral is an aluminium-alloy conductor of fixed size (54,6 mm.) relative to the phases. Three variations of this basic principle enshrined in a French standard NF-C-33-209, have already been authorised by the Chief Inspector of Manpower for application under the Wiring Code SABS 0142.

A second basic design (so the German Standard VDE0274) which attracts interest, requires a neutral and four phase conductors of common cross-section, all of which are secured at the anchor points. The advantage of this system, where a reduced neutral is not acceptable, appears immediately.

In both designs, insulation is of black ultra violet protected crosslinked polythylene. However, core identification requirements are dissimilar in the two foreign standards, and both differ from those imposed for local authorisation in terms of SABS 0142. The extent to which foreign manufacturers would accept the latter remains undefined and is probably related to commercial qualities intended.

Both systems allow for auxiliary cores for earthing and streetlighting or other duties.

As both systems use cores laid up geometrically with a fairly short lay length, the assemblies are compact, and the difference between neutral-messenger support and "all cores" support seems immaterial.

Clearly there are a number of potential conflicts. The local cable manufacturing industry notes major consensus in favour of rationalisation by setting up a local standard specification, and an approach is being made to the SABS to undertake this preparation.

#### B. DUDLEY - AFFILIATE

Bundled Conductor Systems have been in use since the mid-fifties in France and other European Countries. Johannesburg erected their first L.V. Bundled Conductors about 1977 and the electricity department of the City of Cape Town erected their first 11 kV Bundle about 1968. Several Systems have been developed with the basic difference being in the insulating materials being used or whether they are full tensioned or the catenary type.

Factors leading to the development of Bundled Conductor Systems were:

1. A significant increase in consumers
2. Increase in individual consumer demand
3. Safety
4. Continuity of supply
5. Aesthetics
6. Maintenance cost

After initial market research and investigation of the various systems available on the international market, the system found to be most widely accepted was developed by the French. The technique was introduced into the Republic of South Africa in 1980.

AMEU approval was obtained on 23.2.81 and a Certificate of Compliance on 12.7.83 based on the French NFC 33-209 standard with specific additional requirements relating to the identification of conductors and connectors as required in the Republic of South Africa.

Bundled Conductors are not merely an alternative to Bare Conductors since they extend the scope of Overhead design beyond limits previously set by Bare Conductor Systems.

The bundle consists of phase conductors in varying sizes, one or two optional conductors for streetlighting and a uniform neutral catenary. Phase and streetlighting conductors are of 3/4 hardened and compressed stranded aluminium with X.L.P.E. insulation clearly numbered with printing and embossing. The neutral consists of Almelec Conductor and a neutral clearly identified with a longitudinal rib throughout.

Some of the advantages of the system are:

#### 1. SAFETY

- (i) Conductors and hardware have to withstand 10 kV 60 sec puncture test effectively giving 20 kV to earth and 20 kV between phases.
- (ii) Connector design allows connections to be made to live conductors without the workmen coming into contact with any live material. Connectors are of the insulation type.

#### 2. VANDALISM

Wire throwing ceases to be a problem. The system is being used for security of perimeter lighting.

#### 3. CONTINUITY OF SUPPLY

Mechanically fused brackets allow the cable to be lowered to the ground without endangering the public or having any broken con-

ductors should loads exceed the design limits of the hardware i.e. should branches fall on the line or a pole be knocked by vehicles the cable is released and lowered with minimum repair work to be done.

#### 4. ELECTRICAL PERFORMANCE

Inductive reactance of Bundled Conductors is 0,10Ω km in comparison with 0,30Ω km for bare conductors.

#### 5. MAINTENANCE

The system requires minimum maintenance with high resistance to corrosion. It is a weather-proof water-proof system and at no point is any live material exposed to the atmosphere.

Bundled Conductor systems also have a much lower fault frequency compared to bare conductors as shown in the following table:

Type of Cable	Faults per hundred km per annum
Bare Overhead Conductors	18
Underground Cables	1,2
Bundled Conductors	1,8

#### 6. TREE TRIMMING

Tree trimming is reduced to an absolute minimum and only stout limbs that may chafe the conductors should be removed.

#### 7. MECHANICAL

Since only the neutral is tensioned, the mechanical loading on the system is considerably lower. Hence lighter and shorter poles could be used with fewer angle stays, side stays or struts, which solves some of the problems indicated by Mr Clarke in his comments.

#### 8. AESTHETICS

The aesthetics of an installation can be considerably improved since Post Office and Power Supplier can share the same poles. The Bundle can be erected under bare H.T. lines without cradling and trees to a large degree camouflage the Bundled System. Poles are tidier than for conventional bare lines.

9. The system also has an element of flexibility in that it can be used for factory installations, for builder's temporary supplies as well as for reticulation systems.

#### 10. COST

Bundled Conductor Systems allow the designer new scope for design particularly for low cost housing. Projects in South America, the far East, the Middle East and in Europe have proved that, with good design, bundles are far more cost effective and much safer.

At the 47th Convention of the AMEU held at Durban in 1981, Mr J.C. van Alphen of the SABS had an interesting comment and I quote: "In order to minimise the danger of a broken neutral or ECC, the code advocates the use of a cable (concentric or split concentric) for all service connections even when overhead". In order to fully exploit the potential of Overhead Bundled Conductor Systems, hybrid systems should be avoided e.g. a Bundled Overhead Conductor system with underground service connections. In this regard I quote Mr von Alphen, since a very convenient clamping arrangement is offered to facilitate the use of concentric neutral cables for overhead service connections, particularly for low cost housing.

Many engineers may recoil at the thought of this apparent backward step but, as Mr Clarke has so rightly reminded us, we should critically examine what we are doing and keep an open mind.

Bundled Conductor Systems for 11,22 and 33 kV are already in service in the Republic of South Africa. This further facilitates revolutionary designs giving better aesthetics and far better economy enabling designers to stretch their rands to new limits, whilst maintaining a fair balance of safety and aesthetics.

#### H.F. FORSYTH - AFFILIATE

Two systems are currently in widespread use in Europe, one of which has been well publicised in South Africa. This particular system incorporates a reduced neutral of special alloy which also serves as the strain member. This poses certain questions in my mind. I have always understood that loss of the neutral in a low voltage reticulation system is an occurrence to be avoided as far as is practically possible. Is it wise that the strain member in such an installation is in fact the neutral conductor?

Furthermore, my knowledge of SABS specifications suggests that it has never been accepted that reduced neutrals in low voltage reticulation systems are permitted in conductor sizes below 185 mm<sup>2</sup>. Are the SABS specifications incorrect?

Should reduced neutrals be permitted?

An alternative system is that in which phase and neutral conductors are

of the same size and accessories are available for the installation of such a system. Would this be a preferable approach? Both types of cable can be manufactured locally.

Would there be merit at this stage in requesting the SABS to investigate the possibility of publishing a South African specification to cover this type of cable after due investigation of the queries I have posed?

MR VAN DER SPUY of the West Rand Administration Board warned that the degradation effects which the reef conditions of high incidence of ultra violet radiation and low humidities might have on the insulating materials used in areas cables meant that one should be cautious before introducing it on a wide scale.

#### E.G. DAVIES - PIETERMARITZBURG

The Council with which I am associated has recently installed bundled conductors and has issued a contract for considerable lengths of this conductor. It has done so after studies of the various systems available.

The two systems are those imported from Germany and France. The basic difference is that in the French system the tension is taken on one conductor which is constructed of high tensile aluminium alloy. In the German system all the conductors are tensioned. A detailed survey has been undertaken by the East Midlands Electricity Board in the United Kingdom, the outcome of which did appear to favour the French system and some of the points made are as follows:

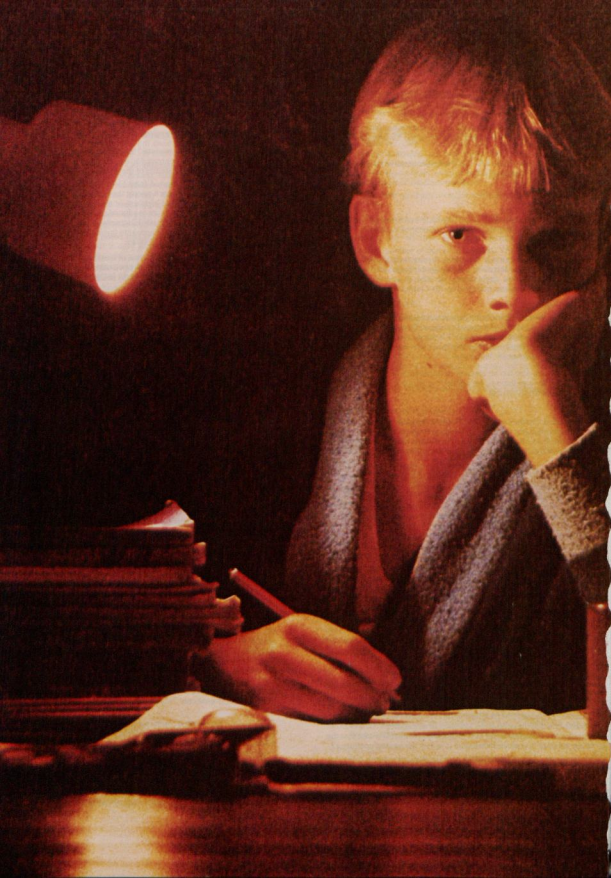
1. It is difficult to ensure even distribution of tension over all four conductors in the German system. This is obviated in the French design where all mechanical load is carried by the neutral conductor. Erection, mid-span repairs and retensioning are all much easier with the French system.
2. Continuous operating temperature for the conductors in the German system is limited to 80° C whereas the French system can go up to 90° C.
3. One suspension clamp and one tensioning device suffice for the entire range of bundled conductors in the French system whereas in the German system different devices are required for each size.
4. Because the phase conductors are not tensioned in the French system it is easier to spread the cores when applying line taps than in the German system.
5. My personal view is that for ease of erection the single tension conductor system is preferred and this is an important consideration in this country where there is an abundance of semi-skilled labour. The components are, we believe, well designed but only operating experience will confirm this. The same system and components have been operating in France for upwards of 20 years.

It should be noted, however, that on the larger size of bundled conductor the neutral conductor may be less than either of the phase conductors but in the situation pertaining to municipal reticulation this is not usually a restricting factor.

The question of curved streets does not appear to enter into the discussion because bundled conductors and normal overhead lines would require approximately the same number of stays or struts but the advantage of bundled conductor appears to be in tree-lined streets. However, if a tree were to fall over a bundled conductor line the possibility exists that the conductor insulation would prevent isolation of the circuit and there remains the possibility of shocks to persons in the vicinity. I do not consider that bundled conductors eliminate the possibility of electric shock in broken wire conditions although experience might prove that it is safer than the open wire system.

On a relatively small installation which required two sections of bundled conductor, one of four and one of seven spans, the cost of installing a bundled conductor system was estimated to be 23% higher than for an open wire A.C.S.R. construction, with the cost of installing underground cable 112% higher than the bundled system. This latter figure has been revised due to the recent significant drop in P.V.C. cable prices and the present cost of an underground cable system is now only 76% higher than the aerial bundled system.

In my opinion the bundled conductor will show a marked advantage for replacing open wire conductors where the existing poles are in a sound condition but, where wood poles have been in use for many years, they tend to reach the end of their useful life at the same time as the conductors. In this situation it would probably be better to replace the entire installation with cable. Undoubtedly as the financial situation is changing continuously it is likely that prices of bundled conductor will increase, particularly if imported cable supplies are limited, whereas recently the cost of underground cable has decreased.



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And that simply, is that we've always believed size in itself is not an indication of strength.

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# DEVELOPMENTS IN VACUUM AND SF6 SWITCHGEAR

J.C. van der Westhuizen – Affiliate

## 1. INTRODUCTION

Outdoor and indoor switchgear with varying voltage and current ratings are regularly commissioned for various applications worldwide.

Vacuum and SF6 switchgear are both modern technologies which cover mainly the medium- and high-voltage range. The excellent insulation and arc-quenching capabilities are utilised in both switchgear technologies.

Vacuum technology has been successfully produced and used worldwide for the past 10 – 15 years. The switchgear range is commercially available for the voltage range 3,6 kV – 36 kV. So far, the major applications have been for indoor and primarily in metal-enclosed switchgear systems. The vacuum circuit-breaker and contactor are the two essential items covered in this technology.

SF6 switchgear technology employs the heavy gas Sulphur-Hexafluoride which is now widely used as an insulating and arc-quenching medium for indoor as well as outdoor switchgear. This technology is becoming the preferred system for the high-voltage range (i.e. rated voltage 72 kV and above). During the past years development extended to include the medium-voltage range. Therefore distribution networks can also be served using this technique.

In the future medium-voltage switchgear based on vacuum and SF6 technologies are expected to overtake the previously used switchgear systems, (i.e. bulk-oil, minimum-oil, air-break and air-blast) owing to the better switching characteristics combined with the economical advantages afforded.

## 2. VACUUM INTERRUPTERS

Vacuum interrupters have been successfully used worldwide in medium-voltage industrial and distribution systems. They are available in the following two main applications:

- Contactors : 1 kV – 12 kV and 400 Amp rated current.
- Circuit breakers : 1 kV – 36 kV and rated currents up to 3 150 Amp and rated short-circuit breaking capacities up to 40 kA.

After many years of research and development advantage has been taken of the excellent dielectric strength high-vacuum offers as well as the outstanding qualities of contact shapes in conjunction with contact materials.

In Figure 1 below the dielectric strength of a vacuum interrupter for 24 kV is shown.

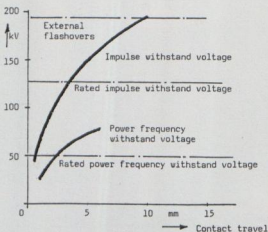


Fig. 1 Dielectric strength of a vacuum interrupter for 24kV rated voltage.

There are various designs of vacuum interrupters. The design differences emanate mainly from a compromise between contact materials, construction and travel.

In the vacuum technology no decomposition of the insulating medium can occur. Contact materials, e.g., sintered alloys of tungsten and copper, or chromium and copper, are gas-free and do not vaporise easily. Vacuum bottles are sealed for life, thus maintenance is minimal and limited to the operating mechanisms.

The table below summarises the data of contact materials for Siemens vacuum interrupters.

	Vacuum Interrupters for Contactors	Vacuum Interrupters for Circuit-Breakers
Max. breaking current	4 kA	63 kA
Max. making current	63 kA	160 kA
Welding force	Less than force exerted by drive mechanism	Less than force exerted by drive mechanism
Life		
Switching operations at In	10 <sup>6</sup>	2.10 <sup>4</sup>
Switching operations at Ik	–	100
Maximum contact erosion	2 mm	3 mm
Max. impulse voltage	75 kV	170 kV
Max. chopping current	5 Amps	5 Amps
Max. conductivity	20 S/mm sq.	17 S/mm sq.

In Rated operating current

Ik Rated short-circuit breaking current

Table 1 : Data of contact materials for Siemens vacuum interrupters.

Market requirements prompted the development and constructional features which resulted in the following:

- High reliability
- Long life expectancy
- Long maintenance-free service periods
- Large number of switching operations, as well as switching of large short-circuit currents.

## 3. VACUUM SWITCHGEAR SYSTEMS

The vacuum contactors and circuit-breakers form the essential part of the switchgear. The switchgear incorporates the current- and voltage transformers, busbars, protection relays, instruments and in most indoor applications, also the total assembly integrating the above in a metal-enclosed or metal-clad housing.

A comprehensive range of universally applicable air-insulated and SF6-insulated M.V. switch panels in which vacuum interrupters are the sole switching elements are available as shown in Table 2 below.

Rated Voltage	Rated short-circuit breaking current					
	8kA	12,5kA	16kA	20kA	25kA	31,5kA 50kA
7,2 kV			640A		630A	630A 1250A
12 kV & 15 kV			to 1600A		to 2500A	to 3150A
24 kV	630A to 1250A	630A to 1250A	630A to 1250A	630A to 2000A	630A to 2000A	
36 kV			1250A to 2500A		1250A to 2500A	1250A to 2500A

Table 2: Data of Rated Voltage, Short-Circuit Breaking Current and Normal Operating Current

The vacuum circuit-breaker has features which simplified the design of a new generation of switchgear. These features are summarised as follows:



- The arc-quenching medium does not have to be maintained as it is sealed for life.
- Even breakers of high ratings have a relatively small mass.
- Low energy operating mechanisms are required.
- Only lubrication of the operating mechanism has to be performed at 10 year intervals.

The above made it possible to manufacture switchgear panels in the following forms:

- Withdrawable
- Non-withdrawable (incorporating air-break isolators)
- SF6 insulated, fixed pattern (incorporating SF6 off-load isolators and earthing switches).

Of the above types of switchgear, the SF6 insulated fixed pattern type is the latest switchgear system. In this technique the good insulating properties of SF6 are combined with the outstanding switching ability of the vacuum circuit-breaker. The switchgear is available in single phase or three phase encapsulation, depending mainly on the switchgear manufacturer's preferences.

The SF6-filled chambers, in conjunction with the vacuum arc-quenching principle employed, give switchgear of this design the following characteristics:

- High degree of availability
- No exposure of the built-in equipment to climatic or other environmental effects because of the hermetic sealing.
- Dielectric strength independent of the atmospheric pressure, making the panels suitable for installation at any altitude.
- Dead tank design, permitting the panels to be installed in any service location.
- No trucks are used, switchgear can operate in any position.
- IP65 degree of protection.
- Extremely compact, panel width of 600 mm for voltage up to 36 kV.
- High-voltage busbars and isolating contacts not subject to corrosion.

The design employed also:

- Prevents contamination and condensation effects.
- Ensures total vermin proofing.
- Allows slip-on and plug-in cable connectors to be used.
- Accommodates modern electronic protection and measuring equipment.

#### 4. SULPHUR HEXAFLUORIDE (SF6) SWITCHGEAR

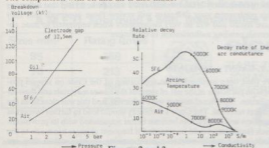
The excellent properties of sulphur hexafluoride (SF6) gas are optimally employed for insulation as well as for arc-quenching. SF6 has been primarily used in switchgear for transmission voltages of 88 kV and above. However, over the past years a number of switchgear manufacturers introduced this technique also in the medium-voltage range, i.e. for voltages up to 36 kV.

SF6 Gas - Can be summarised as having the following characteristics:

- Good arc-quenching capability
- Higher dielectric strength than air at same pressure
- High thermal conductivity
- High electronegativity
- Rapid recovery of dielectric strength after switching
- Odourless and colourless
- Chemically stable and inert
- Non-toxic
- Incombustible
- Good insulant therefore affords compact switchgear designs.

The insulating properties and quenching properties of SF6 gas are illustrated in Figures 2 and 3.

The comparison with oil and air is also made.



Figures 2 and 3

#### Arc interruption

The most important types of arc-extinction employed in switchgear today are discussed below.

- **The Puffer type:** This relies upon compression of the SF6 gas during contact opening, which is afforded by movement of a piston in a cylinder. The compressed gas is forced into the arc which ensures cooling and extinguishing of the arc. This type is used mainly in circuit-breakers.
- **The Double-Pressure type:** Employs the same principle as the puffer type. However, an additional pressure reservoir for supplying high pressure SF6 gas which is blasted into the arc is required. This method has been used in the first circuit-breakers but is economically unfavourable for distribution voltages.
- **The Magnetic-Rotary-Arc type:** Allows in its design the concept whereby the arc is rotated spirally through the gas with the help of a series connected magnetic field to effect arc extinction. This method is mainly used in contactors. Due to the relatively short stroke only a low-energy mechanism is required, hence high switching duty is possible. Such high switching duties are mainly of interest in motor control centres, (i.e. where low normal currents are switched many times per hour).

In recent years, development in the high-voltage range has been concentrated mainly on increasing the interrupter breaking capacity. Breakers capable of interrupting currents of up to 100 kA have been tested. Figure 4 illustrates the increasing capacities and also the transition stage of double-pressure breaker to single-pressure breaker.

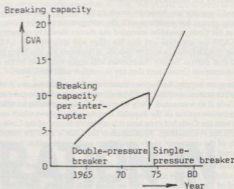


Figure 4.

#### SF6 Switchgear for Voltages up to 36 kV

This range of switchgear is available as,

- Metal enclosed, fixed pattern type
- Metal enclosed, drawout pattern type
- Metal-clad, fixed pattern type
- Outdoor type switchgear components

It has been found that for rated voltages up to 12 kV the metal-enclosed drawout-pattern type is preferred owing to the fact that most users have laid down operating and maintenance procedures to meet bulk-oil switchgear requirements.

The drawout-pattern type SF6 switchgear incorporates horizontal isolation, horizontal drawout features with two circuit-breaker types, these being:

- Three phase encapsulation, i.e. one gas chamber for all three phases.
- Single phase encapsulation, i.e. three separate gas chambers.

In this type of switchgear use is made of the conventional metal-cladding and insulation techniques.

In the metal-clad fixed pattern type all properties of the SF6 are employed. In other words, the SF6 gas is used both as insulating and arc-quenching medium.

In summary, the SF6 medium-voltage switchgear is now available for rated voltages 1 - 36 kV. The introduction of this switchgear has brought about no major disadvantages, but rather greater application possibilities. These switchgear systems have now been in service for approximately five years.

#### SF6 Switchgear Above 36 kV

The application of this switchgear in municipal networks can be found

primarily at main intake stations. Here the major application is the use of outdoor switchgear.

In large cities and towns where more power must be distributed in densely populated and built-up areas, there has been a trend towards indoor switchgear installations.

The 88 kV - 132 kV switchgear range has seen the development of versatile switching devices in both outdoor and indoor applications. Advantage has been taken of the long service periods without maintenance as well as the competitive nature of available SF6 switchgear.

The major development in the higher voltage levels took place in order to increase reliability and to optimise manufacturing costs with the following results:

- One interrupter for voltages up to 170 kV
- Complete three phase metal-encapsulation for voltages up to 170 kV
- Three-phase busbar metal-encapsulation for voltages up to 525 kV
- Smaller dimensions of equipment

## 5. CONCLUSION

The ever increasing cost of labour and the rising costs of land are the reasons for high-voltage switchgear being designed to be compact and maintenance-free.

Designs of switchgear are seen to follow a trend whereby durable switching devices based on SF6 and vacuum are used in order to prolong the lifetime of switchgear systems.

# CODE OF PRACTICE FOR THE WIRING OF PREMISES

## J.K. von Ahlften - Springs

Quite a number of disputes seem to have arisen between Supply Authorities and Electrical Contractors regarding the interpretation of various regulations in the new Code of Practice for the Wiring of Premises. As a result thereof a number of appeals for ruling have been lodged with the Chief Inspector of Factories who has mostly upheld the interpretation given by Suppliers where this has been done in the interest of safety of the users of the electrical installations.

The Chief Inspector has, however, made it clear on many occasions that where any person has problems with the interpretation of the Code or feels that the Code should be amended the matter should be submitted to the SABS for attention and that his office will insist that the SABS gives due consideration to such proposals. Arguments are also being put forward that certain Supply Authorities still apply bylaws in terms of local Government Ordinances that are in conflict with the Code.

In this respect Supply Authorities should also bring deficiencies in the Code to the attention of the SABS for consideration and incorporation in the Code if so warranted. Only where the Code requirements affect the distribution system of the Supplier may he make bylaws which may conflict with the Code but even here it is advisable to amend the Code to meet with the eventualities. Application of the Code is all in the interest of safety of the consumer as are regulations and anything that is necessary should go into the Code.

It is obvious that appeals do take a long time and are not meant to be an instant solution and that disputes between contractors and suppliers are a hazard of the industry and must be dealt with as such. The Code is however common ground and must be refined until it is no longer a source of dispute but its interpretation is going through growing pains and a certain degree of patience is needed.

It is however the duty of both the Supplier and the Contractor to know the Code very well and to test their knowledge thereof against one another even at a financial risk. On the other hand it has become pretty obvious that there is an urgent action required on the part of the South African Bureau of Standards to amend the Code in such a way that the often needless disputes do not arise and that the Code is capable of one interpretation only.

At various Reef Installation Inspectors' meetings and no doubt elsewhere in the country, an in depth study of the new Wiring Code was however made in an effort to achieve some measure of uniform interpretation amongst the installation inspectors themselves which however proved not to be an easy task taking into account the basic philosophy of the Code which is to allow a certain measure of flexibility within accepted standards for materials and workmanship.

Urgent action on the part of the South African Bureau of Standards to achieve uniform interpretation wherever necessary would therefore appear essential.

This topic is now open for general discussion and the views of all the interested parties concerned will be sincerely appreciated.

## M. DOYLE - AFFILIATE

Appendix G is a totally essential part of the Wiring Code and should eventually ensure that only those products duly authorised by the Chief Inspector of Factories will be used in electrical installations in this country, thus ensuring a high technical performance and safety standard.

It is however, of concern that another phrase has crept into the Code and that is, "approval pending authorisation". This deviation from Appendix G was introduced to be used and I quote, "in exceptional circumstances". In other words, it was a procedure which would enable certain product where standard authorised products were not available,

to be used in installations where otherwise significant and expensive delays would be experienced if the authorisation procedure as outlined in Appendix G were followed.

Unfortunately it would appear that the original intention has been overlooked and that this deviation from the written procedure is being used to give prior approval before authorisation of many standard products where equivalent authorised products are freely available.

This gives cause for concern and raises several questions.

Firstly, what would happen if a range of products given approval pending authorisation were subsequently not recommended for authorisation by the Recommendations Committee? Let us say that this was because of a suspected safety hazard. Presumably it would mean that those products having already been installed, would now have to be removed and replaced by authorised products. If not, we would knowingly be allowing installations to remain which were potentially dangerous.

Secondly, who is responsible for recording accurately where the non-authorised products have been installed?

Thirdly, if in the interests of safety the products had to be replaced, whose responsibility would it be to bear the cost of such replacement? Would it be the client who in fairness is entitled to a sound, safe installation? Would it be the consulting engineer who is responsible for the technical standard of the installation? Would it be the contractor who had installed the equipment, or would it be the supply authority who initially gave approval for non-authorised products to be used? I feel certain that many of your delegates have faced such circumstances in the past and can see the ingredients for much lively argument should such a situation arise.

At present approval pending authorisation can be issued by a supplier based only on the evidence that the authorisation procedure has commenced. That can and has meant as little as a confirmation letter from the SABS to the applicant that samples and a request to proceed have been received.

A cursory examination of the report of the Recommendations Committee for 1981/1982 distributed before the conference, shows that during the eight ordinary meetings held between the 19th February 1981 and the 18th November 1982, thirty six products were considered for authorisation. Of those only 47% were recommended for authorisation and the balance of 53% were either not approved or authorisation was withheld for unspecified reasons. It is certainly conceivable that of the 53%, some had been given approval pending authorisation, although doubt obviously existed in the minds of the committee as to whether they should be recommended for authorisation.

I would urge your delegates to consider the implications of this matter very seriously. There is much concern surrounding this subject in the electrical industry at the moment and I would like to feel that following this conference your delegates will review those approvals that they have issued and will be very circumspect when requested to issue approvals pending authorisation in the future.

## C.T. GAUNT - AFFILIATE

We have been involved in the application of the Code on several projects, in particular in the use of some of the newer materials and their installation. Significant savings were achieved, and this was clear from the tenders received. The Code's flexibility should lead to further savings as suppliers and contractors become better acquainted with its provisions. Such familiarity would be retarded if frequent changes are made to the Code and I would caution against making changes unless they are clearly necessary.

#### J.V. GRANT - SABS

The Code is intended to allow a certain degree of flexibility within accepted standards of material and workmanship. It is therefore not possible to pin down exactly what should be done. Equally it is not possible to improve the Code so that there can be no mistaking the way something should be done. The Code itself can and will be amended, but it will be better to amend the Wireman's Code so that alternative methods are still available.

Contractors are not aware of the flexibility of the Code and in other cases the supply authority has not always adapted to the Code.

#### W. BARNARD - PRESIDENT

The supply authorities are generally conservatives and perfectionists and it is difficult to look at an installation from a safety point of view, when the work is shoddy even if safe.

This may be an area of friction between the supply authority and the contractor.

#### K.G. ROBSON - EAST LONDON

We should look at the Code in the light of the extent to which it is allowing the standard of work to deteriorate. What is to be the future of the contracting industry? It is felt that contractors are using unskilled labour with no intention of providing it with the training given to white apprentices. The code should take cognizance of this.

#### J.V. GRANT - SABS

Mr Doyle's statistics refer to items recommended and not to authorisations. The term "approved pending authorisation" was introduced so that the supply authority could connect an installation even though it was not in accordance with the code. The Bureau sends out letters starting "We acknowledge receipt of your application for authorisation". This must not be taken as a blanket approval as authorisation may not be granted.

#### F. PRINS - DEPARTMENT COMMUNITY DEVELOPMENT

The Bureau should investigate the question of heat dissipation in distribution boards where many conductors are grouped together and this heat built up causes the circuit breakers to trip unnecessarily.

#### F. VAN DER VELDE - CAPE TOWN

The Code is drawn up as a minimum Code for safety. It should therefore not be used as a design handbook. There is definitely a saving to be derived from the application of the new Code as opposed to the old blue book. The reason that the saving has not come about is attributable to conservatism in the application of the Code.

#### MR BAKER - ECA

In reply to Mr Robson, it should be noted that of the 1500 apprentices of all trades to the building industry at present, 1 000 are electricians. The contractor are therefore not ignoring training.

The ECA is negotiating agreements with the trade unions for providing training for the unskilled to bring them up to semi-skilled status. A new category of worker has been introduced called an "electrical installation operatives" who will be trained and will do the mundane tasks. Some of the larger contracting companies have already set up training programmes.

#### MR LAING - CARLETONVILLE

Should we not have a code just for the ordinary house where it is laid down exactly what should be done and leave the flexibility for the larger type of installation?

#### J.V. GRANT - SABS

Mr Laing's idea had previously been discussed but was regrettably discarded.

#### A.A. WEICH - DEPARTMENT OF MANPOWER

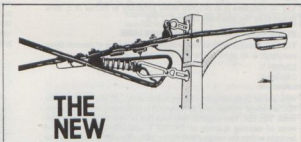
Local Authorities should not advise contractors of all the individual faults on an installation when testing, but should leave them to find the faults. By pointing out the faults, the authority is assisting contractors and encouraging them not to accept responsibility for their own installation work.

The Code is a good one but must continually be updated and, in order for this to be done, we must feed our complaints to the Bureau.

#### A. MIDDLECOTE

The Code lays down safety standards only. The question of neatness of work lies with the client. The Code allows for lower cost installations if designed properly.

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# STANDARDIZATION OF NOMINAL VOLTAGES OF LOW VOLTAGE DISTRIBUTION NETWORKS

A.A. Middlecote - SABS

The ideal of a single international standard voltage for low voltage distribution networks has always been attractive since it can bring about rationalization of the design of distribution networks and of the equipment used in such networks. This has obvious economic advantages.

These days the advantages of having such a standard voltage is even more pronounced because of the increasing use of home domestic appliances. These appliances, because they are required to be reasonably priced and also to be small in size and light so as to satisfy ergonomic requirements, are usually designed to operate only within a narrow band of operating voltages. Internationally this has been accepted as  $\pm 6\%$  of the valid voltage of the appliance. Mention should also be made of the case incandescent lamps. These are very sensitive to operation at incorrect voltages since a 5% overvoltage halves the life of the lamp while a 10% increase in voltage reduces the life to 25% of the specified life.

## NOMINAL VOLTAGES IN PRACTICE

Unfortunately the development of nominal voltages has been haphazard and confusion between the declared voltage of a system and the terminal voltage of distribution transformers has aggravated matters. Thus at one stage nominal voltages of 200, 220, 230, 240 and 250 Volts existed.

At present two predominate internationally (apart from the very different 120 Volt of the USA - Canada influenced countries). These are 220 V and 240 V. 220 V predominates in continental Europe and 240 V in the United Kingdom. In South Africa the declared national nominal voltage is 220 V, though other nominal voltages are declared by certain municipalities and supply authorities.

However in many cases reality is very different from declared intention. Few supply authorities have in practice a median voltage near the declared nominal voltage.

An example is given in Figure 1 attached which shows the voltage variation in a very large municipality in South Africa, which claimed to have a standard nominal voltage of 220. As can be seen the actual median voltage is nearer 230 V and the % variation certainly more than 10%.

Figure 2 gives the results of a survey carried out countrywide in Western Germany where the declared national standard voltage is 220. Again it can be seen that the median voltage is nearer 230.

This emphasizes two factors:

- Few distribution voltages in practice line up with the declared or legal nominal voltage;
- The % variation is in practice more generally in excess of  $\pm 10\%$  rather than the generally claimed  $\pm 5\%$ .

## INTERNATIONAL STANDARD VOLTAGES

The IEC has approached this problem by accepting at present three standards in its publication 86 - Standard Voltages e.g.

220/380 V

230/400 V

240/415 V

with a note indicating that in the future only 230/400 V will be the IEC standard voltage and its adoption is recommended in new systems. The IEC also suggests that with this in view the voltage variations of existing systems at 230/380 V and 240/415 V should be brought within the range  $230/400 V \pm 10\%$ . This 10% could later be reduced as the networks are further improved.

This is a sound approach towards the goal of obtaining a single national standard voltage which could simplify design of networks in the future and could also, by simplifying the design requirements of home electric appliances, reduce costs and facilitate international trade.

## RECOMMENDATION

It is therefore recommended that here in South Africa we should consider the following approach:

- Accept the national standard to be 230/400 V with a variation of 10%, thus giving the first challenge to supply authorities to ensure that their existing networks comply with this requirement.
- Design all new networks as soon as possible for a nominal voltage of  $230/400 \pm 5\%$  (or perhaps  $-10\%, +5\%$ ) and make reasonable allowance for this to be maintained as the general load increases.
- In the future, (say within ten years), further modify existing net-

works (now hopefully  $230/400 V \pm 10\%$ ) to line up with  $230/400 V \pm 5\%$ .

In considering this recommendation all concerned should be realistic and accept the following:

- Few distribution network nominal voltages are in practice what they are claimed to be.
- The variation in the actual voltages in practice is more like  $\pm 10\%$  rather than the  $\pm 5\%$  claimed.
- There is a further voltage drop which must be allowed for in the wiring of premises up to 5%. Fortunately this normally only applies if the loads are heavy such as those of large and more robust appliances and not light loads such as those of lighter but more sensitive home appliances.
- The present standard voltage under the Electricity Act is 220/380 V.

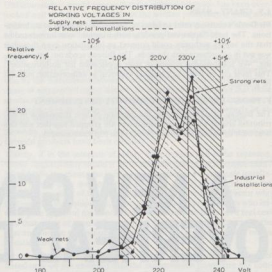


FIGURE 2

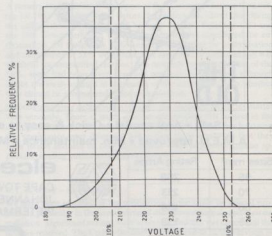


FIGURE 1



In 12966 SABS 780 "Distribution Transformers" set the standard no-load voltage of distribution transformers at 400/231V. Thereby enabling systems to satisfy the standard voltage of 220V in South Africa with limits of variation between  $\pm 5\%$ , i.e. ranging from 231V to 209V.

Quoting from the minutes of the recently held meetings of the SABS committee revising SABS 1019, Minute 5.2(b) reads as follows:

"If the SABS committee were to adopt the IEC standard voltage it would have to be adopted with the limits of  $230V \pm 5\% - 10\%$ ".

This range would correspond with the following limits on the declared voltage of 220 V:  $229 V \pm 10\% - 6\%$ .

The upper limit is within the capability of the distribution transformer to SABS 780 because it is required to operate satisfactorily at 105% of rated primary voltage and under light load conditions the 220 V + 10% limit may therefore be reached.

However, under full load conditions, a voltage drop of 10% from 230 V is in many systems a dream that may take a long time before it can be realised.

Minute 5.2(d) reads that a representative of the Domestic Appliances Manufacturers Association of SA (DAMASA) stated that his company had to resort to ordering motors to 220 V  $\pm 10\%$  because of an unacceptably high return of faulty motors made to 220 V  $\pm 5\%$ . It is to be expected that a large share of these returns was due to under voltage conditions.

This is important to bear in mind because if 230 V were to be adopted, the word would spread that systems are 230 V nominal and the frequency of undervoltage burn-outs would increase, possibly at a disastrous rate.

The SABS committee is therefore looking for guidance from the AMEU and, in doing so, would submit the following recommendations:

1. SABS 780 should not be amended to raise the standard no-load voltage. Standardization at 400/231 V which has been achieved over 17 years, should be seriously jeopardized if this standard voltage were to be raised.
2. It is not considered good practice to raise the secondary voltage by overfluxing the transformer. Transformer taps are for compensating for primary voltage fluctuations. Although up to 5% overfluxing is allowed for in transformer design, a consistent use of this facility for increasing the secondary voltage to 230V may result in:
  - (a) increased no-load loss of the transformer

- (b) increased noise level
- (c) increased demand for resistive loads during peak loading conditions.

3. That SABS 1019 should at this stage not recommend the introduction of 230/400V but, in order to justify a future introduction of such IEC voltage, that systems be strengthened in order to consistently confine their lower voltage limit to 220 V - 6%, which would fall in with 230 V + , which would fall in with 230 V - 10%.

It should be remembered that the IEC have established a value towards which international standardisation should be directed. Shortly after World War II, the CEBG in the UK decided to rationalise their large variety of standard voltages to a unified value of 240 V, an exercise which, it is believed, took 25 years to be accomplished.

Similarly, the AMEU should take a pragmatic approach. It may be imprudent to move headlong into a standard voltage of 230 V but it is essential to move in this direction by upgrading the existing systems so as to achieve the lower limit of 230 V - 10%, i.e. 207 V, consistently. Above all, this should be achieved with SABS 780 distribution transformers having a rated no-load voltage of 400/231 V, without the taps being used for upgrading the system.

Paradoxically, it is not so much the formal adoption of 230 V as a standard voltage, as the assurance that systems can meet the lower limit of 207 V consistently which will govern the transition to a truly 230 V nominal system voltage.

### E.D.E.C. PRETORIUS - POTCHEFSTROOM

Niemand sal die voordele van 'n internasionale standaard laespanning betwis nie. Maar hoekom dit juis 230/400V moet wees, is vir my nie aanvaarbaar nie want die standaardspanning van die meeste nywerheidslande en ontwikkelende lande in die wêreld is, soos in die RSA, 220/380 V.

Ek wil ook net daarop wys dat mini-substasie-transformators nie met tapwisselaars voorsien word nie tensy spesifiek daarom gevra word en dat baie ingenieurs, op aanbeveling van die SABS, ook hulle verspreidingstransformators SONDER tapwisselaars spesifiseer. Indien daar oorgeskakel word na 230/400V, PLUS ENIGE PERSENTASIE, sal al hierdie transformators nie meer geskik wees nie en teen groot koste.

Ek stel formeel voor dat die VEMO nie die oorskakeling na 'n RSA-standaardspanning van 230/400 V i.p.v. die huidige 220/380 V steun nie.

## RETICULATION OF NEW TOWNSHIPS

### J.D. Dawson - Uitenhage

Any present day discussion on "Reticulation of new Townships" cannot ignore the actuality of the "Rational norms for electricity distribution in residential townships" or the "Standardised specifications for electrical distribution in residential townships" and the probability that the central government will promote their use in an effort to speed up tendering procedures and possibly reduce costs.

At the Technical Meeting held in George on the 3rd and 4th May, 1982 Jules van Ahlften explained the reasons for the establishment of the rational norms and the work done in producing them by the Technical Committee of the AMEU of which he was Chairman.

At the time of writing this introduction to the discussion on "Reticulation of new townships" I am told by the NBRI that the norms will probably be published in mid 1983 and therefore should be available to delegates attending the Convention in October.

Because of the relevance of the norms to the proposed Code of Practice to be used with the standardised specification the NBRI asked the AMEU members of the Technical Committee to comment on certain of the technical contents of the standardised specifications.

I must make it quite clear however that the Technical Committee was in no way involved with the format or the original contents of the specifications.

I am told that the Code of Practice and the specifications would be published by the SABS by August 1983 and as in the case of the norms should probably be available to delegates at the Convention.

For the record this series consists of the following documents:

SABS 0150: Code of practice for use with standardised specifications of electrical engineering works and contract documents. This code will be divided into five parts:

Part 1: Format and content of contract documentation.

Part 2: Project specifications. This part will cover those requirements which are additional to the standard specifications and will include variations which may be made to suit local conditions and the requirements of a particular project.

Part 3: Design guidelines.

Part 4: Typical schedules of quantities.

Part 5: Contract administration.

It is considered to be in the national interest for contract documentation and procedures to be standardised and familiar to everyone involved with electrical installation. The code provides a basis for standardisation as well as guidelines for each of the specifications listed below under the categories indicated (i.e. Parts 2 to 5).

### THE STANDARDISED SPECIFICATIONS

SABS 1500 SA:

Electrical distribution in residential townships: General

SABS 1500 SB:

Electrical distribution in residential townships: Substations

SABS 1500 SC:

Electrical distribution in residential townships: Underground

SABS SD:

Electrical distribution in residential townships: Overhead

SABS 1500 SA:

Electrical distribution in residential townships: Service connections

SABS 1500 SF:

Electrical installations of dwelling units

In these specifications, all materials, accessories and technical details of the plant are specified by reference to SABS/IEC/BS Standards.

It is not my intention to justify or condemn the use of the standardised specifications but it is certain that municipal undertakings will not be

allowed to just ignore them.

I know for example from having worked on the technical advisory committee of the Rive Commission on the upgrading of the communal infrastructure of the urban black residential areas in the Port Elizabeth/Uitenhage metropolitan area that the electrical consultants appointed to design the electrification systems and issue the tender documents for these schemes have been instructed in their brief to make use of the standardised specifications even although they have not yet been issued officially.

I am sure that each one of us in some form of other uses and repuses standardised specifications produced by our own undertakings and probably does not give a great deal of thought to the up-dating of these from time to time.

If national standardised specifications can even help us to maintain and up-date our own specifications then they will have served a useful purpose.

Furthermore, if over a period of time consensus can be reached on the contents of the national standardised specifications this should be in the interest of all electricity undertakings and South Africa as a whole.

The Code and the standardised specifications are lengthy documents and the task of commenting on or correlating even the technical contents is a daunting one especially when you take into account the variations of opinion on details which exist between electrical engineers. However the Technical Committee did succeed in reaching agreement on general principles particularly in respect of the norms and to a lesser degree in respect of the standardised specifications.

In my opinion there is still much work to be done especially on the specifications but I understand that this problem is understood and accepted by the NBRI and the Bureau of Standards and that the revising and up-dating of the original documents will be an on-going process.

Constructive criticism from all engineer members of the AMEU is therefore essential and this discussion is the first step towards consensus.

## STANDARD ELECTRICITY TARIFFS

### D.C. Palser – Cape Town

The subject of electricity tariffs, by its very nature, is one that has aroused considerable interest and engendered heated discussion almost from the inception of the electricity supply industry. It is a subject that has been debated at considerable length at a number of previous AMEU conventions. In fact, at the very first convention held in Johannesburg in 1915 a paper on electricity tariffs was presented by Mr. J. Roberts, then City Electrical Engineer of Durban. In this paper it was stressed that electricity tariffs should be commercially sound, fair and equitable, and simple. These three conditions are as valid today as they were then.

Since, at first, electricity was used mainly for lighting, the tariff rates developed were relatively straightforward and simple, and in most cases a flat-rate tariff based on the kW h's consumed was considered adequate. But as other and more diverse uses were found for electricity, it became necessary to formulate new and more equitable tariffs to meet the changing conditions. And this is where the controversy really started; for then, even as today, no two authorities seemed able to agree as to what constituted an equitable tariff. Some contended that tariffs should be based closely on the actual cost of providing the service, while others again were inclined to the view that tariffs should be based more on the value of the service rendered to the consumer.

The basic aim of all electricity tariffs is primarily to recover the supply undertaking's costs in as equitable a manner as possible. This immediately suggests that all tariffs should be based on costs; and up to a point this is correct. But one should not lose sight, however, of the fact that electricity is put to many different uses. Certain types of load, such as lighting, have what might be called a high "utility" or "use" value. The consumer, consequently, is prepared to pay appreciably more than the cost of supplying this particular service and in such cases the undertaking often charges a relatively high rate compatible with "what the traffic will bear".

On the other hand there are certain consumers, such as large industrial consumers, who are in a position to obtain portion of their energy requirements from alternative sources. Or it might be the policy of the local authority to encourage industrial development within its area of jurisdiction. In such cases the tariff rate offered should be based more closely on "cost of supply" than "value of service", or possibly even offered at an effective discount.

This subject of cross-subsidisation between tariff rates is a most contentious one and is a practice which economists generally frown upon; they contend that economic theory dictates that all rates should be based closely on costs. I will come back to this point later.

Another more recent but equally contentious issue in tariff formulation is whether tariff rates should be based on accounting costs or marginal costs. Until fairly recently – around the mid-seventies – costs were generally computed in the traditional manner and based on accounting costs, that is the so-called historical or embedded costs.

But with the exceptionally high rate of inflation experienced in the Western world over the past decade increasing interest has been shown in various forms of inflation accounting to adequately compensate for the attendant decrease in the purchasing power of money and to reflect more accurately the operating results of companies. A system that has now been widely adopted both here and overseas is that known as current cost accounting. In South Africa a guideline on current cost accounting has been issued by the National Council of Chartered Account-

ants (SA) to assist in the development of accounting practices that will reflect the effect of changing prices on financial results.

From this interest stemmed a growing conviction that it would also be more correct to base electricity tariffs on marginal costs rather than conventional accounting costs, as in the past.

From this interest stemmed a growing conviction that it would also be more correct to base electricity tariffs on marginal costs rather than conventional accounting costs, as in the past.

In general terms, economists define marginal cost as the cost of society's scarce resources that must be used to produce one additional unit of some commodity, or conversely, the value of resources that would be saved by producing one unit less. If the price is lower than marginal cost, then the value of the last unit of consumption to the consumer is less than what it costs society to produce, and consequently more resources are being devoted to the production of the commodity than is socially efficient. Marginal cost pricing is accordingly conducive to economic efficiency in the overall national context. But is the efficient allocation of national resources the responsibility of electricity undertakings? Possibly not; but should the government decide that such a policy is in the national interest, then electricity undertakings would have to comply. However, for such a policy to be fully effective throughout the economy and to avoid any distortion it would be necessary for the country as a whole to adopt a similar approach in its pricing strategy.

There are arguments both for and against marginal cost pricing as opposed to accounting costing. Marginal cost pricing, however, is gaining in popularity and has won approval and national acceptance in countries such as France and the United Kingdom, as well as in the USA where the position, however, is complicated because of the various regulatory constraints imposed on electric utilities in this latter country.

The aim of economists, looking at the overall economy, is to strive for the ideal, which is the equating of price to marginal cost. Accountants, however, incline more towards basing price on actual historical costs, while sociologists are more concerned with utility pricing, particularly the impact on consumers in the lower income groups. The engineer, on the other hand, being more of a realist, is quite happy to go along with any pricing theory or practice that will restrict peak-load growth and improve load factors! In practice, though, it is generally necessary to take all three viewpoints into account in formulating acceptable tariff rates.

From a study of the principles involved in tariff formulation it is quite clear that there is no need for tariffs to be complex and difficult to understand and apply. Simple tariff rates can be developed that are economically sound and socially acceptable.

In practice, one need generally only distinguish between the three main consumer groups, namely domestic, industrial and commercial. For the larger consumers, such as the industrial group, the conventional two-part maximum demand tariff is quite adequate. For the smaller consumers, such as the domestic group, where the cost of expensive metering is not warranted, simple flat-rate or two-block kW.h rates, and perhaps circuit breaker rates, are perfectly satisfactory. Possible refinements include on-peak, shoulder and off-peak rates, as well as time-of-day rates, to more accurately reflect peak responsibility and the different demand-related costs in each case.

There is accordingly no reason why relatively simple and straightforward standard electricity tariff rates cannot be developed that will be suitable

for use by all municipal and other local authority electricity undertakings. It is not suggested that an attempt be made to standardise on actual monetary values; obviously these must vary from one undertaking to another to reflect actual cost structures. What is suggested, though, is that there is no valid reason why the multiplicity of different electricity tariffs in the country cannot be reduced in number and their basic structure standardised.

In giving consideration to the development of standard electricity tariffs for the country as a whole, however, it is also necessary to consider the views of various recently appointed government bodies on the subject of electricity tariffs.

Firstly, in March 1977, the Minister of Economic Affairs requested the Board of Trade and Industries to investigate and report on the tariff policy and tariff structure of electricity supply in South Africa. Arising out of this investigation a most comprehensive and detailed report was submitted some two years later.

Insofar as municipal electricity undertakings are concerned the Board in its report concluded that the provincial authorities should perhaps control electricity tariff levels to prevent excessive surpluses and, in addition, exercise the necessary supervision to ensure that tariffs were re-structured periodically and that there was no cross-subsidisation between rates. Reference was also made to the depreciation of assets and current cost accounting.

The report concluded by recommending that these various matters be referred to the Inter-Departmental Committee of Inquiry into the Finance of Local Authorities appointed by the Minister of Finance in January 1976, namely the so-called Browne Committee.

The Browne Committee submitted its report in 1980 but because of numerous objections, particularly those voiced by local authorities, the Minister appointed a working group, known as the Croeser Working Group, to investigate all complaints and related matters and to report back. The report of the working group was published in May 1982 and tabled in parliament in March this year.

Insofar as electricity undertakings are concerned the Croeser Working Group supported in principle the recommendation of the Browne Committee, and the grounds on which it was based, that the tariffs of trading services of local authorities be gradually converted to a marginal cost basis. As the tariffs levied for the supply of services may influence the establishment of new townships, the working group resolved to refer this matter to the specialised sub-working group appointed specifically to look into matters affecting the development of new townships and urban areas. This sub-working group has still to submit its report.

Of related interest is the Commission of Inquiry which was appointed by the Minister of Mineral and Energy Affairs in May this year to investigate certain matters pertaining to the supply of electricity in South Africa. The terms of reference of this Commission include inter alia an investigation into the principles of electricity supply and the impact of price determination and existing tariff structures on the financial policy of the country, with special reference to inflation and economic growth.

From the foregoing it is clear that the electricity tariffs of local authorities are coming increasingly under the purview of higher authority and that close attention will have to be given to such matters as current cost accounting, marginal cost pricing, cross-subsidisation and trading surpluses in the near future.

I would therefore suggest that the AMEU take the initiative in this matter and support a reference to the Executive Council that all tariff-related matters be investigated and reported on. To this end the whole question could perhaps be referred to the Electricity Supplies Committee, that is the old Escom Committee, or alternatively a special Electricity Tariffs Committee appointed to deal specifically with this subject.

As a start, a survey could be undertaken of the electricity tariffs of all municipal and other local authorities. This could be followed by a review of the extensive literature on the subject of marginal cost pricing and current cost accounting with a view to applying these principles to our own particular local conditions. I might mention that in Cape Town we have already embarked on just such a study with the objective of possibly applying these principles of marginal cost pricing and current cost accounting to our own electricity tariff.

In conclusion, you may recall that at the Durban Convention in 1975, in opening the discussion on a Members Forum item on the standardisation of electricity tariff; I advocated the appointment of a committee to investigate this question of standardisation. Regrettably no further action was taken at the time. I would submit, though, that the position is now a lot more urgent and would strongly urge that we now take the lead in this matter of the standardisation of electricity tariffs along the lines suggested.

Sir Austin Bunch commented that if one based electricity tariffs on long run marginal costs, there is always the difficulty of obtaining the desired cash flow. Inflation considerably complicates the issue. There has always been arguments as to whether or not present consumers should

pay for assets which future consumers will use. The answer to this is a political decision.

Mr Levy of the Electricity Control Board explained that the Board has no direct concern in the affairs of Municipalities within their own areas of jurisdiction, but is concerned with supplies given outside these areas. There is a large variation in the tariffs of different Municipalities. He stressed the need for the drawing up of Guide Lines for preferred tariff structures to assist the Municipalities in achieving some sort of uniformity.

The main costs of a Municipality's electricity undertaking are generation, transmission and bulk supply from ESCOM, with the latter usually comprising the major cost. The bulk supply cost is imposed on a Municipality and to attempt to apply marginal costing principles to the other two cost components only is a rather futile exercise.

#### NICO BOTHA — BLOEMFONTEIN

Tereg wys mnr Palser daarop dat elektrisiteitstariewe een van daardie onderwerpe is wat oor die jare heen telkens bespreek is. 'n Mens behoort sekerlik vir jouself af te vra, waarom word dit gedoen? Waarom word elektrisiteitstariewe onderhewig gemaak aan provinsiale- en elektrisiteitsbeheerrade se goedkeuring? Waarom voorstelle deur die Brown komitee en Croeser werkgroep in die verband.

Ek is van mening die rede is omdat elektrisiteitsvoorsiening 'n noodsaaklike gemeenskapdiens is, wat onder monopolistiese toestande bedryf word. Andersins sou die vrye mark meganisme die tarief-strukture en tariewe bepaal het.

Omdat belêde dinamies moet wees, is dit dan eintlik reg dat daar so dikwels as moontlik daarom besin moet word.

Any tariff structure in municipal affairs is mainly used as a policy-making instrument and, as such, city councils would always consider it as their prerogative to change tariff structures according to local conditions and demands. I do not think they can be blamed for that. As long as the electricity supply function remains part of municipal affairs it is a city council's right to decide on these matters.

I am, in principle, against too much control. Every day we are told about the devolution of power. But if this proposal means that it is the first step in the direction of a regional supply concept that I would whole-heartedly support Mr Palser's proposals.

#### E.G. DAVIES — PIETERMARITZBURG

The contention that tariffs should be based on actual cost or on the value of service rendered might well be correct but our experience is that tariffs ultimately revert to being based on "what the traffic will bear".

Cross-subsidisation of tariffs has proliferated because in almost all situations the domestic consumer exerts pressure. I believe that such cross-subsidisation is incorrect but that it will never be eradicated as long as electricity undertakings are controlled by committees who have to report back to their constituents.

Marginal pricing is of course a complex subject but one which I believe should be studied in some detail in relation to the financial situation in the Republic. I do not believe that existing consumers should be forced, through electricity tariffs, to subsidise grossly uneconomic additions to the system.

As is stated, the engineer is happy to go along with any pricing theory which will restrict peak load growth and improve load factor. The improvement of load factor, I believe, will result in larger savings than any of the somewhat obtrusive theories being proposed, particularly if all consumers are offered a tariff which contributes to the improvement of load factor.

I agree that tariffs should be made simple but even relatively simple tariffs in my experience are difficult to explain to consumers who do not wish to part with their hard-earned cash. I personally do not believe that the tariff should distinguish between the domestic, industrial and commercial sectors other than on the basis of quantity of electricity used. There should, in my opinion, be a discount for bulk supply.

The practice of charging a domestic consumer less than cost is one which has grown up over many years and it would be very difficult to reverse this anomaly. Nevertheless in the long term I believe that the aim should be to equalise the tariffs.

The normal electricity authority pays two-thirds of the purchase price of electricity in respect of demand so that in most cases the simple flat-rate tariff is inequitable. To overcome this inequity one can resort to a two-block tariff but the difficulty here is in determining the most suitable size for the initial block.

In the two-block tariff the starting point of the second block is usually determined by sociological instead of cost considerations. The fixed charges should be recouped in the first block but if this block is set too high then the smaller consumers could in fact only be consuming half the kW.h; the first block would be subsidised by the large consumers.

My Council introduced a circuit-breaker tariff just over two years ago which is used by the smaller consumer with a demand of up to 65 kV. A. While I will agree that the consumer may initially be inconvenienced by spurious tripping until he establishes the correct size of mcb, this tariff does ensure that the supply authority is reimbursed on a pro-rata basis according to the consumer's potential demand. I am of the opinion that if the mcb charge is set at a realistic value, this tariff undoubtedly has the effect of reducing individual demand and thus improving system load factor.

Mr Pretorius sounded a note of warning that off-peak tariffs could create embarrassing peaks at the most unexpected times.

#### P.J. BOTES – ROODEPOORT

Ek wil beklemtoon, elke dorp en stad leef; het sy eie leefwyse – en die tarief is nie 'n dooie artikel waarop 'n vaste prys geplaas kan word nie. Daar is ook die kwesie van die standaard van diens wat gelewer word, dit het 'n koste komplement en daarvoor moet voorsiening in die tariefstruktuur gemaak word.

#### MR PALSER – CAPE TOWN

In reply to a question from Mr Andrews of Walvis Bay, explained why the room base charge for domestic consumers was now considered unnecessary. Individual domestic loads all tend to peak about the same time. Individual demands and Unit Consumption have been found to be proportional and can therefore be consolidated into a simple flat charge.

Cape Town has dropped the 70% minimum charge in respect of the highest maximum demand. This charge created administrative difficulties and was the cause of discontent, particularly with consumers who had their peak in the summer months, such as cold storage for the fishing industry, which did not contribute to the city's overall maximum demand which occurred in winter.

With regard to Mr Davidson's difficulties of being in an area embracing four different ESCOM undertakings, this should not prevent one from having a common basic tariff structure but applying the different ESCOM charges to that tariff.

### Closing Session – Afsluitingsitting

#### THE MAYOR, COUNCILLOR ALAN GADD, MPC

Meneer die President, geëerde gaste, afgevaardigdes, dames en here, u is nou reeds drie dae besig om in hierdie saal die toekoms van elektrisiteit vir sover dit plaaslike bestuur dwarfs deur die Republiek van Suid-Afrika raak, te oorweeg en te bespreek.

You have no doubt during this time discussed many issues of which I am sure some have been highly controversial whilst others have been the normal run of the mill topics.

I have no doubt in my mind that there has been a lot which you have learnt at this convention, and I dare say there has been a lot with which some of you may have disagreed, but I believe one point is paramount.

Ek het dikwels gesê dat Johannesburg 'n stad van mense is, net soos Suid-Afrika 'n land van mense is, en dis die mense van hierdie land wat die hart en siel van die land self is.

U onderwerp, Elektrisiteit, moet nie deur politieke verskille geraak word nie en u moet in die belang van plaaslike besture in die hele Suid-Afrika saamwerk tot voordeel van hierdie land se toekoms.

If during these deliberations you have learnt to accept only one or two points which may be new to your thinking, then this convention would have been a great success.

The next two years insofar as your association is concerned will certainly be a most important one in the history of our country. Those of us who are classified as ordinary citizens, know that as long as associations such as yourselves keep meeting and discussing the various topics, the solutions of the problems must of necessity be found.

On behalf of all the citizens of Johannesburg, may I hasten to add it was indeed a pleasure having you in our city, and I sincerely trust that we will not wait another 24 years before we can be your hosts.

Mr President, may I take this opportunity today of wishing all your delegates and their respective families a safe return home and as I said at my opening address, I trust that they will all return with fond memories of Johannesburg, our city of gold.

#### MR J. MORRISON – HONORARY MEMBER

Meneer die President, meneer die Burgemeester, dames en here, as 'n ywerige bewonderaar van die beeldskone dames teenwoordig, het ek die versoek om namens hulle te praat, as 'n groot eer beskou en baie ernstig opgeneem, en gedurende die afgelepe paar weke het ek dus 'n

intensiewe studie gedoen van die eienskappe wat vrouens so aanloklik maak vir mans.

Now in case you jump to the wrong conclusions, let me hasten to explain that I am seeking the reason a youth, in the prime of his independence, should suddenly desert his drinking pals, to hitch up with a member of the opposite sex for a best friend.

This trend is quite contrary to my earlier findings which reveal that a man's best friend is not a girl at all – but a dog! This fact is amply evinced by my old friend Mat Diddlecote, who was taking an evening stroll during one of those International Conferences, when he wandered off the straight and narrow to plunge up to his neck in deep snow. In vain he struggled and shouted for help and had just given up all hope of rescue, when he saw a large St Bernard paddling towards him with a little barrel of brandy tied under his neck.

"Oh thank goodness!" he cried, "here come's man's best friend ... and, look at the enormous dog that's carrying it!"

On the other hand I was equally distressed to learn that diamonds and not we magnificent men, are a girl's best friend! This means that all those T.V. advertisements showing a young man grabbing a bunch of flowers to win the heart of a sweet smelling damsel who uses MUSK perfume, are phoney – he should be showering her with rocks, as did a certain Gordon Selfridge, the store tycoon, who had a crush on one of the Dolly Sisters. I am sure you will remember her as the original good time that was had by all! Anyway his bizarre gift was a fine 4 carat blue diamond that was set into the shell of a tortoise, so that she could take her very special prize for walks. The moral being, that the best way to approach a lady with a past is with a present.

But what of the lovely charmers who have stolen our hearts away – the ladies who divide our sorrows, double our joys and treble our expenses? Whilst it is an established fact that women definitely do make the best wives, however did they manage to catch such a hard bitten bunch of morons such as you lot!

Was it their beauty? Of course – or that silk jersey dress that held tight going round the curves? Well perhaps – or even the eager acceptance of your smug opinions? Whatever the subtle strategy employed, they overwhelmed our defences and completely captured us ... and didn't we love it.

The other day, I was explaining to my son the secret of married bliss. "To avoid argument", I said, "you must let your wife have the last word on all minor questions, whilst you decide the major ones."

"That's terrific" he replied, "but how do you know which category the question fits? What things are minor for instance?"

"Oh things such as ... Where we'll live ... or where I'll work ... or where we will go on holiday. She decides minor things like that."

"But Dad, if these are the minor questions, whatever are the major ones?"

"Well, for example ... whether we should play Ray Mordt on the left wing?"

"Things like that are major."

This worldly advice is sweetened by my happy doggerel:

*Here's to women, the sweetheart or wife  
The delight of our fireside by night or by day,  
Who never does anything wrong in her life  
Except when insisting to have her own way.*

But as we become older and the flush of youth passes, so we grow closer and enjoy life more fully each day.

Wasn't it Maurice Chevalier who said ... "When you hit 70, you eat better, sleep sounder and feel more active than when you were 30. Which all goes to show that it is healthier to have women on your mind than one on your knees."

Thus, with our beautiful ladies very much on my mind, may I sum up my studies by saying:

*It is not fair to visit all  
The blame on Eve for Adams fall,  
The most she did was to display  
Contributory neglect.*

Mr President, I fear that I have been carried away by the inspiration of my subject and have strayed from my main duty of thanking those who have made this Convention such a memorable occasion for our ladies.

To the Mayoress for her kind and generous hospitality ... to the staff of the Johannesburg Electricity Department for making the superb arrangements ... and especially to Iona Barnard for all the trouble she has taken in organising such a wonderful programme ... Our very sincere thanks.

And now as we come to the close, our ladies are already looking forward to the next Convention and hope that they will again have the opportunity of adding just that extra sparkle of precious gems to your deliberations.



## MR PETER MULLER - ON BEHALF OF THE AFFILIATES

Meneer die President ek voel geëerd dat u my die voorreg aangebied het om hierdie benydenswaardige taak te hanteer waardeur ek die geleentheid aangebied is om namens die geaffilieerde lede die afsluitingsboodskap te bring. Meneer, ek doen dit graag met voorbehoud. U moet beseft dat u 'n rede te lewer voor 'n uitgesoekte gehoor soos die, namens soveel toonaangewende organisasies inderdaad 'n voorreg is.

Mag ek ter aanvang, meneer die President, my hartlike gelukwense namens die geaffilieerde lede aan u en u komitee oordra vir die voortreflike wyse waarop u hierdie suksesvolle konferensie georganiseer het. Hierdie konferensie getuig van die besondere tradisie van die vereniging vir munisipale elektriese ondernemings.

Gedurende die afgelope drie dae het almal van ons hier teenwoordig kennis opgedoen met betrekking tot die veskie fasette van die elektrotegniese disipline. Die besondere gehalte van die aanbringende getuig van die hoë standarde wat gestel word deur die VMEÖ.

Ons, as die geaffilieerde lede was bevoorreg om deel te kon hê aan die verrigtinge en ons hoop meneer dat ons bydrae hier ook kon strek tot voordeel van u lede.

Die wedsydse kommunisering van idees en ondervinding op hierdie gebied kan slegs tot voordeel wees en dit is miskien die mees betekenisvolle bydrae wat gelewer kon word deur hierdie konferensie. Verder die feit dat hierdie konferensie 'n platform vorm vir nuwe konsepte is sekerlik van onskatbare waarde vir ons en u lede.

Die sukses van die afgelope drie dae, meneer die President, moet nie slegs gesien word teen die agtergrond van krag faktore en kilowatts nie, maar ook bereken word in terme van die kameradskap wat opgebou is tussen mense met 'n gemeenskaplike doel.

Sekerlik moet die samebinding van bande hier geag word as van waarde en die genotvolle sameen vir drie dae moet beskou word as die diening van 'n gemeenskaplike belang.

Meneer, die President, u moet geluk gewens word met die wyse waarop u hierdie konferensie gehanteer het. Onder u leierskap is die tegniese besprekinge gestimuleer, u teenwoordigheid by die sosiale funksies het dit verryk, en u entoesiasme vir die onderwerp onder bespreking was 'n sprekende voorbeeld vir almal van ons.

Mr President, when asked to give the closing address on behalf of the affiliates, I realised that I was in fact an affiliate. Being ignorant of the exact meaning of "Affiliates" I consulted the Oxford Concise Dictionary - I quote "affiliate - adopt, attach, to connect with ... fix paternity of illegitimate child ... for purpose of maintenance." It is in terms of this last definition that I think we are normally thought of. In fact we may often be referred to as illegitimate children - no doubt by another expression - no doubt often with just cause. But Mr President, may we have a serious talk with you on this question of maintenance.

In considering the AMEU I am often reminded of my old school motto - "Lustorum Semita Lux Splendens" - for those without the benefit of a Western Transvaal Education, this translates as - "The path of the just is like a shining light". No doubt an able Latin scholar could rearrange this more suitably for the AMEU, to read - "The shining light in the path is just." Because, Mr President, the labours of your association and members are in a just cause. You are responsible for supplying light and power in our homes, shops, offices and factories. What you do epitomises Western civilisation. Your members, Mr President, can be

proud of their contribution to our way of life in South Africa - they truly battle on in a just and noble cause - and we, the affiliates are honoured and privileged to be your auxiliary and logistic support in this battle.

Finally, Mr President, may I again convey our heartiest congratulations on a most successful conference and may we all wish you and Iona a very successful and satisfying two years in office. - Thank you.

## JAN LOUBSER - AANGEWSE-PRESIDENT

Mnr die President, na afluop van 'n baie suksesvolle Konvensie, en nadat u al die bedankings gedoen het, bly daar een persoon oor wat nog nie bedank is nie, nl. self.

Eerstens wil ons aan u dankie sê vir die besonder waardige manier waarop u hierdie vergadering gelei het. Met u gewone sin vir humor en u besondere diplomatiek het u daarin geslaag om ons almal gelukkig te laat voel.

Glo my, as u "eppie" het ek baie geleer. Tweedens, vir al die reëlings wat self getref het. Almal van ons wat die "buitemure" funksies kon bywoon is beïndruk met die reëlings wat u getref het. Ons weet u groot personeel het bygedra en ons wil hulle ook almal dankie sê, maar per slot van sake was u die brein agter al die reëlings.

Derdens, sê ons dankie dat u daarin kon slaag om u Raad te oordeel om vir ons verslyb in u stad so aangenaam te maak. Dra dan asseblief ook ons dank oor aan die Stadsraad van Johannesburg daarvoor.

Vierdens moet ons u gelukwens dat u 'n vrou soos Iona kon trou. Sy het dit vir ons egeenotes so aangenaam gemaak dat hulle nie kan uitgepraat raak daaroor nie, maar ek weet hulle sal wel vir haar dankie sê op 'n gepaste manier.

Tenslotte, mnr die President, d.w.s. namens almal teenwoordig, baie dankie vir 'n baie aangename Konvensie.

## MR BARNARD

Mr Barnard closed the proceedings by firstly expressing his mixed feelings of regret that the Convention was over, and relief that it had gone off so successfully.

He thanked the Mayor and Mayoress for gracing the meeting with their presence and in particular the Mayoress for hosting the very successful ladies programme at the Mining Museum and the Civic Centre.

The excellent speakers had been thanked previously, but he reiterated his special thanks for their fine efforts.

The sponsors who had contributed so generously with the bags, folders and other items given to the delegates at registration, were individually acknowledged.

In advance, the Affiliates were thanked for the dinner/dance which all were looking forward to this evening.

At an occasion like this, one must not forget many who were involved in the organisation of the proceedings, the staff of the Wanderers Club, the many helpers to Mr Barnard's staff, the Secretary and a special thanks to his wife, who had stood by him and assisted so much.

After this Mr Barnard made presentations to the Mayoress, the helpers on his staff and in recognition of his ten years service to the AMEU, the secretary, Mr Bennie van der Walt.

Mr Barnard then wished all a safe journey home and the 1983 Convention was declared closed.

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MOSTERT, S.A.: Elektrotegniese Ingenieur, Posbus 19, George 6530.  
MOSTERT, A.H.: Posbus 53, Swakopmund 9180.  
MURPHY, K.J.: Municipal Electrical Engineer, P.O. Box 19, Somerset West 7130.  
MYBURGH, H.: Elektrotegniese Ingenieur, Posbus 4, Kuruman 8460.

N

NEL, J.T.F.: Elektrotegniese Stadsingenieur, Posbus 33, King Williamstown 5600.  
NORTJE, G.J.: Elektrotegniese Stadsingenieur, Posbus 145, Germiston 1400.

O

ODENDAAL, M.W.: Elektrotegniese Stadsingenieur, Posbus 4, Alberton 1450.

P

PAGEL, P.V.E.: Elektrotegniese Ingenieur, Munisipaliteit Plettenbergbaai 6600.  
PALSER, D.C.: City Electrical Engineer, P.O. Box 82, Cape Town 8000.  
PEENS, J.G.: Dorpsingenieur, Posbus 24, Carolina 1185.  
PETERS, A.G.: Town Electrical Engineer, P.O. Box 278, Gwelo, Harare.  
PIENAAR, J.F.: Dorps- en Elektrotegniese Ingenieur, Posbus 10, Glencoe 2930.  
PIETERSE, A.C.: A/Raad Suid-OVS, Posbus 2313, Bloemfontein 9300.  
PIKE, E.: P.O. Box 57, Vryheid 3100.  
POLLOCK, T.: Electrical Engineer, P.O. Box 3, Gordon's Bay 7150.  
POTGIETER, D.E.T.: Elektrotegniese Stadsingenieur, Posbus 14103, Verwoerdburg 0140.  
PRETORIUS, E. DE E.: Elektrotegniese Stadsingenieur, Posbus 113, Potchefstroom 2520.  
PRETORIUS, P.J.R.: Elektrotegniese Stadsingenieur, Posbus 35, Vryburg 8600.  
PRITCHARD, M.R.: Elektrotegniese Ingenieur, Privaatsak X7, Virginia 9430.  
PURDON, D.: Town Electrical Engineer, P.O. Box 67, Phalaborwa 1390.

R

RATTEY, W.P.: Electrical Engineer, P.O. Box 3 Strand 7140.  
RAUTENBACH, G.F.: Elektrotegniese Ingenieur, Posbus 99, Klerksdorp 2570.  
RHEEDER, R.J.B.: Posbus 41, Cathcart 5310.  
ROBSON, K.G.: City Electrical Engineer, P.O. Box 529, East London 5200.  
ROHRBECK, W.D.: Posbus 39, Hoopstad 2670.  
ROODT, J.S.G.: Posbus 26, Reitz 9810.  
ROSSOUW, G.T.: Posbus 241, Kempdorp 8550.

S

SMALL, C.T.R.: Town Electrical Engineer, P.O. Box 9, Beaufort West 6970.  
SMITH, F.H.: Electrical Engineer, P.O. Box 42, Despatch 6220.  
STAPELTON, R.: Borough & Electrical Engineer, P.O. Box 37, Eshone 3815.  
STRAUSS, J.C.: Elektrotegniese Ingenieur, Posbus 60, Sasolburg 9570.  
SWART, J.C.P.: Posbus 29, Veldrif 7365.  
SWART, T.L.: Elektrotegniese Ingenieur, Posbus 10, Glencoe 2930.

T

TEN CATE, J.I.: Elektrotegniese Stadsingenieur, Posbus 67, Phalaborwa 1390.  
TRAUTMAN, E.P.E.W.: Electrical Engineer, P.O. Box 29, Lady-smith 3370.  
THERON, T.A.: Stads- en Elektrotegniese Ingenieur, Posbus 48, Ermelo 2350.  
TURNBULL, A.F.: Town Electrical Engineer, P.O. Box 35, Vereeniging 1930.

V

VAN DEN BERG, A.J.: Elektrotegniese Ingenieur, Posbus 94, Krugersdorp 1740.  
VAN DER MERWE, D.S.: Elektrotegniese Ingenieur, Posbus 3, Witbank 1035.  
VAN DER MERWE, F.J.: Elektrotegniese Ingenieur, Posbus 3, Carletonville 2400.  
VAN DER MERWE, G.: Posbus 96, Louis Trichardt 0920.  
VAN DER MERWE, P.J.: Stads & Elektrotegniese Ingenieur, Posbus 20, Stilfontein 2550.  
VAN DER SCHYFF, G.W.: Stadsingenieur, Posbus 3, Bethal 2031.  
VAN DER WALT, F.S.P.: Privaatsak 5005, Kimberley 8300.  
VAN DER WALT, P.S.: Posbus 3, Bultfontein 9670.  
VAN NIEKERK, P.J.S.: Borough Electrical Engineer, P.O. Box 21, Newcastle 2940.  
VAN ROOYEN, H.E.: Dorps- Waterwerk en Elektrotegniese Ingenieur, Munisipaliteit, Kirkwood 6120.  
VAN TONDER, C.J.: Elektrotegniese en Werktuigkundige Ingenieur, Posbus 21, Odendaalsrus 9480.  
VAN WYK, A.A.: Elektrotegniese Ingenieur, Posbus 45, Nelspruit 1200.  
VENTER, G.A.: Elektrotegniese Ingenieur, Posbus 9, Meyerton 1960.  
VENTER, J.A.: Posbus 90, Thabazimbi 0380.  
VELDSMAN, D.E.: Elektrotegniese Ingenieur, P/Sak X7, Goodwood 7460.  
VIDLER, J.A.: P.O. Box 21, Jeffreys Bay 6330.  
VON AHLFTEN, J.K.: Elektrotegniese Ingenieur, Posbus 45, Springs 1560.  
VOSLOO, C.: Posbus 628, Kimberley 8300.

W

WEAKLEY, S.L.: P.O. Box 24, Cradock 5880.  
WHEELER, D.J.: Posbus 13, Burgersdorp 5520.

Y

YOUNG, J.J.: Posbus 15, Groot-Brakrivier 6252.

#### ASSOCIATE MEMBERS - ASSOSIAATLEDE

B

BAILEY, R.V.: Acting Electrical Engineer, P.O. Box 72, Stanger 4450.  
BECK, H.D.: Deputy City Electrical Engineer, P.O. Box 529, East London 5200.  
BOSCH, L.A.: Elektrotegniese Superintendent, Posbus 13, Burgersdorp 5520.  
BOTHIA, J.N.: Posbus 1, Fochville 2515.  
BRINK, H.J.: Groeningsingenieur, Posbus 288, Bloemfontein 9300.

C

CARMICHAEL, T.R.: Assistent Electrical Engineer, P.O. Box 39, Pietermaritzburg 3200.  
CLOETE, D.J.: Posbus 99, Klerksdorp 2570.  
COOPER-CHADWICK, L.: P.O. Box 57, Germiston 1400.

D

DE BEER, W.H.: Adjunk-Elektrotegniese Stadsingenieur, Posbus 48, Warmbad 0480.  
DU PLESSIS, C.J.: Posbus 868, Kempton Park 1620.  
DU PLESSIS, G.C.: Adjunk-Elektrotegniese Stadsingenieur, Posbus 94, Krugersdorp 1740.

E

ERASMUS, P.R.: Posbus 2, Secunda 2302.

F

FLETCHER, J.L.: Deputy City Electrical Engineer, P.O. Box 147, Durban 4000.

**G**  
GOWIE, D.: P.O. Box 35, Matatiele 4730.

**H**  
HILL, D.R.: City Electrical Dept., P.O. Box 147, Durban 4000.  
HOBBS, J.L.: Deputy Electrical Engineer, P.O. Box 45, Uitenhage 6230.

**L**  
LAMPRECHT, B.C.: Privaatsak X014, Benoni 1500.  
LEIGH, R.A.: Deputy Electrical Engineer, P.O. Box 699, Johannesburg 2000.  
LIEBENBERG, H.D.G.: Posbus 64, Ladybrand 9745.

**M**  
MALAN, J.G.: Assistent Elektrotegniese Ingenieur, Posbus 13, Kempton Park 1620.  
MULDER, J.A.C.: Posbus 60, Piketberg 7320.

**O**  
OPPERMAN, D.J.: Adjunk-Elektrotegniese Ingenieur, Posbus 45, Springs 1560.

**P**  
PEENS, J.G.: Posbus 6, Wesselsbron 9680.  
PRETORIUS, J.W.: Assistent-Elektrotegniese Ingenieur, Posbus 23, Nigel 1490.

**S**  
SMIT, A.H.: Posbus 3, Bethal 2310.  
SMIT, A.H.: Hoof Elektrisiën, Heilbron Munisipaliteit, Heilbron 9650.  
SMIT, J.J.: Assistent-Elektrotegniese Ingenieur, Posbus 3, Witbank 1035.  
SMITH, A.M.: 22 Bournemouth Street, Summerstrand, Port Elizabeth 6001.  
SURTREES, E.H.: Deputy Town Engineer, P.O. Box 215, Boksburg 1460.

**V**  
VAN DER WALT, C.J.: Privaatsak X014, Benoni 1500.  
VAN SCHALKWYK, A.P.: Assistent-Elektrotegniese Stadsingeneur, Posbus 288, Bloemfontein 9300.  
VENTER, J.A.: Posbus 82, Kaapstad 8000.

#### LOCAL AUTHORITIES – PLAASLIKE BESTURE

**A**  
The Town Clerk, P.O. Box 38, Adelaide 5760.  
Die Hoofdirekteur, Administrasieraad Hoëveldgebied, Posbus 520, Witbank 1035.  
Die Hoofdirekteur, Administrasieraad Sentraal Tvl, Privaatsak X449, Pretoria 001.  
Die Hoofdirekteur, Administrasieraad Suid-Transvaal, Privaatsak X2016, Standerton 2430.  
Die Hoofdirekteur, Administrasieraad Oos-Kaap, Posbus 14025, Sidwell 6061.  
Die Hoofdirekteur, Administrasieraad Oos-Transvaal, Posbus 888, Nelspruit 1200.  
Die Hoofdirekteur, Administrasieraad Oranje-Vaal, Privaatsak X029, Vanderbijlpark 1900.  
Die Hoofdirekteur, Oos-Randse Administrasieraad, Posbus 57, Germiston 1400.  
Die Hoofdirekteur, Administrasieraad Suid-OVS, Posbus 2313, Bloemfontein 9300.  
Die Hoofdirekteur, Administrasieraad Noord-Kaap, Privaatsak X5005, Kimberley 8300.  
Die Hoofdirekteur, Administrasieraad Wes-Kaap, Privaatsak X7, Goodwood 7460.  
Die Hoofdirekteur, Wes-Randse Administrasieraad, Posbus 4414, Johannesburg 2000.  
The Town Clerk, P.O. Box 46, Aliwal North 5530.  
The Town Clerk, P.O. Box 4, Alberton 1450.

**B**  
The Town Clerk, P.O. Box 33, Barberton 1300.  
The Town Clerk, P.O. Box 9, Beaufort West 6970.  
The Town Clerk, P.O. Box 3, Bedfordview 2008.  
The Town Clerk, P.O. Box 45, Benoni 1500.  
The Town Clerk, P.O. Box 3, Bethal 2310.  
The Town Clerk, P.O. Box 130, Bethlehem 9700.  
The Town Clerk, P.O. Box 288, Bloemfontein 9300.  
The Town Clerk, P.O. Box 215, Boksburg 1460.  
The Town Clerk, P.O. Box 10, Bonnievale 6730.

The Town Clerk, P.O. Box 12, Bothaville 9660.  
The Town Clerk, P.O. Box 15, Brakpan 1540.  
Die Stadsklere, Posbus 13, Brandfontein 9400.  
The Town Clerk, P.O. Box 51, Bredasdorp 7280.  
The Town Clerk, P.O. Box 106, Brits 0250.  
The Town Clerk, P.O. Box 13, Burgersdorp 5520.  
Die Stadsklere, Posbus 3, Bultfontein 9670.

**C**  
The Town Clerk, P.O. Box 82, Cape Town 8000.  
The Town Clerk, P.O. Box 3, Carletonville 2500.  
The Town Clerk, P.O. Box 10, Carnarvon 7060.  
The Town Clerk, P.O. Box 24, Carolina 1185.  
The Town Clerk, P.O. Box 35, Cathcart 5310.  
The Town Clerk, P.O. Box 44, Ceres 6835.  
The Town Clerk, P.O. Box 24, Cradock 5880.

**D**  
Die Stadsklere, Posbus 43, Danielskuil 8405.  
The Town Clerk, P.O. Box 42, De Aar 7000.  
The Town Clerk, P.O. Box 6, Delmas 2210.  
Die Stadsklere, Posbus 42, Despatch 6220.  
The Town Clerk, P.O. Box 13, Dewetsdorp 9940.  
Die Stadsklere, Posbus 27, Douglas 8730.  
The Town Clerk, P.O. Box 36, Duiwelskloof 0835.  
The Town Clerk, P.O. Box 76, Dundee 3000.  
The Town Clerk, P.O. Box 147, Durban 4000.  
The Secretary, Divisional Council of the Cape, P.O. Box 1073, Cape Town 8000.

**E**  
The Town Clerk, P.O. Box 134, East London 5200.  
The Town Clerk, P.O. Box 25, Edenvale 1610.  
The Town Clerk, Private Bag, Empangeni 3880.  
The Town Clerk, P.O. Box 48, Ermelo 2350.  
The Town Clerk, P.O. Box 37, Eshoew 3815.  
The Town Clerk, P.O. Box 15, Estcourt 3310.  
The Town Clerk, P.O. Box 55, Evander 2280.

**F**  
The Town Clerk, P.O. Box 1, Fochville 2515.  
The Town Clerk, P.O. Box 36, Fort Beaufort 5720.  
Die Stadsklere, Posbus 2, Frankfort 9830.

**G**  
The Town Clerk, P.O. Box 19, George (C.P. 6530).  
The Town Clerk, P.O. Box 145, Germiston 1400.  
The Town Clerk, P.O. Box 10, Glencoe 2930.  
The Town Clerk, P.O. Box 33, Gobabis 9140.  
The Town Clerk, P.O. Box 3, Gordons Bay 7150.  
The Town Clerk, P.O. Box 72, Graaf-Reinet 6280.  
The Town Clerk, P.O. Box 176, Grahamstown 6140.  
The Town Clerk, P.O. Box 71, Greytown 3500.  
Die Stadsklere, Posbus 15, Groot-Brakrivier 6525.

**H**  
Die Stadsklere, Posbus 83, Hartswater 8570.  
The Town Clerk, P.O. Box 201, Heidelberg 2400.  
Die Stadsklere, Munisipaliteit, Heilbron 9650.  
Die Stadsklere, Posbus 29, Hennenman 9445.  
The Town Clerk, P.O. Box 20, Hermanus 7200.  
Die Stadsklere, Munisipaliteit, Hoopstad 2670.  
Die Stadsklere, Privaatsak X3, Hopetown 8750.  
The Town Clerk, P.O. Box 5, Howick 3250.

**J**  
Die Stadsklere, Posbus 241, Jan Kempdorp 8550.  
The Town Clerk, P.O. Box 21, Jeffreys Bay 6330.  
The Town Clerk, P.O. Box 1049, Johannesburg 2000.

**K**  
The Town Clerk, P.O. Box 174, Kakamas 8870.  
The Town Clerk, P.O. Box 25, Keetmanshoop 9020.  
The Town Clerk, P.O. Box 13, Kempton Park 1620.  
The Town Clerk, P.O. Box 15, Kenhardt C.P. 8900.  
The Town Clerk, P.O. Box 194, Kimberley 8300.  
The Town Clerk, P.O. Box 33, Kingwilliamstown 5600.  
The Town Clerk, P.K. Kirkwood 6120.  
The Town Clerk, P.O. Box 160, Klerksdorp 2570.  
The Town Clerk, P.O. Box 21, Knysna 6570.  
Die Stadsklere, Posbus 7, Koffiefontein 9986.  
The Town Clerk, P.O. Box 6, Kokstad 4700.  
The Town Clerk, P.O. Box 21, Komga 4950.  
The Town Clerk, P.O. Box 14, Koppies 9540.  
The Town Clerk, P.O. Box 302, Kroonstad 9500.  
The Town Clerk, P.O. Box 94, Krugersdorp 1740.  
The Town Clerk, P.O. Box 4, Kuruman 8460.



**L**

The Town Clerk, P.O. Box 64, Ladybrand 9745.  
 The Town Clerk, P.O. Box 29, Ladysmith 3370.  
 The Town Clerk, P.O. Box 7, Lichtenburg 2740.  
 The Town Clerk, P.O. Box 6, Lydenburg 1120.

**M**

The Town Clerk, P.O. Box 42, Mafikeng 8670.  
 The Town Clerk, P.O. Box 35, Matielé 4730.  
 The Town Clerk, P.O. Box 11, Melmoth 3835.  
 The Town Clerk, P.O. Box 9, Meyerout 1960.  
 The Town Clerk, P.O. Box 55, Middelburg C.P. 5900.  
 The Town Clerk, P.O. Box 14, Middelburg Tvl. 1050.  
 The Town Clerk, P.O. Box 47, Mooi River 3200.  
 The Town Clerk, P.O. Box 25, Mossel Bay 6500.  
 The Town Clerk, P.O. Box 24, Montagu 6720.

**N**

The Town Clerk, P.O. Box 45, Nelspruit 1200  
 The Town Clerk, P.O. Box 21, Newcastle 2940.  
 The Town Clerk, P.O. Box 23, Nigel 1490.  
 Die Stadsclerk, Privatsak 1008, Nylstroom 0510.

**O**

The Town Clerk, P.O. Box 21, Oordenaar 9480.  
 The Town Clerk, P.O. Box 34, Orkney 2620.  
 The Town Clerk, Private Bag 2209, Otjiwarongo S.W.A. 9210.  
 The Town Clerk, P.O. Box 255, Oudstroom 6620.

**P**

The Town Clerk, P.O. Box 12, Paarl 7620.  
 The Town Clerk, P.O. Box 359, Parys 9585.  
 Die Stadsclerk, Posbus 12, Petrus Steyn 9640.  
 The Town Clerk, P.O. Box 67, Phalaborwa 1390.  
 The Town Clerk, P.O. Box 321, Pietermaritzburg 3200.  
 The Town Clerk, P.O. Box 111, Pietersburg 0700.  
 The Town Clerk, P.O. Box 23, Piet Retief 2380.  
 The Town Clerk, Municipality, Piketberg 7320.  
 The Town Clerk, P.O. Box 26, Plettenbergbaai 6600  
 The Town Clerk, P.O. Box 13, Port Alfred 6170.  
 The Town Clerk, P.O. Box 116, Port Elizabeth 6000.  
 The Town Clerk, P.O. Box 5, Port Shepstone 4240.  
 The Town Clerk, P.O. Box 5, Postmasburg 8420.  
 The Town Clerk, P.O. Box 113, Potchefstroom 2520.  
 The Town Clerk, P.O. Box 34, Potgietersrus 0600.  
 The Town Clerk, P.O. Box 440, Pretoria 0002.  
 The Head, Peri Urban Area Health Board, P.O. Box 1341, Pretoria 0001.  
 Die Stadsclerk, Posbus 16, Prieska 8940.

**Q**

The Town Clerk, P.O. Box 113, Queenstown 5320.

**R**

The Town Clerk, Private Bag 1, Randburg 2125.  
 The Town Clerk, P.O. Box 139, Randfontein 1760.  
 Die Stadsclerk, Posbus 26, Reitz 9810.  
 The Town Clerk, Private Bag, Richards Bay 3900.  
 The Town Clerk, P.O. Box 29, Riversdale 6770.  
 The Town Clerk, P.O. Box 52, Robertson 6705.  
 The Town Clerk, P.O. Box 217, Rooxepoort 1725.  
 The Town Clerk, P.O. Box 16, Rustenburg 0300.

**S**

The Town Clerk, P.O. Box 78001, Sandton 2146.  
 The Town Clerk, P.O. Box 60, Sasolburg 9570.  
 Die Stadsclerk, Munisipaliteit, Secunda 2302.  
 Die Stadsclerk, Posbus 20, Senekal 9600.  
 The Town Clerk, P.O. Box 21, Somerset East 5850.  
 The Town Clerk, P.O. Box 19, Somerset West 7130.  
 The Town Clerk, P.O. Box 45, Springs 1560.  
 The Town Clerk, P.O. Box 66, Standerton 2430.  
 The Town Clerk, P.O. Box 72, Stanger 4450.  
 The Town Clerk, P.O. Box 17, Stellenbosch 7600.  
 Die Stadsclerk, Posbus 20, Stilfontein 2550.  
 The Town Clerk, P.O. Box 3, Strand 7140.  
 The Town Clerk, P.O. Box 53, Swakopmund 9180.  
 The Town Clerk, P.O. Box 2, Stutterheim 4930.  
 The Town Clerk, P.O. Box 20, Swellendam 6740.

**T**

The Town Clerk, P.O. Box 21, Tarkastad 5370.  
 The Town Clerk, P.O. Box 90, Thabazimbi 0380.  
 The Town Clerk, P.O. Box 33, Tongaat 4400.  
 The Town Clerk, P.O. Box 24, Tzaneen 0850.

**U**

The Town Clerk, P.O. Box 45, Uitenhage 6230.

The Town Clerk, P.O. Box 57, Umata 5100.

The Town Clerk, P.O. Box 17, Upington 8800.

**V**

The Town Clerk, P.O. Box 3, Vanderbijlpark 1900.  
 Die Stadsclerk, Posbus 29, Veldrifi 7365.  
 The Town Clerk, P.O. Box 35, Vereeniging 1930.  
 The Town Clerk, P.O. Box 14013, Verwoerdburg 0140.  
 The Town Clerk, P.O. Box 37, Viljoenskroon 9520.  
 The Town Clerk, P.O. Box 156, Virginia 9430.  
 The Town Clerk, P.O. Box 48, Volksrust 2470.  
 Die Stadsclerk, Posbus 155, Vrede 2455.  
 The Town Clerk, Private Bag, Vredenburg-Saldanha 7380.  
 The Town Clerk, Municipality, Vredendal 8160.  
 The Town Clerk, P.O. Box 35, Vryburg 4600.  
 The Town Clerk, P.O. Box 57, Vryheid 3100.

**W**

The Town Clerk, P.O. Box 10, Warrenton 8530.  
 The Town Clerk, P.O. Box 86, Warrata Bay 9190.  
 The Town Clerk, P.O. Box 48, Warmbad 0480.  
 The Town Clerk, P.O. Box 12, Wellington 7655.  
 The Town Clerk, P.O. Box 708, Welkom 9460.  
 Die Stadsclerk, Posbus 31, Wepener 9944.  
 Die Stadsclerk, Posbus 6, Wesselsbron 9680.  
 The Town Clerk, P.O. Box 19, Westonaria 1780.  
 The Town Clerk, P.O. Box 26, Winburg 9420.  
 The Town Clerk, P.O. Box 1055, Windhoek 9100.  
 The Town Clerk, P.O. Box 3, Witbank 1035.  
 The Town Clerk, P.O. Box 2, Wit Rivier 1240.  
 The Town Clerk, P.O. Box 17, Wolmaranstad 3630.  
 The Town Clerk, Private Bag X3046, Worcester 6850.

**Z**

Die Stadsclerk, Munisipaliteit, Zaarstron 9950.

**AFFILIATE MEMBERS - GEAFFLIEERDE LEDE****A**

ABERDARE CABLES AFRICA LTD: P.O. Box 494, Port Elizabeth 6000. Tel.: (041) 45331.  
 AECI LTD: P.O. Box 1122, Johannesburg 2000. Tel.: 975-8111.  
 AEG TELEFUNKEN (PTY) LTD: P.O. Box 10264, Johannesburg 2000. Tel.: 786-3400.  
 AFRICAN CABLES LTD: P.O. Box 172, Vereeniging 1930. Tel.: (016) 45821.  
 AFRICAN ELECTRIC (PTY) LTD: P.O. Box 14040, Wadeville 1407. Tel.: 348717.  
 ALUSAF: P.O. Box 284, Empangeni 3880. Tel.: (0351) 51111.  
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 ASEA ELECTRIC (PTY) LTD: P.O. Box 691, Pretoria 0001. Tel.: (012) 79-7020.  
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 AYLIFFE CABLES LTD: P.O. Box 1558, Edenvalle 1610. Tel.: 609-4020.

**B**

BALLENDE & ROBB: P.O. Box 78734, Sandton 2146. Tel.: 783-10389.  
 BEKA (PTY) LTD: P.O. Box 120, Olifantsfontein 1665. Tel. (012) 611552.  
 BONNYCAN ELECTRIC CO. P.O. Box 10983, Johannesburg 2000. Tel.: 942-1110.  
 BOSAL AFRIKA (PTY) LTD: P.O. Box 1652, Pretoria 0001. Tel.: (012) 731171.  
 BOWTHORPE-HELLERMAN-DEUTSCH (PTY) LTD: P.O. Box 27063, Benrose 2011. Tel.: 614-1111.  
 BRIAN COLOUHOUN, O'DONNELL & PTNS. (PTY) LTD: P.O. Box 31757, Braamfontein 2017. Tel.: 39-4376.  
 BROWN BOVERI SA (PTY) LTD: P.O. Box 1500, Johannesburg 2000. Tel.: 836-5791.

**C**

CAHI, DE VRIES & BRINK: Posbus 26321, Arcadia 0007. Tel.: 26-3746.  
 CAHI, DE VRIES & BRINK: Posbus 1079, Bloemfontein 9300, Tel.: 78081.  
 CHARLES ELVEY AGENCIES (PTY) LTD: P.O. Box 8082, Johannesburg 2000. Tel.: 614-6541  
 CHANCE HARDWARE ASSEMBLERS (PTY) LTD: P.O. Box 1586, Pietermaritzburg 3200. Tel.: (0331) 72327.

CLINCSALES MAUGHAN BROWN & PTNRS: P.O. Box 196, Port Elizabeth. Tel.: (041) 29731.  
CLINCSAKES MAUGHAN BROWN & PTNRS: P.O. Box 570, Cape Town 8000.  
COHEN, BAHR LINDSELL & PTNRS: P.O. Box 87366, Houghton 2041. Tel.: 41-5610.  
COMPLETE CABLING EQUIPMENT (PTY) LTD: P.O. Box 107, Montrose, 2110. Tel.: 830-7029.  
CONRADIE, D.J.R. & VENNOTE, Posbus 17031, Groenkloof 0001. Tel.: 3-1755.  
CONRADIE, D.J.J. & VENTER: Posbus 1009, Bloemfontein 9300. Tel.: 7163677.  
CRABTREE J.A. (PTY) LTD: P.O. Box 413, Springs 1560. Tel.: 56-7911.  
CULLINAN ELECTRICAL, Private Bag 18, Olifantsfontein 1665. Tel.: (012) 612551.  
CU AL ENGINEERING (PTY) LTD: P.O. Box 18228, Dalbridge 4014. Tel.: (031) 210285.  
CUTLER-HAMMER (SA) LTD: P.O. Box 14089, Wadeville 1422. Tel.: 34-9124.

**D**  
DE VILLIERS & MOORE: Posbus 472, Durbanville 7550. Tel.: 96-3087.  
DREWETT, HUBBLE & POKORNY: P.O. Box 47270, Parklands 2121. Tel.: 788-5460.  
DU TOIT C.A. & PARTNERS: P.O. Box 4256, Pretoria 0001. Tel.: (012) 38991.  
DU TOIT C.A. & VENNOTE (SUID): Posbus 11347, Vlaeberg 8018. Tel.: 26541.  
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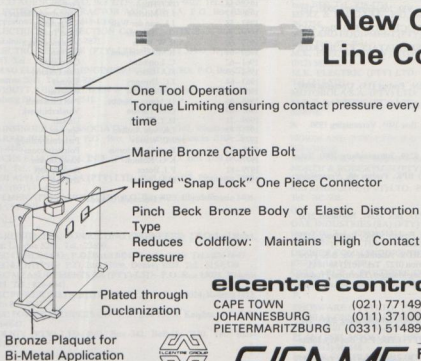
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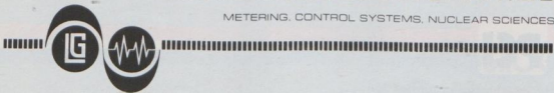
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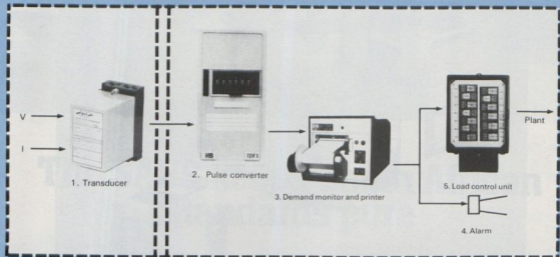
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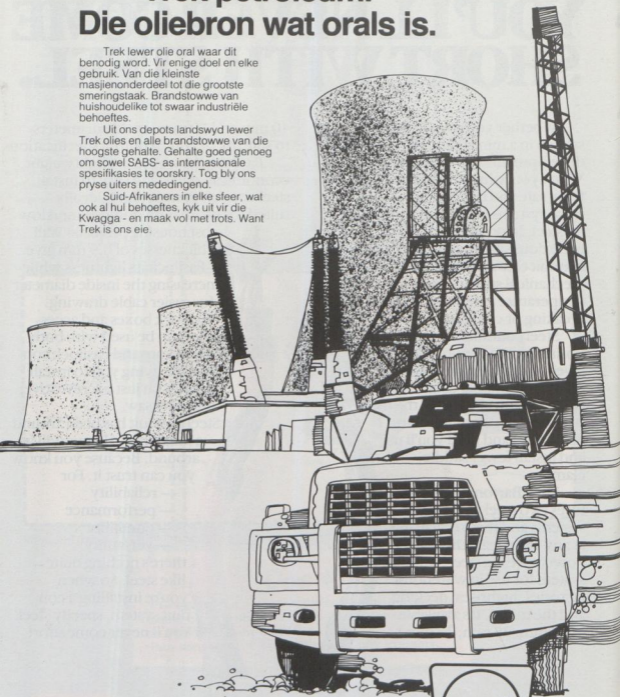
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## Electricity kills child

A Staff Reporter

A 7 year old child was electrocuted when he climbed a tree branch which fell on to the Weavers' Christ Church, Diana's Komme police station. The boy was injured and taken to hospital. Mrs J.C. was the wife of the boy's father and she was on the way to work when it rained and the power was cut off.

★ Safe

★ Anti vandal

★ Quick & easy to erect

★ No corrosion

★ Economical

★ Min. maintenance

★ Min. tree trimming

★ Good aesthetics

★ No cradling under HV

★ A.M.E.U. approved

### THE SOLUTION

INTEGRATED CABLE SYSTEM  
3 Power Cores    1 Lighting Core  
1 Neutral/Catenary Core  
SYSTEM VOLTAGE  
380 V, 3 phase  
SIZES  
85 mm<sup>2</sup> 70 mm<sup>2</sup> 50 mm<sup>2</sup> 35 mm<sup>2</sup>

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## SICAME

Fully approved insulated overhead system



## Even here, the new SF<sub>6</sub>-insulated ring main unit would operate maintenance free.

Siemens announces the new SF<sub>6</sub>-insulated, sealed metal ring main unit 8DJ, enclosed ring main unit 8DJ.

The new Siemens ring main unit is universally applicable.

Whether you need a ring main unit for cement industries, or for coal mines, for your city in the Drakensberg or in the mid-ele of the Karoo, the Siemens ring main unit 8DJ will meet your required performance.

Because it is completely imper-

vious to any climatic conditions

or altitude influences.

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member of the worldwide

proven family of switchgear

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800 kV the whole range is SF<sub>6</sub>-

insulated. Based on the most

up-to-date circuit-breaking

technology which is available

in air insulated versions.



**The new Siemens ring main unit is completely maintenance free.**

All switching chambers are

sealed and gastight. The com-

position of corrosion free

materials, the extremely long

SF<sub>6</sub> and the insulating gas

eliminate any problems with

mechanical and electrical life

need them.

**The new Siemens ring main unit is completely reliable and operationally safe.**

Once installed you can forget

it for years and years.

Because all live parts are

completely isolated from en-

vironmental conditions.

**Siemens: Switch to the future.**

**PPE**

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M.S.L. Floodlights - uses linear metal halide lamp to produce colour TV lighting for stadia or areas flood-lighting for industry and security lighting.



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C.S.I. Floodlights - high intensity symmetrical projector with compact iodide lamp designed to produce colour TV lighting for sports stadia.



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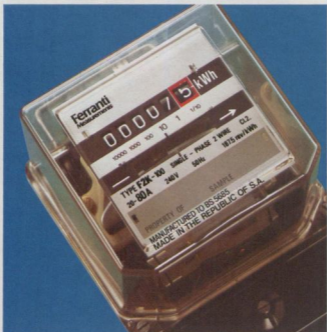
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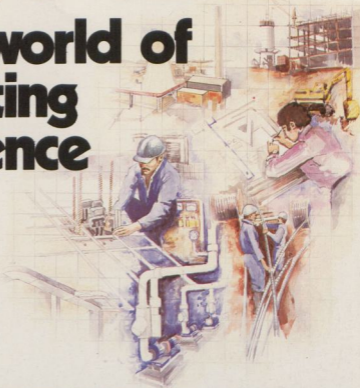
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