# THE VOLUNTARY APPLICATION OF THE INTEGRATED ENVIRONMENTAL MANAGEMENT GUIDELINES BY ESKOM IN KWAZULU-NATAL

## - 1989 TO 1997 -

by

**BRUCE JONATHAN BURGER**

Submitted in partial fulfilment of the requirements for the degree of Master of Science, in the School of Life and Environmental Sciences, University of Natal, Durban.

**DECEMBER 2003**

Advice is so cheap you can take it from me -
its yours to keep, because opinions are free.
Nobody knows about the trouble I've seen
nobody's perfect, mister, nobody's clean.

It costs too much and it takes too long, to find out too late,
some words are not heard 'til after they're spoken.
Your role was protective, your soul was too defective,
some people just don't have a heart to be broken.

We could have gone all the way to the great wall of china
if you'd only had a little more faith in me.
Instead of gold and diamonds
you will still have your ..... silver reminders.
All the king's men and all the king's horses
can't put you together the way you used to be -

We could have been standing on the great wall of china.

**billy joel, the great wall of china**

## ABSTRACT

The end of the last century saw a meteoric rise in Environmental Impact Assessment (EIA) and its implementation worldwide subsequent to it being legislated by the United States in 1970. The South African Government's Council for the Environment attempted to emulate international developments in EIA and compiled the Integrated Environmental Management (IEM) guidelines of 1989 which delineated the procedure for undertaking EIAs for development projects in South Africa. It was envisaged that these guidelines would ultimately be made law. The period between 1989 and 1997 was a window period when the IEM guidelines were implemented voluntarily. This period therefore constitutes an important era in the history of EIA in South Africa to which constant reference is made and upon which further development in EIA in South Africa has been reliant.

The period 1989 to 1997 also coincided with a major increase in the bulk electricity supply to KwaZulu-Natal by Eskom, the national electricity utility. Eskom had actively tracked the evolution of Environmental Management globally and was considered to be at the forefront of Industrial Environmental Management in South Africa and there was therefore an expectation that Eskom would implement the IEM guidelines.

In this study twelve EIAs for Eskom powerlines and substations constructed in KZN for the period were analysed and trends in the implementation of the IEM guidelines extrapolated. This study highlights the extent to which the IEM guidelines were implemented. It discusses the problems attendant to its implementation, which were found to be common to the implementation of EIA globally. From this research it became clear that factors external to the IEM guidelines needed to be resolved before the IEM guidelines could be implemented. The administrative requirement was one of the most important and necessary requirements for successful implementation, but this had not been thoroughly anticipated by Eskom nor the guidelines themselves. This required that there was major reform to policy and company procedure, which had to be clearly understood and accepted, before IEM could be effectively implemented. As a consequence, the implementation of the various steps of the IEM guidelines seldom revealed consistent and satisfactory implementation. Even where

the IEM guidelines were more closely followed and implemented, previously entrenched technocentrist procedures and ideals persisted and therefore IEM was subverted and implemented with the wrong goal in mind. There was also an expectation that there would be an improvement in EIA practice with time. It was found that there was a greater association between the quality of the EIA conducted and the Eskom Environmental Officer responsible for it, rather than a consistent improvement with time. Thus integration into the project process of environmental procedure is a complex process and it requires firstly that a company is reformed. Reform has subsequently begun to transpire in Eskom. This reform includes education of company employees, which in turn is linked to political will which is necessary to effect the changes required to apply a procedure such as the IEM guidelines.

This study reviews the implementation of the IEM guidelines in Eskom during this important development phase. It therefore reflects on a key portion of the history of EIA implementation in this country. The study provides insight into organisational reform and the voluntary commitments required for successful implementation of EIA. Benefit can be drawn from this study for future implementation of EIA even though EIA legislation now exists, as some form of voluntariness, political will and organisational reform is always imperative for EIA's successful and effective implementation.

## PREFACE

The work presented in this thesis was carried out in the School of Life and Environmental Sciences, University of Natal, Durban, under the supervision of Mrs C Oelofse.

The study presents original work by the author and has not been submitted in any form to another university. Where use was made of the work of others, it has been duly acknowledged in the text.

## ACKNOWLEDGEMENTS

It has been both a privilege and a challenge to have been associated with this period of growth and development of Environmental Impact Assessment within Eskom and South Africa during the 1990's. To my predecessors - the pioneers – the faces too many to recount, whether it be CEO, engineer, environmentalist, surveyor, project manager, …. I salute their achievements no matter how small.

A special thank you to my supervisor, Cathy Oelofse, for her tireless encouragement, time and effort for the duration of the study. Like so many other students this was often at the expense of time otherwise spent with her family. To her, Marc and family I am indebted.

Thank you to those who contributed comments and endured the interviews.

Gratitude is due to Eskom Distribution for financial support and more specifically to Neil Purdon, Land Development Manager.

I express my gratitude to Heather Rottcher for so kindly compiling the maps in this study.

To Wendy, my wife, for her understanding, love and support.

To my silent companion, Tom, who often stopped in to keep me company and added !~@#$%^wwerty his comment as he walked across the keyboard.

I thank the Lord Jesus Christ, the creator of all things, for the opportunity to be involved in something that is so beautiful and intriguing as His creation and yet our wanton abuse of it must grieve Him. He makes the crooked way straight (Isaiah 45:2).

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# CHAPTER 1

# INTRODUCTION

## 1.1 The Development of Environmental Impact Assessment

World-wide concern for the environmental implications of development has been influenced by the environmental movement that swept the United States in the late 1960's.

> "By the end of the 1960's, warnings, conferences, legislative initiatives and media attention .... in western countries had set the stage for legislation, environmental institution building and the rise of proactive citizen groups – the non-governmental organizations" (Modak and Biswas, 1999, p 1).

The Environmental Impact Assessment (EIA) process arose out of a growing concern that development was resulting in unacceptable levels of degradation. The passing of legislation, namely the United States National Environmental Policy Act of 1969 (NEPA), was regarded as a watershed which made the Environmental Impact Assessment of all major projects mandatory and dealt with cross-sectoral issues in the United States. NEPA is accredited with having launched EIA in the United States and precipitated its legislation elsewhere (Modak and Biswas, 1999).

The South African Government's Council for the Environment, attempted to emulate international developments in EIA and compiled the Integrated Environmental Management (IEM) guidelines of 1989 (Council for the Environment, 1989a). This was to enable the implementation of EIAs in development projects - in effect the IEM guidelines delineated the procedure for undertaking EIAs in South Africa but on a voluntary basis (Preston, et al, 1992; Sowman, et al, 1995). It was envisaged that these guidelines would ultimately be made law. The period between 1989 and 1997 was a window period when the IEM guidelines, first formulated in 1989 but later revised and re-published in 1992 by the Department of Environmental Affairs and Tourism (DEA), were implemented voluntarily and constitutes a unique era in the history of EIA in South Africa.

There are numerous claims in the literature for and against the acceptance and successful implementation of the IEM guidelines which remain to be substantiated. To date there has only been a single study, of which the author is aware, undertaken of EIA practice in South Africa prior to the IEM guidelines (Mafune, et al, 1997). Subsequently a holistic evaluation of the effectiveness of and

trends in IEM practice for the period 1989 to 1997 in South Africa is also lacking (Weaver, et al, 1998). In the light of this deficit, and with the emphasis placed on EIA implementation globally, within South Africa and within Eskom, it is pertinent therefore to ascertain and examine the extent to which the IEM guidelines were implemented in South Africa by Eskom during this period.

## 1.2 The Acceptance of the IEM Guidelines between 1989 and 1997

Certain authors assert that the IEM guidelines were accepted by numerous companies in South Africa (Ridl, 1994; Sowman, et al, 1995; Sandwith and Porter; 1996; Claassen and Heydenrych, 1998) and others state that they were implemented when undertaking EIAs (Quinlan, 1993; Wood, 1999a; Hatton, pers comm., 1999 and Weaver, pers comm., 1999). According to Avis (1994, cited in Wood, 1999a, p 52) "the IEM guidelines formed the basis of several hundred voluntary EIAs in South Africa". Wood (1999a, p 52) supports this viewpoint when he states that "South Africa has a proud history of EIA, dating back to the mid-1970s which was latterly comprised of the non-mandatory implementation of the IEM guidelines".

National Departments such as Water Affairs and Forestry, Mineral and Energy Affairs and Transport were noted as being supportive of IEM and modified their policies and procedures to comply with the IEM approach (Sowman, et al, 1995). Posnik (cited in Sowman, et al, 1995, p 52) states that "in general IEM has been adopted either formally or informally by businesses and authorities".

The Draft Revision of Integrated Environmental Management Procedures stated that "Integrated Environmental Management (IEM) has been in use in South Africa for some years now, and is generally well understood and widely accepted" (Claassen and Heydenrych, 1998, p 9). Lawson, himself an Eskom Environmental Practitioner at the time, perceived that IEM "has received national acceptance" (Lawson, 1996, p 4).

It can be concluded that the IEM guidelines were widely accepted nationally in South Africa prior to the drafting of legislation in 1997. The study seeks, as one of its objectives, to review the acceptance of the IEM guidelines by Eskom.

## 1.3 Scepticism Regarding the Implementation of the IEM Guidelines

A clear distinction must be drawn between the acceptance of the IEM guidelines and the extent of their implementation. Ridl (1994, p 61) asserts that since the publication of the IEM guidelines (Council for the Environment, 1989a) it had "become the habit of proponents of development to declare their commitment to the principles espoused in the document" but argues that it was unlikely that the guidelines had been correctly implemented as there was public opposition to a number of major development proposals for the period with claims by interested and affected parties that they were not consulted during the planning phase of the development. He concludes that often the developer's commitment to the IEM guidelines amounted to mere lip-service. Although Avis (1994) states that the IEM guidelines formed the basis of several hundred voluntary EIAs in South Africa he simultaneously expresses the concern that as IEM was undertaken on a voluntary basis there could be no guarantee that its implementation was adequate.

The Planning Department of the then Natal Parks Board (NPB) was acknowledged as a key interested and affected party (I&AP) by Eskom and was often responsible for the review of Eskom EIAs conducted in KZN for the period 1989 to 1997. Sandwith and Porter (1996, p 74), who were employed in this department, acknowledge that "Integrated Environmental Management has assumed particular significance for decision-making regarding development and the environment. There is extensive acceptance of the procedures, .... . since 1989 IEM has been applied both within and beyond protected areas" and that Eskom itself had undertaken EIAs in accordance with the IEM procedures. They add that these EIAs with time had become more compliant with the IEM procedures but ultimately conclude that the procedure was not acceptably applied, neither in the initial stages of development nor during its implementation phase. They promoted, as in other countries, that EIA needed to be a statutory requirement to be successfully implemented (Sandwith and Porter, 1996).

It has also been claimed that stating compliance with the IEM guidelines was used to merely "gain public confidence in the proposal and licence to proceed in the manner most beneficial" to the proponent (Ridl, 1994, p 61). Ridl (1994, p 74) mentions Eskom's first attempt at the Ariadne-Venus 400kV line EIA as one such example. Others echo Ridl's sentiments and some even question the implementability of the IEM guidelines themselves (Avis, 1994, in Wood, 1999a; Sowman et al, 1995; Nel, 1997, pers comm.; Van Viegen, 1998). The White Paper on Environmental Management Policy for South Africa (cited in Wood, 1999a, p 57) states that "there is a widespread view that environmental issues in South Africa have low priority ... . This is reflected by a failure to integrate

environmental concerns into economic planning and decision making at all levels in society". This pessimistic viewpoint vis-à-vis the adequacy of the implementation of the IEM guidelines was supported by the fact that there was a lack of capacity available at the time to suitably implement them, further making the adequate implementation of the IEM guidelines questionable (Sowman, et al, 1995). A further problem of implementation was that there also appeared to be a lack of clarity as to which circumstances they were to be applied (Ridl, 1994).

Thus some hold the view that the IEM guidelines were accepted while others suggest that the extent of their implementation is highly questionable. The focus of this study, therefore, is to provide substantive investigation and argument about the implementation of the IEM guidelines by Eskom during this era.

## 1.4 Perceptions Relating to Eskom's Acceptance of the IEM Guidelines

Eskom, as a result of remaining abreast of environmental developments internationally, was regarded as being a proactive leader in Industrial Environmental Management within South Africa. There was thus an expectation by those outside the company, such as the public, who were recipients of Eskom promotional material and annual reports post 1990, and experts in the field of environmental management and environmentally related fields, that the IEM guidelines would be accepted and applied by Eskom. The extent to which this expectation was realised, however, has not to date been verified. The period 1980 - 1990 had seen the coming of age of the term "environment" in Eskom, as can be deduced from the establishment of Corporate, Generation, Transmission and Distribution environmental sections and the formulation of environmental policy. Eskom also made the claim that by 1990 Environmental Management had come of age in Eskom and Integrated Environmental Management has proven itself to work for Eskom. (Eskom Communique, undated-a). Such statements must have contributed to the unsubstantiated perception that the IEM guidelines were largely accepted by corporations such as Eskom and voluntarily applied in anticipation of their being made legislation (Weaver, pers comm., 1998 and Weaver, et al, 1999).

In contradiction to this perception, the NPB stated, concerning the Ariadne-Venus 400kV line, that "the Natal Parks Board has on numerous occasions stated its concern that Eskom is not adhering to the principles of Integrated Environmental Management as defined by the Department of Environmental Affairs and subscribed to by Eskom". Kruger and Lucas (1997, p 163), whilst employed as Eskom environmental officers, remark that "although Eskom has for over a decade been undertaking

Environmental Impact Assessments, adopted the South African Integrated Environmental Management principles and process, as well as formulated its own internationally recognised practices – environmental impacts still take place during the construction phase of projects".

Thus there is a perception, within and beyond the company, that Eskom accepts and applies the IEM guidelines. However, as illustrated by the counter-arguments, the extent of this needs to be tested.

## 1.5 Aim of the Study

The publication of the IEM guidelines during 1989 and their revision in 1992, and the period from 1989 to 1997 as a whole, coincided with the bulk upgrading of Eskom supply to the environmentally sensitive and diverse province of KwaZulu-Natal (KZN). The bulk upgrading of electrical supply included supply to the major urban and industrial centres of Pietermaritzburg, Durban and the KwaZulu-Natal South Coast. The aim of this thesis therefore is to assess the implementation of the IEM guidelines in these projects in KZN for the period 1989 to 1997 in order to ascertain whether the IEM guidelines were indeed accepted and applied by Eskom, prior to EIA being legislated. As Eskom's familiarity with the IEM procedure grew, a measure of increasing consistency or improvement in the implementation of IEM would also be expected for the period.

The objectives of this study are to:

- assess whether the IEM guidelines were accepted by Eskom for the period 1989 to 1997;
- ascertain to what extent the IEM guidelines were being voluntarily implemented in projects in Eskom between 1989 and 1997, prior to the passing of Environmental Impact Assessment (EIA) legislation in South Africa, by considering a sample of case studies in KZN for the period;
- note trends and changes in the implementation of IEM by Eskom in these projects over the period;
- elicit reasons for compliance or a lack of compliance;
- examine to what extent the implementation of the IEM guidelines influenced Eskom and the Eskom project process; and
- attempt to conclusively chronicle an important period in the history of EIA in South Africa for which there are limited comprehensive records.

For the period prior to EIA being legislated in South Africa, from 1989 to 1997, IEM was the proposed procedure for undertaking EIAs voluntarily in South Africa. Its ongoing acceptance and promulgation in subsequent legislation such as the National Environmental Management Act of 1998 and policy such as the discussion document on IEM (Claassen and Heydenrych, 1998) amplify the need to more accurately assess its past acceptance and implementation and any shortcomings in this regard (Preston, 1993; Sandwith and Porter, 1996; Joughin, 1997; Wood, 1999a; Ira, et al, 2000). Even though legislation has been passed making EIAs mandatory, the findings of the period, when the IEM guidelines were being applied voluntarily, remains relevant for future EIA implementation, since self-regulation remains integral to the adequate application of EIA procedure (Ridl, 1991; Hanks, 1996; Van Viegen, 1998; Du Plessis, 2000).

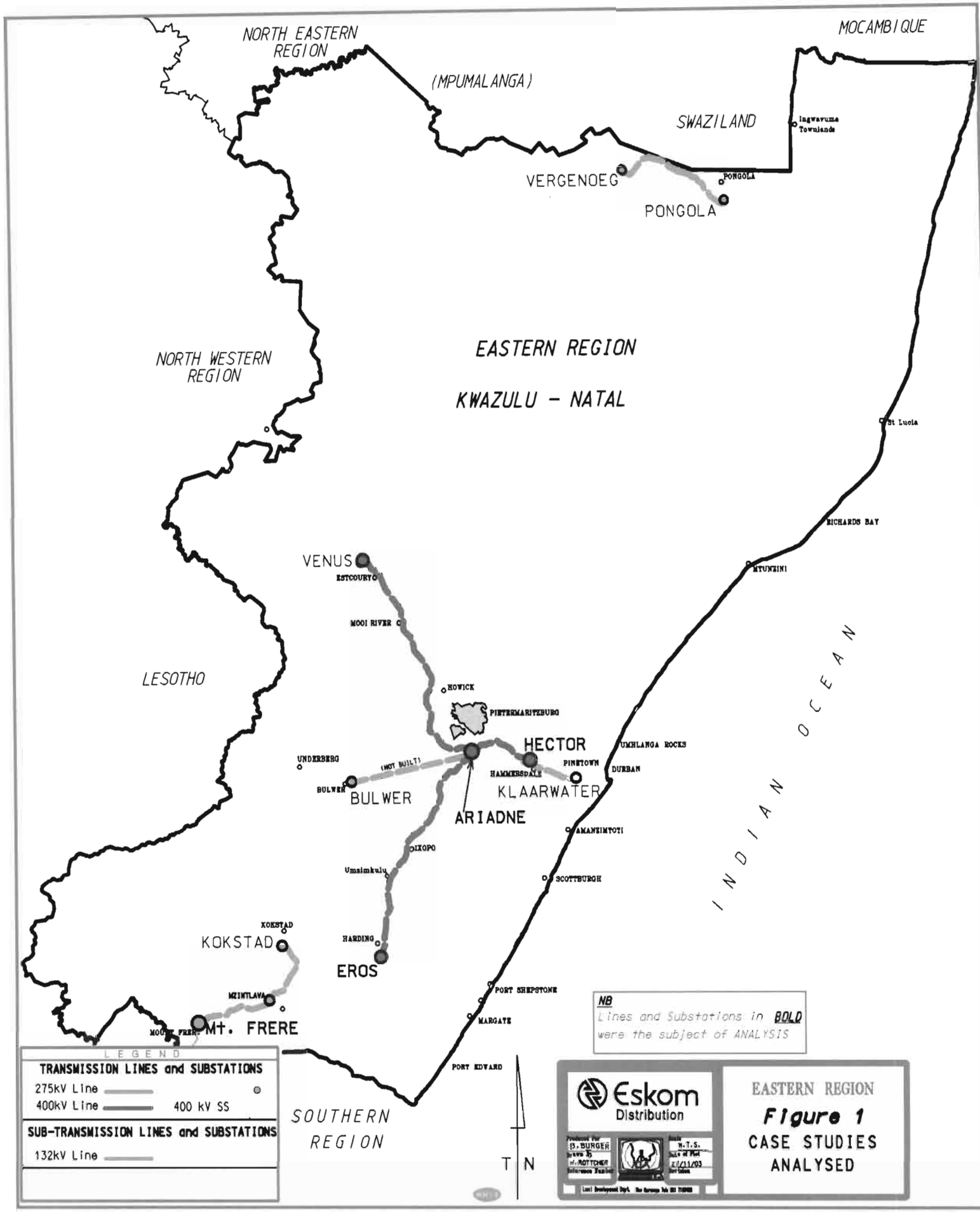
Twelve case studies were selected to test the assumption that the IEM guidelines had been accepted and implemented by Eskom. The first chapter outlines this perception. Figure 1 shows the location of substations and routes of powerlines to be analysed

Chapter 2 provides the theoretical framework for this study. It discusses and substantiates, using literature sources, the development of EIA both globally and in South Africa. Problems familiar to EIA implementation worldwide are considered against which the implementation of IEM in South Africa can be compared.

Chapter 3 provides the methodology used in this research. It explains why and how certain aspects of the IEM guidelines were selected and reviewed and it presents the methodological approach adopted.

Chapter 4 provides the background to the study. It presents information about Eskom and the development of its infrastructure in KwaZulu-Natal for the period 1989-1997. It also provides a description of the projects selected for analysis which coincided with the application of the IEM guidelines.

Chapter 5 presents the analysis of the twelve projects selected and extrapolates trends in the application of the IEM guidelines for the period 1989 to 1997. Chapter 6 then summarises and discusses conclusions drawn. Recommendations are made for the implementation of the IEM or closely aligned guidelines.


NORTH EASTERN REGION
(MPUMALANGA)
MOCAMBIQUE
SWAZILAND
Ingwavuma Townlands
VERGENOEG
PONGOLA
PONGOLA
NORTH WESTERN REGION
EASTERN REGION
KWAZULU - NATAL
St Lucia
RICHARDS BAY
MTUNZINI
VENUS
ESTCOURT
MOOI RIVER
LESOTHO
HOWICK
PIETERMARITZBURG
HECTOR
UMHLANGA ROCKS
UNDERBERG
(NOT BUILT)
PINETOWN
DURBAN
HAMMERSDALE
BULWER
BULWER
KLAARWATER
ARIADNE
INDIAN OCEAN
AMANZIMTOTI
IXOPO
Umzimkulu
SCOTTBURGH
KOKSTAD
KOKSTAD
HARDING
EROS
MZINTLAVA
Mt. FRERE
PORT SHEPSTONE
MARGATE
PORT EDWARD
SOUTHERN REGION
T N
LEGEND
TRANSMISSION LINES and SUBSTATIONS
275kV Line
400kV Line
400 kV SS
SUB-TRANSMISSION LINES and SUBSTATIONS
132kV Line
NB
Lines and Substations in BOLD were the subject of ANALYSIS
Eskom Distribution
EASTERN REGION
Figure 1
CASE STUDIES ANALYSED

# CHAPTER 2
# THE DEVELOPMENT OF ENVIRONMENTAL IMPACT ASSESSMENT

## 2.1 Growth in EIA Requirements Internationally

International events, such as the enactment of NEPA in the United States in 1970 had influenced governments and academics globally, including those within South Africa, to explore the merits of introducing a similar mechanism of environmental evaluation into their respective planning and administrative systems (Hoogervorst, 1993; Sowman, et al, 1995). According to Gupta and Asher (1998, p 228), NEPA had led to three main developments in the USA:

- a number of EIAs were prepared in the United States;
- a host of methodologies were proposed and out of these a mainstream technique for preparing an EIA emerged; and
- a rapid growth of legislation in many countries requiring an EIA.

The United Nations Conference on the Environment held in Stockholm in June 1972 resulted in *inter alia,* the discussion of the relationship between development and the environment. This, in turn, led to the World Commission on Environment and Development also known as the Brundtland Commission in 1987. This Commission published a report entitled 'Our Common Future' which first promulgated and defined the term sustainable development as "development which meets the needs of the present without compromising our ability to meet those of the future" (World Commission on Environment and Development cited in Weaver, et al, 1999, p 313). EIA is considered to be integral to these ends, as envisioned by these and subsequent conferences and declarations, thus its endorsement as a tool of sustainable development. Another feature of the 1970s and 1980s was the introduction of broad spectrum environmental legislation in countries such as Australia, Canada and New Zealand as well as the creation of environmental policies and institutions in the developed world (see Table 5) (Modak and Biswas, 1999).

There was growing global acceptance of EIA with more countries introducing EIA in the 1980s and 1990s than previously. EIA was also introduced in some of the developing countries such as Malaysia

and the Philippines (Modak and Biswas, 1999). The result is that EIAs are now legislated in over 100 countries around the world and applied voluntarily in many others.

Other milestones which aided the institutionalisation of EIAs internationally were:

- "The European Commission published a Directive on EIA in its Member States in 1985 (amended in 1997).
- This was followed by the World Bank Operational Directive on Environmental Assessment (1989) and the United Nations Economic Commission for Europe Convention on EIA in a Transboundary Context (1991).
- Principle 17 of the Rio Declaration of Environment and Development (1992) endorsed the use of EIA as a national instrument for sustainable development."

(Sadler and Weaver, 1999, cited in Weaver, et al, 1999, p 315)

## 2.2 South African EIA Requirements

This section explores the development of EIA and IEM in South Africa over the past twenty five years.

### 2.2.1 The Inception of the IEM Guidelines

Delegates from South Africa had attended the 1972 United Nations Conference on the Environment held in Sweden (Stockholm Conference). This was to lead to the creation of a Cabinet Committee on Environmental Conservation established in 1972 (later to become the Council for the Environment in 1976). Although never implemented, this committee commenced development of national environmental policies (Hoogervorst, 1993; Sowman, et al, 1995).

The Council for the Habitat, a non-governmental organisation established in 1974 to co-ordinate the activities of various environmental organisations in South Africa, frequently reviewed the subject of EIA and professional planners were identified as the group who should provide guidance on the integration of environmental concerns in project planning and design. The Environmental Planning Professions Interdisciplinary Committee (EPPIC), representing the various planning professions, was established in 1974. One of its primary tasks was to prepare a set of guidelines to assist planning professionals in taking environmental aspects into account and to capitalise on overseas experience

(Boden, 1980). According to Sowman, et al, (1995, p 49) these guidelines, published in a 1980 White Paper on a national policy regarding environment conservation, stated that:

> "it was the intention of the government that proposed actions be evaluated in the light of environmental considerations and that environmental impacts be considered in the planning, development and operational phases of such actions".

A direct outcome of the 1980 White Paper was the Environment Conservation Act of 1982 (Act 100 of 1982). This Act made provision for the co-ordination of all actions directed at, or which may have an impact on the environment, its aim being to achieve harmonious interaction between humans and their habitat. A shortcoming of the Act was that although EIA had been prominently mentioned in the White Paper it neglected to "mention it explicitly in the legislation as a mechanism for achieving policy objectives" (Sowman, et al, 1995, p 49). The Council for the Environment was established on 7 July 1982 in terms of the Environment Conservation Act (Act 100 of 1982).

Subsequently the Planning Committee of the President's Council issued two reports (PC 2/1984 and PC 5/1984) which advocated that it be made compulsory to consider the environmental consequences of developments (Council for the Environment, 1989a) but according to Sowman, et al, (1995, p 50) "these reports had little influence as very few of their recommendations were ever acted upon".

The development of EIA overseas was invaluable to South Africa and the Stockholm Conference had created the expectation that EIA could also be applied in less developed countries (LDCs). There were concerns expressed, however, about its legislation in countries such as South Africa and an initial voluntary adherence to a code of practice, guidelines or policy statement was deemed more appropriate (Olokesusi, 1992; Hoogervorst, 1993; Rabie, 1986, cited in Mafune, et al, 1997).

According to Sowman, et al, (1995, p 51):

> "it became increasingly evident that any environmental evaluation system developed for South Africa had to be flexible, generally applicable, widely accepted, and practical to implement. Once such a generic procedure was in place, more detailed procedures and guidelines for specific types of projects, policies or plans could be developed".

Thus the requirement for the formulation of the IEM guidelines for EIAs in South Africa materialised.

The Council for the Environment had been responsible for researching EIA procedures internationally and established a committee entitled the Standing Committee for Man and Environment in 1984. This committee was also known subsequently as the Committee for Environmental Impact Assessment and then the Committee for Integrated Environmental Management (Council for the Environment, 1994). In 1985 the Standing Committee for Man and Environment met to formulate recommendations for South African policy on Environmental Impact Assessment. This was circulated for comment. As a result it was resolved that "South African environmental evaluation procedures should be part of an integrated environmental management policy" (Council for the Environment, 1994, p 33).

A term was needed that would accurately describe the process of guiding and documenting all development decisions to ensure the protection and wise utilisation of the environment. The term chosen to describe this process was Integrated Environmental Management (IEM). The Environment Conservation Act of 1982 regarding environmental evaluation was ammended accordingly in 1987 in order to make it compatible with the IEM framework. The committee also compiled the document Integrated Environmental Management in South Africa in 1987 which was approved by the Council in 1988 and submitted to the Minister. In 1989 various symposia and seminars were held to bring the IEM guidelines to the attention of developers. To make the document more user-friendly and to encourage the application of IEM an abbreviated version with cartoons entitled 'IEM – A Framework for Harmony between Development and Environment' was published, as well as an illustrated poster (Council for the Environment, 1989b). During 1990 and 1991 the committee focused on refining and improving the Council's IEM document (Council for the Environment, 1994). Thus the original IEM guidelines as published in 1989 were later to be revised and published as a six part guideline series in 1992 entitled: The Integrated Environmental Management Guidelines Series.

### 2.2.2 The Definition of IEM in South Africa

The term Integrated Environmental Management appears in the literature internationally with ever increasing frequency (Born and Sonzogni, 1995; Margerum, 1999). However, what is referred to by the terms the 'IEM guidelines of 1989' and 'IEM guidelines of 1992' differs from international use of the term although the underlying intent has noticeable similarities. It was initially envisaged during the late 1980s that EIAs would not be stand-alone procedures but integrated into the project process (Wathern, 1988). South Africa endeavoured to incorporate this ideal into the application of EIAs locally by naming its EIA procedure accordingly. According to Sowman, et al, (1995, p 51):

> "The term IEM was chosen to indicate an approach that integrates environmental considerations into all stages of the planning and development process and requires post-impact assessment, monitoring and management. It was felt that the term EIA was inappropriate as the EIA process was perceived to be too limited in scope, reactive, anti-development, too separate from the planning process and often the cause of unnecessary and costly delays".

The Council for the Environment's definition of IEM, which is similar to that of Sowman, et al, (1995) as mentioned above, is:

> "a systematic approach for ensuring the structured inclusion of environmental considerations at all stages of decision-making and development. The objective is not to impede development but to provide an effective approach using interactive and iterative evaluation techniques to improve proposals or suggest more acceptable environmental alternatives. IEM is concerned with all aspects and stages of environmental resource allocation, from conceptualisation, planning and assessment of possible effects, to the taking and implementing of decisions and monitoring of results. It encompasses a broad range of assessment methodologies. IEM applies to all categories of proposed actions, from policy formulation to devising general programmes for effecting policies, to the initiation of specific projects in order to achieve a desirable balance between conservation and development"
>
> (Council for the Environment, 1989a, p 2).

Fuggle (1992, p 764) defines Environmental Impact Assessment as the:

> "administrative or regulatory process by which the environmental impact of a project is determined. In South Africa the process is termed Integrated Environmental Management (IEM)".

The principles which underpin IEM are:

- a broad understanding of the term "environment";
- informed decision-making;
- accountability for decisions and for the information on which they are based;

- an open, participatory approach in the planning of proposals, and
- pro-active and positive planning.

(Preston, et al, cited in Mafune, et al, 1997, p 200).

IEM also aligns itself with the aims of NEPA as summarised by Modak and Biswas, (1999, p 2):

> "NEPA directed federal agencies to use a systematic, interdisciplinary approach that ensures the integrated use of natural and social sciences and environmental design in planning and decision making. It also gave the public the opportunity to influence the implementation of a development project. The Act also specified that the project's proponents must provide information on any adverse environmental effects of the proposed action, alternatives to the proposed action and information on any irreversible effects".

South Africa's use of the term illustrated by the IEM Guidelines of 1989 and 1992 is also associated with regulating the use of EIAs for policies, programmes or projects (Council for the Environment, 1989a). However, the focus and application of the term has since expanded internationally and is not merely limited to EIAs for projects, be it at a planning, programme or policy level, as it has been considered locally. Reference is also made internationally to managing or planning economic and social activities in a particular portion of the environment such as a catchment area in an integrated manner (Margerum, 1999).

### 2.2.3 The Pertinence of the IEM Guidelines for the Ongoing Development of Environmental Legislation in South Africa

The Environment Conservation Act 100 of 1982 was replaced by the Environment Conservation Act of 1989 (Act 73 of 1989). The Environment Conservation Act 73 of 1989 was an important, comprehensive and holistic piece of environmental legislation. It was developed to counter the piecemeal approach and plethora of laws which previously prevailed on various aspects of the environment. However this Act "provided for control over certain development proposals, but only if the administrative authority was exercised" (Lawson, 1996, p 4). This administrative authority was eventually exercised and EIA no longer peddled as a 'voluntary adherence to a code of practice' but Regulations 1182 and 1183 of September 1997 promulgated in terms of Sections 21, 22 and 26 of the Environment Conservation Act (Act 73 of 1989) made Environmental Impact Assessments (EIA)

mandatory for certain development activities. These listed activities included the construction or upgrading of facilities for commercial electricity generation and supply. The procedure adopted for EIA legislation has its roots in the IEM guidelines although there was apprehension expressed as to whether it would be as thorough (Preston, 1993).

More recently environmental legislation has further entrenched the use of IEM in environmental management in South Africa. The National Environmental Management Act 107 of 1998 (NEMA) makes broad provision for the inclusion of the Principles of IEM in Chapter 5 of the Act. EIA legislation will also eventually be promulgated in terms of this Act under Chapter 5, supplanting Regulations 1182 and 1183 (Allen, pers comm., 1999).

## 2.3 Issues Common to the Implementation of EIA Globally

### 2.3.1 Introduction

The implementation of EIA in the 20th Century, although spectacular and one of the great achievements thereof, was nevertheless plagued with numerous teething problems (Weaver, 1996). There have even been "at a general level, calls to reconsider EIA practices" as a result (Cocklin, et al, 1992a, p 31). When attempting to apply IEM to catchment management it has been found that although the basic concepts and principles of IEM are easily understood extreme difficulties have been experienced in implementing IEM internationally (Born and Sonzogni, 1995; Mitchell and Hollick, 1993 in Margerum, 1999; Bailey, 1997; Margerum, 1999). Thus difficulty in implementing the IEM guidelines in South Africa and more specifically Eskom could be expected, especially as it was to be implemented voluntarily. The literature covering EIA was reviewed in this study in order to discover and highlight these inconsistencies and glean generalizations about problems in the implementation of EIA procedure worldwide, to which the implementation of the IEM guidelines by Eskom in South Africa, could be compared.

The first aspects reviewed are not core components of the EIA procedure itself but exert a strong influence on its implementation. They are external to the EIA process such as the need for political will to drive the implementation of EIA; institutionalisation/legislation and the administration of EIAs; the difference, if any, between third world (less developed) and first world (more developed) countries' implementation of EIA; as well as the requirement for skilled and trained personnel to conduct EIAs. The successive stages of an EIA process that are pertinent to this study are then

reviewed. These key stages/phases are scoping, the investigation of issues, review, the compilation and implementation of the environmental management plan and monitoring and auditing.

### 2.3.2 Factors External to the EIA Process which Influence its Effective Implementation

Wood (1999b) accedes that the evaluation of the effectiveness of an EIA is not easily determined empirically and there are numerous other or external factors that need to be analysed which influence its implementation.

*Political Will - the Enabling Ingredient*

There is an overall acknowledgement that an EIA's success is reliant on the political will of the decision-makers to support its undertaking, take cognisance of its recommendations when making decisions and support the implementation of these recommendations (Rees, 1988; Hoogervorst, 1993; Sorenson and West, 1990, cited in Sowman, et al, 1995; Sankoh, 1996; Sadler, 1996, cited in Weaver, 1996; Jardine, et al, 1997; Petts, 1999a).

> "In any country or region the effectiveness of EA as an environmental management tool will always be limited by political context – that is, by the degree to which the relevant authorities are willing or able to make environmentally sound development a genuine priority" (MacDonald, 1994, p 29).

Development, or what Rees (1988, p 282) terms the "growth-oriented ideology of most governments" which is prevalent in a country such as South Africa, often means that developers do not see or do not want to see the need to take into account the environmental impacts of development (Huntley, et al, 1989). Developers, who traditionally focus on the exigencies of time and cost, disregard environmental issues which pose the potential for their projects to be delayed or even halted and thus taking them "into account is (considered) counter-productive" (Avis, 1994, p 240). It is not surprising therefore, in this political climate where development enjoys such high priority, that time and budget constraints were identified as a key problem area for EIA implementation in South Africa (Ridl, 1994; Barker, 1995 cited in Weaver, 1996). Thus EIA is dependent on numerous factors where "perceptions and values and social and economic priorities determine outcomes as much as the data and methods of impact prediction" (Petts, 1999b, p 6). It is also known that where an appreciation of the necessity of Environmental Impact Assessment does not exist it is highly probable that the recommendations of

EIAs are not really understood and consistently implemented (Canadian Environmental Assessment Research Council, in Wood, 1999a). The perceptions of decision-makers are especially important as it is held that "EIAs do not make decisions but provide only one insight to those who do" (Hoogervorst, 1993, p 7).

A lack of EIA implementation may be partially ascribed to a lack of public awareness of the need for EIA in less developed countries (LDCs) whereas in developed countries (DCs) opposition often takes the form of clearly antagonistic and defined resistance (Kakonge and Imevbore, 1993; Wood, 1999b). This shows that EIA can never be taken for granted even in developed countries and "public and political endorsement", no matter how advanced the EIA system, remains a global requirement for EIA to be achieved successfully (Wood, 1999b, p 32). Once initiated EIA can partly remedy this lack of public awareness, as it involves I&APs and has the potential to be a source of education and training itself, ultimately helping to generate the political will needed to assist in the implementation of its decisions (Avis, 1994; Mitchell and Hollick, 1993 in Margerum, 1999).

This debate between conservation and development, environmentalist and developer exists historically and easily erupts into confrontation which ultimately complicates decision-making. Developers and decision-makers subsequently attempt to sideline EIA (Susskind, et al, 1978 cited in De Jongh, 1988; Avis, 1994). According to Rees (1988, p 283), EIA in the late 1980s was "typically still a reactive, quasi-regulatory instrument, expected to have only a marginal effect on project design and implementation". He expressed the concern that the ability to place the environment's ecological integrity on a par or above the economy and proposed project remained an unattained goal primarily due to a lack of political support for the concept, especially in LDCs.

Resistance to give environmental management and EIAs the recognition they deserve was already prevalent in South Africa during the late 1970s. Sowman, et al, (1995, p 46) accredits "the lack of the adoption of environmental evaluation procedures, either by legislative or administrative control, amongst others, to the lack of political will and awareness of the need to consider environmental issues" as some of the contributing factors. There was greater reliance on political will for EIA implementation in South Africa where the unique situation arose whereby EIA, according to the IEM guidelines, was voluntarily implemented, by companies such as Eskom.

The necessity and merits of legislation to provide the incentive for undertaking EIA has been debated and recognised (Ortolano, et al, 1987; Kakonge and Imevbore, 1993). However, legislation possesses

its own limitations and is inadequate in itself to ensure that procedure is adequately enacted and recommendations implemented if political will is absent (Preston, 1993; Van Viegen, 1998). Wood (1999a) corroborates these shortcomings *vis-a-vis* legislation in his studies of EIAs in South Africa post EIA legislation. He recognised that even though South African EIA legislation post 1997 meets certain evaluation criteria political will and institution capacity, however, needs to be strengthened in order for EIA to avoid becoming a substitute for the real thing. Caldwell, et al, (1982, cited in Wathern, 1988) similarly found that, whilst reviewing EIA methodologies internationally, there was more of a requirement for institutional rather than technical reform to improve the implementation of EIA.

It is expected therefore that these studies will also have relevance post EIA legislation in South Africa as even where EIA is a legal requirement it still relies on a measure of voluntary and wilfully driven institutionalisation for its successful implementation.

In summary the literature adequately illustrates the importance and need for an accepting and supportive political environment for the successful implementation of the EIA process and for the support of any recommendations which influence decision-making.

*Administration - the Integration of EIA into the Project Process*

'Integration' is the key word used to describe South Africa's administrative format for conducting EIAs. It is important to review therefore how EIA has been administered elsewhere. EIA effectiveness largely depends on two factors "its quality in technical terms, and the degree to which it influences a project's conceptualization, design and implementation" (The World Bank, June 1995, p 3). The latter it achieves through 'linkages' or administrative procedures which are fundamental to an EIA's efficacy and comprise the conduit for the integration of an EIA's recommendations into the project's design, implementation, etc. For this reason EIA is intended to be "an integral part of" or integrated into the project-planning process (Kakonge and Imevbore, 1993; McDonald and Brown, 1995). Schulkin and Sarokin (1996, p 283) note that "the ultimate aim for IEM is for it not to be a stand alone process but to facilitate, via linkages, environmental considerations in decision-making in projects (enabling the) balancing of economic developmental considerations amidst considerations about the environment".

NEPA recognised the need to integrate EIA and project processes (Lahlou and Canter, 1993). Early in the day it was acknowledged that unless the outputs of EIA were influential in decision-making and

linked to the project process, to enable these interventions, the exercise became a waste of time (Wathern, 1988; Olokesusi, 1992; McDonald and Brown, 1995). Sadler (cited in Weaver, 1996, p 111) writes that "the real test of successful performance is the extent to which EA has 'made a difference', whether better decisions follow and environmental objectives are realised". Thus "the effectiveness of EIA depends on how well EIA is internalized into planning and decision-making processes" (Lim, 1985, p 151).

EIAs, however, are often conducted as a stand-alone process merely to meet another agenda such as legal requirements and facilitate the project's approval, and are therefore alienated and of little consequence to the project itself (Wathern, 1988). Sadler (cited in Glasson, et al, 1999, p 384) criticises this scenario as "one of the indicators of worst case performance for EIA". McDonald and Brown (1995, p 493) support these observations that "issues of ineffectiveness and inefficiency, which are often levelled at EIA, have more to do with current administrative requirements and entrenched practices of EIA rather than the fundamental goals and concepts of EIA". Sowman, et al, (1995, p 46) partially accredit the lack of the adoption of environmental evaluation procedures, to "inefficient administrative structures".

Thus there is the need to integrate EIA outcomes into the project-planning process (Kakonge and Imevbore, 1993; Petts, 1999a). This requires a transformation of project administration procedures to accommodate environmental requirements. McDonald and Brown (1995, p 488) emphasise that "administrative systems must be developed that avoid marginalization of environmental professionals from the real planning process and encourage, not discourage, creative interaction between environmental aspects and project design". It is apparent that the need to integrate EIA into the project cycle presents one of the main challenges facing EIA to enable it to be practically effective (The World Bank, 1995).

The importance of the administration of the integration of EIA into the project process is fundamental not only to the concept of integration, as espoused by the IEM guidelines, but is also practically necessary to "transcend the gap between economics and ecology so that they can no longer act as separate disciplines" making the otherwise nebulous concept of sustainable development, a reality (Hare, 1991, p 24). Armitage (1995, p 469) also envisaged that "sustainable environmental planning and management require effective integration of ecological, socio-economic and institutional elements". There is a measure of institutional and organizational reform required in order to accommodate IEM. To this end Boden (1980, p 254) noted that the "South African government

administrative structure requires re-organization if we are to adopt EIAs as part of our decision-making process".

The lack of an administrative framework - inadequate institutional and organizational arrangements - according to Hill (2000) similarly contributes to problems in the Environmental Management Plan's (EMP's) implementation. He suggests the need for a merger between an Environmental Management System (EMS) and IEM, a so-called Integrated Environmental Management System (IEMS) which "embodies the synthesis of scientific and managerial competence necessary to attain effective environmental management in the implementation of projects" (Hill, 2000, p 54).

Thus various authors see EIAs efficacy and influence as being fundamentally constrained by inadequate integration into the project process as opposed to EIAs being technically inadequate within themselves (Quinlan, 1993; Sowman, et al, 1995; McDonald and Brown, 1995; Lee and George, 2000). According to Cocklin, et al, (1992a) EIA has been consistently unable to achieve what is environmentally acceptable. A prime cause of this it would appear is due to a lack of consideration of the results of an EIA during various points of decision-making in projects.

Another problem of EIA implementation is the stage at which it is introduced in the planning cycle. Early attempts at environmental management were largely reactive and came to be seen as a negative process stopping a development already in its advanced stages of planning (Council for the Environment, 1989a; Modak and Biswas, 1999). Petts (1999a, p 3) termed this 'end-of-pipe control' when numerous decisions had already been made and substantial funds committed. It was therefore evident, within only a few years of NEPA, that in order to be effective, EIAs had to be implemented proactively and had to be focused on anticipating and mitigating potential impacts early in the project process rather than being reactionary (Cocklin, et al, 1992a; 1996; Pardo, 1997; Rees, cited in Kirkpatrick and Lee, 1999; Lee and George, 2000).

What must rank as a complete misunderstanding of the EIAs purpose, which is to influence the project as early as possible from its inception, is when EIAs are often completed during or after the project has been implemented (Rout, cited in Lee and George, 2000). This window-dressing which is often undertaken merely to fulfil the requirements of legislation relegates the EIA to what Modak and Biswas, (1999, p viii) term a "mechanistic process" which has no environmental benefit for or influence on the project. This deviation from its original intention can often even lead to the undertaking of a sound EIA without "designing a project right, from an environmental perspective"

which always remains the objective of effective EIA (McDonald and Brown, 1995, p 488). According to Lee and George (2000) the gap between the EIA and project design, therefore, consistently needs to be bridged. EIA decisions have to be timely to affect numerous decisions in the project (Canadian Environmental Assessment Research Council, 1988 cited in Wood, 1999b; Sadler, 1996 cited in Wood, 1999b and Modak and Brown, 1999). Lochner and Rossouw (1997, p 194) state that "Environmental management is most effective if it is designed to provide a continuity of inputs to the development process. The appropriate level of information needs to be provided at the appropriate time .... thus preventing the environmental management process ending with the 'snap shot' of development provided by the EIA". In an international study of the effectiveness of EIA it was found that timely input into decisions was a key criterion for ensuring the EIA's effectiveness (Sadler 1996 cited in Weaver, 1996).

The late application of EIA in the project process has also been found to be due to EIAs focusing on the mitigation of impacts rather than being focused on issues prior to this in the project process such as a project's location and design (MacDonald, 1994; Brown and Hill, 1995 cited in Lawson, 1996). Similarly starting the EIA late in the project process results in foregoing the opportunity to consider and compare more environmentally suitable alternatives (Jardine, et al, 1997). This can result in an EIA being interpreted as a superficial exercise to justify a foregone conclusion rather than realising its full potential as a tool which focuses on anticipation and mitigation of potential environmental impacts in order to elicit a better decision (Ridl, 1994; Modak and Biswas, 1999). McDonald and Brown (1995, p 486) elaborate on this aspect and state that EIA "tends to be a process of analysis and criticism rather than being creative - EIA tends not to create solutions. It is usually carried out too late and ends too soon. There is a need to move from react and cure to anticipate and prevent".

Studies show that starting the EIA process late in the project cycle can considerably increase the potential for project costs and delays and diminishes the ability of a project to be modified in terms of environmental criteria when they are identified late in the project process (Lee and George, 2000). The remedy is therefore to consider the environmental impacts of projects at as early a stage in the project process as possible before any irreversible decisions have been made (Wathern, 1988; Clark,, 1983 cited in Ridl, 1994; Olokesusi, 1992; The World Bank, 1995).

Joughin (1997, p 357) recommends that not only must the EIA specifically influence the separate stages of project decision-making, but, in addition especially for big and lengthy projects, the EIA itself must be divided "into a number of phases corresponding with each stage of the development".

This also entails clearly defining the participation (I&APs, specialists, etc) necessary to influence the project decision/stage from an environmental perspective. Joughin (1997, p 359) concludes that "a good understanding of the project decisions to be served by an EIA is essential to the planning of an EIA process that is appropriate for a particular development. There should be direct, explicit environmental input into decisions served by an EIA ... " and again emphasises that there is a need to "undertake overtly decision-driven EIAs".

This lack of integration or an 'integration gap' has been previously observed in Eskom project EIAs by Kruger and Lucas, (1997, p 164) who remark that "IEM in Eskom projects is not always fully accepted nor understood by the project life-cycle teams (planning, design, survey, project management, operations and maintenance) and management teams. Furthermore, the assessment or evaluation of the actual integration and implementation of IEM within a project life-cycle management process is often not effectively determined so as to ensure continual improvement". They reflect on a second concern that "the IEM principles and the EIA process have been developed by and for environmental practitioners and not enough attention placed on integrating the principles into the project life-cycle process" (Kruger and Lucas, 1997, p 164). Kruger and Lucas (1997, p 165) have also observed a discontinuity in the transfer of environmental information from one step in the project process to the next and conclude that "the result of EIA not being integrated into the project life-cycle is that EIA has not had the required meaningful influence on the projects (in Eskom)". This concurs with problems experienced elsewhere where EIAs are adequately conducted by environmental practitioners but have little influence on the project.

In order to accommodate EIAs early in project planning in the South African public sector, Preston (1993, p 32) recommended that "the departments of Planning and Environmental Affairs do belong together ... , and that IEM should be merged with other planning legislation". However, this never materialised (Wood, 1999a). Locally the IEM principles concur with the requirement for environmental considerations to be taken into account from the conceptualization stage, through assessment and planning stages, to the implementation and monitoring stage and that the EIA procedure should be commenced "before any irreversible decisions regarding the project or technology have been made" (Council for the Environment, 1989 cited in Nel, 1997, p 233).

*The need for Strategic and Cumulative Environmental Assessment*

There has "been a trend to consider project impacts at increasingly earlier and more strategic levels of planning" (Glasson, et al, 1999, p 391). "As numerous variables are already resolved by the time the EIA of projects takes place the necessity for the Strategic Environmental Assessment of polices, plans and programmes" has also been realised (Wood, 1999b, p 12). Glasson, et al, (1999, p 316), with specific reference to the electricity supply industry, concur that "the limited treatment of cumulative impacts and alternatives at the project level suggests the desirability of an earlier, more strategic level of assessment". The United Nations recognised the limitation that the lack of assessing the environmental impacts of sectoral policies, as distinguished from discrete projects, was one of the major problems of implementing EIA (United Nations, 1992 cited in Kakonge and Imevbore, 1993, p 300).

The World Bank thus sees as one of its main challenges, to conduct EIA ever earlier in the project process and envisages that it will be part of overall development planning at sectoral and regional levels (The World Bank, June 1995). A positive example of this is where electrical utilities have realised the need for Strategic Environmental Assessment (SEA) as the vast extent of property they own has been identified as being able to contribute significantly to biodiversity conservation on a regional scale (Mattice, et al, 1996). The enactment of SEA, however, does not detract from the requirement for EIA to be applied to individual projects.

In a similar vein it has been suggested that the administration of the cumulative or combined effects of numerous projects at a regional scale should be considered to promote regional sustainability and not just the sustainable development of individual projects whose combined effect would compromise the former. Rees (1988) states that there has to be a realisation that the ecological environment poses limitations on development and there has to be broad-scale planning to accommodate this criterion. Cumulative Impact Assessment considers the combined effects of numerous development projects and questions are being asked about what can be sustained regionally i.e. what is the regional carrying capacity of the environment for development (Rees, 1988; Hare, 1991; Cocklin, et al, 1992b). The consideration of cumulative effects has meant that EIA now has to deal with "large-scale issues such as biodiversity, global climate change and sustainable development and has broadened the arena to include concepts such as environmental pathways, regional thresholds and regional carrying capacities for development (Rees, 1995 cited in Petts, 1999a, p 9). Cumulative Impact Assessment, according to Petts (1999a, p 9), "still suffers from information and method deficiencies in relation to environmental

pathways and threshold and carrying capacities. This is in part serving to provide an excuse for procedural and institutional prevarication". The development and use of strategic and cumulative impact assessment therefore needs attention.

*EIA in Developing Countries*

It is claimed that EIA is not effectively applied in developing countries (Sankoh, 1996; Olokesusi, 1992). The reasons for this are that EIA implementation ultimately relies on political will and a variety of administrative and sophisticated legislative structures, adequate numbers of trained professionals and sufficient funds which provide an enabling environment, in the face of opposing interests and priorities (Sankoh, 1996). Olokesusi (1992, p 170) listed "organized vested interests" in development and "a cumbersome and ineffective bureaucracy" as additional impediments in Nigerian EIAs. The following are additional reasons for deficiencies in EIA in developing countries: inexperience, the complexities in the EIA process; limited in-country capacity to organize, manage, carry out EIAs and integrate them in the project cycle; political and cultural obstacles to implementing certain components of EIA practice, notably those requiring public participation; and general weaknesses in enforcing environmental regulations in circumstances where economic development is given the highest priority (Lee and George, 2000).

MacDonald (1994) argues that none of these obstacles are unique to LDCs and are frequently well documented for DCs. He suggests that "almost all of the concerns regarding EIA are universal" (MacDonald, 1994, p 29). Van der Kooy (1996b) supports this argument and concludes that the excuses for not doing EIAs in developing countries are consistently the same for developed countries. It may be speculated, however, that although the problems are universal the extent to which they are experienced may still differ.

The contrast between less developed and more developed countries is exemplified in South Africa where both co-exist. Thus there is no clearly defined environmental standard in South Africa as it possesses a dichotomy of first and third world standards (Huntley, et al, 1989). It is problematic therefore to attempt to reconcile individual expectations of the developed and developing components of the community (Van Rensburg and Van Niekerk, 1993). In South Africa there is also the compounding factor that previously repressed members of the community see environmental issues as synonomous with land issues (Hart cited in Avis, 1994).

In conclusion the benefits of EIA's development in developed countries is recognised locally and its requirement in LDCs is acknowledged in spite of the degree to which this has been realised (Hoogervorst, 1993).

*The Need for Trained and Skilled People to Conduct EIAs*

According to Sowman, et al, (1995, p 54) the lack of "environmental expertise and financial resources" has seriously impeded the development of Environmental Impact Assessment in South Africa. Wood (1999a, p 55) concludes, for the period under discussion, that consultants used to undertake EIAs in South Africa often "had inappropriate expertise". There is overwhelming acknowledgement that the relevance and practical influence of EIAs are dependent on those who conduct them being suitably qualified and experienced (Kakonge and Imevbore, 1993; Hoogervorst, 1993; Sowman, et al, 1995; Modak and Biswas, 1999; Lee and George, 2000). Thus where the necessary skills are lacking an inferior product is usually anticipated.

Petts (1999a, p 5) states that:

> "The quality of any particular EIA relies as much upon the quality of the individuals who undertake it as on the adherence to any particular procedure or application. The 'cook-book' EIA performed by poorly trained practitioners, often behind closed doors to meet a basic legal obligation, and viewed merely as one more hurdle to be vaulted on the way to implementation, is unlikely to achieve the potential benefits of EIA".

Problems have arisen in the past as planners have traditionally assessed the impacts of developments on the environment but not in the systematic, holistic and multidisciplinary way required by EIA. The requirement for trained personnel thus includes the need for specialists to constitute a multi-disciplinary team (Glasson, et al, 1999).

The ability to function as a team introduces its own complexities and dynamics often not anticipated in EIA practice, however, the co-ordination of these diverse stakeholders and their interests is an eminent requirement for succesful IEM practice (Weaver, et al, 1996; Margerum, 1999).

This section has highlighted the key external factors that influence the succesful implementation of EIA. The following section discusses in more detail the steps or stages that are critical in the EIA process.

### 2.3.3 Steps Integral to the EIA Process

*Introduction*

There are certain steps crucial to the implementation of an EIA as listed in the IEM guidelines and in the literature. These steps are discussed with the exception of some which were of lesser importance, especially in an environment where legislation for EIAs was not yet prescribed. Thus sketching the common challenges in these areas of EIA provides the background against which the enactment of these steps in South Africa by Eskom may be compared.

*Scoping*

Scoping is the procedure used for determining the extent of and approach to be adopted in an impact assessment. "Scoping should identify relevant authorities and interested and affected parties, possible alternatives to the development, the significant issues to be investigated and the guidelines or terms of reference for the EIA" (Ridl, 1994, p 73). Born and Sonzogni, (1995, p 172) state that scoping represents "the interactive aspect of IEM (in) an ongoing search for and exchange of information and a quest for consensus on acceptable solutions among a broad array of interests. In varying degrees it also acknowledges shared decision-making and stewardship with regard to environmental resources". Scoping provides the broad framework for an EIA and under certain conditions can also become a decision making tool, making the completion of a full EIA unnecessary. The IEM guidelines aptly state that "scoping may well be considered to be the critical stage in the IEM procedure. The success of a proposal will be largely determined by the adequacy of the Scoping exercise" (Department of Environment Affairs, 1992b, p 20).

*Consultation with I&APs*

As Schulkin and Sarokin (1996, p 288) wrote "a philosophical vision orients, science informs, but it is the participation of individuals that is essential". Bailey (1997, p 225) confirms that "the role of Integrated Environmental Assessment is to open up (scientific assumptions) to public view and

democratise the construction of knowledge about environmental issues. That is bring decisions out of the realm of theory into the public forum".

The Canadian Environmental Assessment Research Council's (1988 cited in Wood, 1999b) requirements for consultation are very stringent. It considers that an EIA has been undertaken fairly only if all I&APs have been given equal opportunity to influence the decision before it was made. Nel (2000, p 241) notes that this extremely inflexible attitude cannot always preponderate as "the extent and nature of public involvement varies from merely being informed about an activity to a position where they control the decision-making process".

Scoping, it is held, should not restrict I&AP input to only a particular point of the project process but should be ongoing, open, iterative and interactive (Fuggle, 1992; Nel, 2000; Emmett, et al, cited in Freeman, 2001). As was discovered when undertaking EIAs for powerlines in the United Kingdom scoping should allow for public interventions at as many points of decision as possible starting as early in the project as possible (O'Luain and Corcoran, 1996). If, however, scoping is only conducted "at an advanced stage of the project the invitation to comment is regarded as an afterthought" which can and will have little effect on decisions already made (Ridl, 1994, p 70). The EIA will therefore be perceived by I&APs to be an attempt by the proponent to justify an already concluded decision or an attempt to restrict their input. Public input into the scoping phase is a requirement and therefore the sooner scoping is initiated the better and the greater the likelihood that its recommendations and the requests made by I&APs have of being implemented (Glasson, et al, 1999; Kaatz, et al, 2000; Lee and George, 2000).

O'Luain and Corcoran, (1996) note that transparency in the methodology used to ascertain alternatives is crucial in order to avoid suspicion and ensuing delays where more information may be requested at a later stage in the project process. Other benefits are that consultation with I&APs serves the critical role of aptly focusing the project on pertinent issues and should ensure that inconsequential aspects are ommitted thereby improving the quality and credibility of the EIA (Wathern, 1988; Webler, et al, 1995; Wood, 1999b). Margerum (1999, p 151) notes that "stakeholder collaboration and public involvement are central to the operationalizing (of IEM) because this produces a more integrated approach and generates support for implementation". It therefore dispels suspicion when incorporated early and progressively builds trust between I&APs and the proponent which is critical to enable environmentally effective project implementation (Avis, 1994; Ridl, 1994; Webler, et al, 1995; Archer, 1996; Davey, 2000). Once mistrust and suspicion have been created by not adequately

communicating with I&APs, as often happens in South Africa, "a great deal of energy and resources are subsequently wasted trying to convince and change the perceptions of I&APs who are already conditioned and intent on vilifying the developer" (Ridl, 1994, p 71). Once the credibility of the EIA is questioned "emotion rather than scientific information will dominate the process of evaluation" (Ridl, 1994, p 67). I&APs usually, and increasingly so, have the ability to stop projects (Lee and George, 2000). This is especially true for powerline projects which lack strong rights of expropriation (Willemse, 1995a; Van der Kooy, 1996b).

It also stands to reason that where the EIA is undertaken using in-house expertise or consultants paid for by the company the consultation process needs to work harder to dispel suspicion of bias as the danger exists that a report will be developed that will be supportive of the development proposal (Ridl, 1994).

Scoping and consultation are increasingly becoming the domain of specialists who deal with the intricacies of negotiation and group dynamics. Group dynamics require consultation to be a teaching and learning process for I&APs as the collective interest is emphasised and individual gain minimised (Webler, et al, 1995; Lejano and Davos, 1999). Freeman (2001, p 129) promotes what is termed a "transformative variety (of public participation) which builds capacity in order to empower the stakeholder". This differs from "nominal participation" which she regards merely as a form of window-dressing. What she envisages is "empowerment of the public and capacity building, equity and social justice, with action to fight inequality and strive for participative democracy" (Freeman, 2001, p 124). This further emphasises the need for competent professionals to conduct the process in order to realise the full extent and benefits of scoping for both I&APs and proponents.

Many developers are apprehensive about scoping and ignorant of its benefits (Greyling, 2000). Therefore scoping is often reduced to 'exhibiting the EIS for 30 days at the city hall' as was discovered for some EIAs in parts of Spain (Pardo, 1997, p 123). Where the potential for opposition is greatest the need of public participation should also increase. However, the proponent often views this conversely and invariably tends to become less transparent and more secretive to avoid conflict in the face of growing opposition (Glasson, et al, 1999). Some of the reasons for this apprehension are that there are unpredictable delays and costs associated with scoping and it is difficult to define the extent to which it may proceed within the limitations of the project process (Burger and McCallum, 1997; Freeman, 2001). It also opens the project up to decisions of often the most vociferous group and proponents are also concerned that the public participation process can become stressful and divide and

cause conflict in communities over issues raised (Burger and McCallum, 1997; Weaver, et al, 1999). As a result, there is the fear that the project will languish in stalemate without a conclusive decision being reached (Lejano and Davos, 1999; Glasson, et al, 1999). One of the greatest obstacles to public participation in South Africa is the late response of I&APs due to public apathy or past conditioning and disempowerment (Burger and McCallum, 1997). This inevitably leads to the development being delayed when I&APs eventually, at an advanced stage, seek to have the project explained, demand to have input or oppose it (Ridl, 1994). This obviously feeds the negative misconceptions and apprehensions of developers about scoping.

In spite of these fears the fact remains that in order to avoid delays, I&APs, who have a predisposition to "look for confirmation of their fears" about the project must have the whole truth stated candidly (Glasson, et al, 1999, p 164).

One of the main challenges facing EIA according to The World Bank (1995 cited in Glasson, et al, 1999) is to have more effective consultation with locally affected people which enhances the development process. The Brundtland's Commission accentuates the need for intra-generational equity and participation (Glasson, et al, 1999).

Weaver (1999) questions the integrity of South African practices and identified the need to develop a code of ethics when consulting poor sectors of the community. Sowman, et al, (1995, p 54) state that "an elitist approach predominates in South Africa whereby professionals believe that those who are best qualified and most knowledgeable should be responsible for making societal decisions. A key criticism of this approach is that technical and financial, rather than environmental and societal considerations, dominate the decision-making process". Where the concerns of poor people are not adequately considered, the emphasis of EIA may also revert to what Weaver (1999, p 309) terms "green issues". The conclusion is that agencies involved in environmental management need to develop a new ethos and also focus on the needs of resource-poor people, rather than only green issues such as endangered species and wilderness areas (Weaver, et al, 1999).

Some education of the developer during scoping to convince them of the need for "social justice, public participation and equity issues" is therefore also necessary to prevent an authoritarian domination of the scoping process by the developer (Freeman, 2001, p 129). Thus "scoping methods appropriate to less participative minority groups have to be employed". This is opposed to the methods which are easily conducted such as "newspaper notices" but which do not render results or engender a

response from less educated I&APs (Williams and Hill, cited in Glasson, et al, 1999 p 164). Van der Kooy (1996b, p 103) supports this standpoint for disadvantaged communities in South Africa and argues that "the steps of the EIA process should be similar in all situations, but the approach and techniques will differ from one situation to another".

It is apparent that the challenges in reaching illiterate and marginalised people with their difference in perception *vis a vis* the environment had not been met in South Africa in the 1990s (Avis, 1994). South Africa has a dichotomy of first and third world populations with attendant differences in expectations and standards, which was very pronounced during the early 1990s making scoping a complex process (Huntley, et al, 1989; Van Rensburg and Van Niekerk, 1993; Weaver, et al, 1999). Prior to 1994, it is held, there had been limited public participation in EIA under the IEM procedure and even more noticeably so with regard to disadvantaged sections of the community (Ridl, 1994; Khan, 1998 cited in Wood, 1999a). Margerum (1999) acknowledges that collaborative planning between ideologically diverse and often antagonistic or divergent I&APs/stakeholders poses challenges and Mitchell (1986 cited in Margerum, 1999) is resigned to the fact that these differences will never be totally resolved at regional scales when attempting IEM.

It has been proposed, as a necessary solution, that I&APs, especially in illiterate communities, undergo some form of training in the technical aspects of the development by an independent third party, the latter so as to prevent bias (Dowling, 2000). It is evident that public participation requires substantial resources of time and money for education to enable capacity building especially in a developing country.

Merely imposing development on communities is being replaced by a more consultative and participatory approach involving communities thereby giving them greater control over development decisions previously imposed upon them (Rees, 1988; Lukey, 1994; Scott and Oelofse, 2001).

*The Identification of Significant Issues and the Determination of Specific Guidelines*

Initially IEM considers the entire system and interconnections in both the physical and human systems (Margerum, et al, 1995 in Margerum, 1999). According to The World Bank (1995, p 3) "the ultimate purpose of an EA is to safeguard ecological functions, ensure responsible natural resource use and protect community values". EIA has to initially consider all the interacting components of the environment viz. the biophysical, social and economic components. In spite of this broad initial scope

one of the aims of scoping is to narrow and achieve as its goal the prediction of highly specific impacts on these aspects of the environment and allocate significance to these impacts (Glasson, et al, 1999). According to Sadler (1996, cited in Glasson, et al, 1999, p 384) another of the indicators of worst case performance for EIA, is where it "provides information that is unhelpful or irrelevant to decision-making". Wathern (1988, p 9) states that "in practice, a decision will generally depend upon only a small subset of issues of overwhelming importance. Scoping is the process for determining which issues are likely to be important".

Important issues or impacts should be elucidated objectively by ascertaining the magnitude and duration of the impact, however, determining its significance remains more subjective (Glasson, et al, 1999). Because of this subjectivity it is, according to Petts (1999a), imperative that judgements about significance are clear and transparent.

Specific guidelines are also to be elicited from I&APs during scoping and include particular requirements, methods and procedures for preparing the impact assessment and standards to be adopted in accordance with demands of I&APs.

*Scoping for Alternatives*

The essence of any EIA or IEM for that matter, is the comparison, evaluation and selection of the most preferential alternatives (Andrews, 1988; Preston, et al, 1992; Modak and Biswas, 1999). According to Avis (1994, p 239) "incremental or fundamental alternatives for meeting the purpose and need of the original proposal must form part of the investigation into all activities that may impact on the environment".

It is apparent that the consideration of alternatives lends credibility to EIAs. The lack thereof presents the opposite scenario where suspicion can prevail amongst I&APs. Andrews (1988, p 88) aptly states that "if the assessment is designed to compare alternative courses of action, it provides, in effect, the framework for a decision rather than mere justification of a proposal". These sentiments are echoed by NEPA and numerous others as an EIA is not supposed to be a justification of the proposed project or of decisions already made regarding the project but a comparison to find the most preferable alternative giving the decision greater credence (Magness, 1984 cited in Wathern, 1988; The World Bank, June 1995; United Nations, 1994, cited in Gupta and Asher, 1998). The consideration of alternatives also enhances the potential for project sustainability (Petts, 1999b). In a number of South

African EIAs scoping has been done as part of the evaluation of a predetermined land use and not in order to assess and compare alternatives. Even though alternatives receive considerable attention in the IEM guidelines, attention to this aspect in South Africa has been variable (Ridl, 1994; Wood, 1999a). Where no alternatives have been considered public concerns at best can then only be incorporated into the preconceived project design as opposed to aiding the comparison of alternative designs. This trend persists worldwide, where it has been found that EIAs do not do justice to the consideration of alternatives (Saddler, 1996 cited in Wood, 1999b). Where alternatives have not been considered or discarded it has the consequence that EIAs are ultimately relegated to a "rubber stamping exercise" (Hoogervoorst, 1996, p 35). Glasson, et al, (1999) campaign therefore to make the consideration of alternatives mandatory.

Greater flexibility is required in projects to accommodate the consideration of alternatives. This is aided by considering alternatives at a strategic level, according to Petts (1999a) when the project itself is least defined and still in the initial stages of evolution as opposed to the project being already defined. This makes allowance for the consideration of fundamentally different alternatives, as opposed to merely the consideration of incrementally different alternatives of a particular project design (Council for the Environment, 1989a; O'Luain and Corcoran, 1996; Sadler cited in Weaver, 1996; Mafune, et al, 1997; Pardo, 1997; Lee and George, 2000).

The consideration of alternatives at an early stage in the project-planning process also increases the number or scope of alternatives available for consideration (Kakonge and Imevbore, 1993). The consideration of alternatives tends to diminish as the project progresses and becomes more defined or where there is bias, or where the company already owns the property, or has already made substantial capital outlay (Avis, 1994; Jardine, et al, 1997; Glasson, et al, 1999). Thus the window for considering alternatives diminishes as the project progresses and therefore this aspect of scoping needs to be considered as early as possible in the project process before there has been substantial inputs of time and money.

The consideration of alternatives also requires a change in company mindset to a point where cost and profits do not dominate the decision-making process but environmental impacts assume greater or ultimately equal importance. It was found when routing powerlines in Ireland that the consideration of alternatives, be they fundamental or incremental, required a quantum change in company practice and mindset (O'Luain and Corcoran, 1996). The least costly practice of using technical criteria e.g. long straights and minimal bends or the shortest route, for routing powerlines had to be tempered and re-

directed to those practices aimed at minimising the environmental impact. In many cases the best technique to minimise impact was avoidance and this was often more costly. This illustrates the paradigm shift required, away from one that just suits the company to one which considers alternatives beyond what was previously considered financially permissable (O'Luain and Corcoran, 1996).

The 'no development' option/alternative is one that should be considered and in some countries it is even a legal requirement. This option is the ultimate challenge of commitment to EIA procedure, process and ultimately environmental custodianship. Diab, et al, (1999, p 65), however, found that the 'no development' option did not apply in "an underdeveloped context" in KZN, South Africa. Mafune, et al, (1997) studied 28 EIA reports from which Wood (1999a, p 54) drew the conclusion that even though alternatives receive considerable attention in the South African EIA system "the treatment of alternatives, and particularly the no-development alternative, in South African EIA" leaves much to be desired.

The consideration of alternatives will also by necessity receive greater emphasis as the "concern over the sustainability of development grows ... as the consideration of alternative approaches provides greater scope for the avoidance of impacts" (Wood, 1999b, p 29).

*Investigation*

Once the key issues have been identified by scoping adequate investigations into these issues need to be carried out to provide adequate information on potential impacts and to explore the ability to mitigate against these impacts in order to promote informed decision-making.

Two problems associated with investigation have been recognised in the literature. One is where there has been almost no investigation and unjustified generalisations are made (Beanlands, et al, 1983 cited in Duinker and Baskerville, 1986; Andrews, 1988; Pardo, 1997). A definition of EIA is to document an environmental analysis which includes the "identification, interpretation, prediction and mitigation of impacts caused by a proposed project" (Jain, et al, 1977, cited in Ridl, 1994, p 66). Superficial investigation contradicts and nullifies these stages and reduces them to window dressing. A sample of EIRs examined in Canada showed that EIRs were descriptive rather than predictive; largely lacking in a rigorous approach to analysis and interpretation of data; and provided results of questionable value either for decision making or subsequent testing and replication (Beanlands, et al, 1983, cited in

Duinker and Baskerville, 1986). Mitigation measures proposed, therefore, to ameliorate or offset impacts were largely based on generalized principles and not grounded in specific findings.

The other perspective relates to the capacity of EIAs to provide adequate investigations given the limited time and funds available for projects (Hildebrand, et al, 1987 cited in Quinlan, 1993). A point that must be respected is that scientists recognize that there are limits to understanding the processes at work in nature and it is unlikely that EIAs can be expected to provide investigation at these limits (Holling, 1978, cited in Dickman 1991; Rees, 1988). This debate regarding the extent and limitations of investigation is also reflected in research into the complexities of the social environment in EIAs (Quinlan, 1993). This is also often compounded by "a lack of expertise for conducting a comprehensive EIA and data for identifying and predicting potential impacts as a result is often not available" (MacDonald, 1994, p 30). Margerum (1999, p 159) analysed Australian use of IEM and noted that the proponent's need to "develop targeted investigations in partnership with researchers" had been identified in order to try and overcome the dilemma of insufficient time and funds during individual project EIAs.

Even though it is acknowledged that it is considered prudent to err on the side of caution and adopt a precautionary approach, or what is termed a safe minimum standard, via consultation and research before making major changes to ecosystems, there is acceptance that there is always some measure of unpredictability (Beattie, 1995; Ciariacy-Wantrup, 1952, in Coleman, 1996). A simplistic measure adopted to cater for unpredictability is a procedure called adaptive environmental assessment and management whereby issues are dealt with as they arise and the project modified accordingly as it progresses through its successive stages. The steps of EIA are repeated providing feedback and enabling "ammendment of the proposal" (Wood, 1988, p 104). Investigation therefore "has a bias towards coping with uncertainty rather than improving predictability" (Gardner, 1989, p 351). Deficits in predictability need to be compensated for by ongoing and iterative research, auditing and effects monitoring (Rees, 1988; Mattice, et al, 1996). This inability to predict particular impacts with certainty requires a flexibility in projects whose schedules and costing has to be adjusted accordingly (Holling, 1978, cited in Rees, 1988). The feasibility of this approach requires a major change in mindset and it will be interesting to see if this remains a theoretical assumption when the pressures of project schedules and costs predominate.

The down side of not predicting and accounting for impacts via adequate investigation is, as found when studying gully erosion in Ethiopia, that it is extremely difficult to reverse environmental

degradation once it has materialised (Ebisemiju, 1989). In South African EIAs a lack of confidence in the data used in predicting impacts is compromising decision-making (Barker, cited in Weaver, 1996).

A recent survey of the utility industry in the United States showed that "biodiversity was not considered a current major issue ... , however, it was regarded as a potential future issue" (Breece and Ward, 1996, p 803). This is an indication of the paucity in investigation at present and the need for research.

In the past there was a strong emphasis on the biophysical environment but greater project sustainability has been realised as a result of considering both the physical and social environments in which development takes place (Lukey, 1994; Sadler, 1996; Gupta and Asher, 1998; Weaver, et al, 1999). Normally projects are imposed on communities with portions of the IEM guidelines applied which appear most beneficial to the proposed project (Lukey, 1994). This is exacerbated by the fact that the IEM guidelines, according to Quinlan (1993, p 106), endorse a "simplistic positivistic approach" where "change is seen as quantifiable effects ('impacts') and management as the application of an opposite force ('mitigation') to modify the magnitude of these impacts". This is inadequate for social impact assessment, according to Quinlan (1993, p 108), where "social scientists seek to understand change and explain how this change can be managed".

A simple way of describing the nature of social impacts, according to Vanclay (cited in Lee and George, 2000) would be to consider changes in people's way of life; their culture; their community or their environment. There is a need for a shift in emphasis and therefore procedure to reconcile social and ecological needs in EIA. In order to guide the social impact assessment Scott and Oelofse (2001) propose a social justice approach as opposed to the present trend of ecological modernization. The latter is said to include a strong emphasis on ecological issues and economic growth largely to the exclusion of the local communities. They propose a social justice approach especially for "vulnerable and marginalized groups in society that have suffered from historical forms of exploitation and neglect" whereby "environmental management becomes more socially equitable" and not something technocentrically imposed on communities for the sake of reducing environmental degradation and promoting business per se" (Scott and Oelofse, 2001, p 266). This brings into play the means of balancing not only ecological and development criteria but also social criteria.

*Review*

Mattice, et al, (1996) hold that ultimately the responsibility for the preservation of bio-diversity rests with the state. Any investigations and decisions therefore need to take place in consultation with and be reviewed by academia, government and private enterprise (Coleman, 1996; Wieringa and Morton, 1996). However, with the use of in-house expertise to formulate the EIA and the conflict of interest that this implies, the need for external review becomes even greater and it has been suggested that it should be made compulsory under such circumstances (Rees, 1988; Wathern, 1988; Sowman, et al, 1995). The necessity of adequate review for the period 1989 to 1997 when EIA was being conducted in-house and voluntarily in South Africa by Eskom for Eskom projects is considered essential to ensure the credibility of these EIAs.

Review has also been constrained to a single point in the EIA process instead of being iterative and ongoing. Wood (1999b) also suggested that review should be conducted at some other point post project implementation.

*Environmental Management Plan*

Once a decision has been made regarding the alternative that will be developed it is necessary to compile an Environmental Management Plan (EMP) which prescribes environmental considerations such as mitigatory measures to be complied with during the development's implementation and operation phases. According to The World Bank (1995, p 5) "mitigation, monitoring and management plans should always clearly specify the measures and activities to be undertaken, explain how they will be implemented, indicate their timing and duration, and identify entities responsible for their implementation, associated costs and sources of funding. If necessary, priorities should be established between the various measures". The IEM guidelines concur with these requirements but also stipulate the necessity to train those who are to implement the EMP, as well.

It is important to note that the environmental management of a development does not cease at a project's implementation. Bisset (1988, p 126) remonstrates that "a major failing of EIA practice has been a common use of EIA to obtain a development permit, rather than as a tool to achieve sound environmental management .... Presently, the emphasis is directed towards the approval procedure with little attention being given to the post-approval stage". The EIA has been noted to 'stop' at the point of authorization. As a result the EMP, monitoring and auditing have often been neglected

(Wathern, 1988). Others acknowledge that the EMP and monitoring remain "the weakest link" in EIA practice currently (Petts, 1999b; Sadler, 1996 in Hill, 2000; Lee and George, 2000).

The results of a research survey in 1997 found that EMP practice in the UK varied considerably. "There was generally too much emphasis on physical measures, rather than on operational or management controls, and a lack of attention to the impacts of construction and to residual impacts after mitigation" (Glasson, et al, 1999, p 155). Hill (2000) notes that during implementation problems arise due the poor allocation of responsibility for environmental management with a concommitant lack in methods for exercising this responsibility. He concludes that the administrative requirements to implement the EMP, monitor it and provide ongoing corrective action when necessary, are extremely complex. He thus recommends that the roles and environmental responsibilities of those implementing a development need also to be defined via an Environmental Management System.

Similar to other stages of the EIA it remains the task of the EMP to progressively bridge and avoid the disjuncture between planning and implementation often termed the "implementation gap" (Born and Sonzogni, 1995, p 171). Recommendations and mitigatory measures have to become more and more practical as the project progresses and the EMP, and its mitigatory measures, is the vehicle for this to occur (Lee and George, 2000). This sequence has been confounded by environmental practitioners who propose mitigatory measures which are impractical and financially unachievable. There is an arrogant assumption by environmental practitioners that they have sufficient knowledge to develop mitigation measures without consistently consulting engineers and other professions. According to Parkes, et al, (2001, p 228) environmental practitioners "often fail to distinguish between the 'nice to have' mitigation measures, many of which may be financially and practically unachievable" and the necessary "mitigation measures, which should be implemented irrespective of difficulty and cost". Wathern (1988) continues to point out that mitigating measures identified during the EIA may be incorporated more economically at the design stage than subsequently during or post implementation. Seemingly in contradiction Barker (1996) found that mitigatory actions recommended in EIAs were seldom presented in sufficient detail to support their effective implementation. She attributed this to the EIA having to be concluded when the project was still in the conceptual or preliminary design phase and deadlines for the completion of the EIA report did not allow more detailed recommendations to be given as the project progressed. Thus the EMP needs to be progressively applied, revised and linked to points of project decision-making as early in the project process as possible as well as subsequently (Lee and George, 2000; Parkes, et al, 2001).

Greater significance was placed on the EMP in LDCs where the 'no development' option did not hold in an underdeveloped context (Diab, et al, 1999). This, it was purported, meant that the EMP "assumes a role that is paramount in protecting the natural environment" in LDCs (Diab, et al, 1999, p 65). However, Parkes, et al, (2001, p 227) caution that the EMP should not be viewed as "a 'catch-all'". Thus there remain limitations on an EMP's ability to "address all environmental evils from bad design to poor construction practice" (Parkes, et al, 2001, p 227).

*Monitoring*

Monitoring of the EMP and the project's implementation is a necessity (The World Bank, 1995). Duinker (cited in Hill, 2000, p 51) makes a distinction between inspection and monitoring as "monitoring having deeper scientific extraction and refers to measurement over time or repetitive measurement". This differs from auditing which tests against predictions that were forecast. The IEM guidelines of 1992 are specific and exemplary on their requirement for monitoring and auditing (Wood, 1999a). However, a lack of monitoring and auditing has been identified as one of the key problem areas for EIAs in South Africa (Barker, in Weaver, 1996). Modak and Biswas, (1999) state that the absence of proper monitoring and auditing is now a major handicap. This is compounded by the fact that it is not always mandatory (Glasson, et al, 1999).

Wathern (1988, p 16) stresses that monitoring should give attention to continued data collection to actually ascertain impacts which "can be used either to refine the proposal, perhaps by the inclusion of additional remedial measures and the relaxation of constraints found to be unnecessarily restrictive, or to modify the decision". Similarly the importance of ongoing ecological research, monitoring, follow-up and feed-back during implementation needs to be stressed as it extends EIA and enables it to continue as a tool of management and evaluation (Beanlands, 1988).

The lack of monitoring has promoted ignorance of the actual impacts of projects, thwarted learning from past mistakes and reduced the positive benefits these could have for future EIAs (Pardo, 1997). Monitoring could therefore help focus subsequent EIAs on pertinent issues sooner, reducing the time and effort currently expended and also help diminish uncertainty in EIAs (Bisset, 1988).

In conclusion the EMP and monitoring is a phase of concern in current EIA practice requiring greater attention.

*Auditing*

Auditing obviously requires something to audit but "EISs often contain very few testable predictions and environmental parameters that are monitored and what is audited may not even correspond with those for which predictions were made" (Buckley cited in Glasson, et al, 1999, p 198). Sadler (1988, p 141) states that "for the purposes of auditing and evaluation, it is clear that impact predictions should be stated as testable hypotheses". There are several examples from Canada where accurate predictions are the exception rather than the norm and EIA has failed to predict significant impacts (Berks, 1988 cited in Glasson, et al, 1999). This lack of prediction confounds auditing all the more. However, the experience and learning gained from auditing and monitoring more than justifies its necessity in spite of there currently being a deficit with respect to impact prediction (Wood, 1999b). Furthermore post-project auditing should also evaluate the accuracy and effectiveness of the EIA process and be expanded to include the need for auditing of administrative and management procedures which were identified as a major constraint to EMP implementation (Hill, 2000). There are numerous types of audit approaches such as performance audit, procedures audit and predictive techniques audit. Tomlinson and Atkinson (cited in Glasson, et al, 1999, p 198) have noted that "the standard EIA process provides seven different points of audit leaving little excuse for auditing not to be conducted, making it a complex and highly diverse process requiring professional skills and not just relegated to a simplistic end of project function".

The lack of auditing, similarly to monitoring, has diminished and not improved the credibility of EIAs. By not improving and learning from the past and diminishing inaccuracy in prediction or EIA process, future EIAs for similar projects in similar environments repeat past mistakes and waste time and money instead of focusing sooner on significant issues (Gardner, 1989; Bisset, 1988; Sadler, 1988; Petts, 1999b). As a consequence, there appears to be a need for a feedback mechanism in EIA which involves the transfer of knowledge from the actual environmental effects of a project or action to future EIAs. This can only be achieved through auditing. Sadler (1988, p 131) remonstrates that the lack of auditing "results in the well-known tendency of every EIS to duplicate information and undertake unneccessary analysis, because the results of previous experience were not monitored or evaluated. This constant tendency to 'reinvent the wheel' represents a hidden tax upon impact assessment". Auditing will correspondingly improve the efficiency of EIA practice and and the mitigation of impacts as well (The World Bank, 1995; Petts, 1999b; Wood, 1999b).

Gardner (1989, p 344) has warned of the "dangers of relying on institutionalised processes without questioning their effectiveness". The apprehension expressed by Preston (1993, p 31) as to whether IEM "would be worth having" even when legislated and the fact that procedure cannot in any eventuality be adequately legislated (Van Viegen, 1998) heightens the necessity for auditing to allay the fear of EIA becoming mere lip-service. Commitment to sound auditing remains one of the means of determing an organisation, such as Eskom's, commitment to and continual improvement in environmental impact assessment.

## 2.4 Conclusion

The historical context of EIA internationally has been sketched as well as the development of the IEM guidelines locally in order to contextualise the study. A review of the literature illustrates factors external to, as well as peculiarities internal to the EIA process, exerting influence on its implementation. This review has endeavoured to be broad, as well as succinct, in identifying and describing the problems and issues common to EIA implementation from international as well as local literature sources. This provides the background against which the implementation of the IEM guidelines by Eskom, between 1989 and 1997, may be tested.

# CHAPTER 3

# METHOD OF STUDY

## 3.1 Introduction to Methodology

This chapter discusses how the study was conducted. Qualitative approaches were used as well as primary and secondary data. Trends were identified from the data. Walford (1995, p 7) acclaims the merits of geographers who emphasise "contemporary phenomena and the consideration of relatively limited historical trends". He states that "the analysis of processes of change has many applications and practical value as opposed to research for the sake of research or strictly scientific credentials" (Walford, 1995, p 7). Similarly an elucidation of the trends associated with the implementation of the IEM guidelines over the period is deemed to have benefit.

## 3.2 Literature Review

The background to EIA development internationally, within South Africa and more specifically in Eskom, was sketched in Chapter 2, in order to contextualise the study for the period 1989 to 1997. This provided the historical as well as chronological context in which the research took place.

The literature review endeavoured to identify those issues and problems common to EIA practice internationally. This provided the framework for comparison against which implementation by Eskom of the IEM guidelines could be assessed and trends identified. The study did not exclusively restrict the analysis to trends relevant to the steps of IEM procedure as listed below but also endeavoured to spread the net to include those trends evident and pertinent to the overall successful implementation of EIA procedure. It was also not attempted to critique the South African IEM guidelines per se but rather the implementation thereof.

## 3.3 Projects Selected for Analysis

In this research a case study approach was used. Twelve significant projects in terms of magnitude, cost, environmentally sensitive localities and expediency, associated with the bulk upgrading of Eskom electricity supply to KZN, were selected (Figure 1). These case studies coincided with the period 1989

to 1997 when the IEM guidelines were voluntarily applied. Table 1 provides a list of the case studies used in this research.

Table 1: Case Studies Analysed, EIA Period and an Indication of the Researcher's Involvement.

| Case Study | Period of the EIA | Researcher's Involvement in the Project |
|---|---|---|
| Ariadne substation (Tx) | 1991 | Not at all |
| Ariadne-Venus 400kV line (1) (Tx) | 1991 - 1994 | Not at all |
| Hector-Klaarwater 275kV line (Tx) | 1992 - 1994 | Not at all |
| Ariadne-Venus 400kV line (2) (Tx) | 1994 - 1995 | Very little |
| Ariadne-Hector 400kV line (Tx) | 1994 - 1995 | Very little |
| Hector substation (Tx) | 1994 - 1995 | Indirect |
| Pongola-Vergenoeg 132kV line (Dx) | 1994 - 1995 | Indirect |
| Ariadne-Bulwer 132kV line (Dx) | 1994 - 1995 | Direct |
| Ariadne-Eros 400kV line (Tx) | 1995 - 1996 | Very little |
| Eros substation (Tx) | 1995 - 1996 | Indirect |
| Kokstad-Mount Frere 132kV line (Dx) | 1996 - 1997 | Direct |
| Mount Frere substation (Dx) | 1996 - 1997 | Direct |

The author was involved with six of the twelve projects discussed, as evidenced in Table 1, since taking up employment as an Environmental Practitioner with Eskom in KZN during August 1993. He was involved to little or no degree with the other six. Personal involvement with these projects enabled the author to gain an in depth understanding of the development of EIA in Eskom, and to operate as an 'insider' in this research.

Due to the controversy surrounding the Ariadne-Venus 400kV line EIA which had to be repeated, more literature was available making its analysis more tenable and thorough. Similarly the author conducted a four year study on the chronic soil erosion associated with the construction of the Hector 400/275kV substation and therefore this case study is also comparatively more thoroughly referenced than the other ten (Burger, 2000b).

## 3.4 Selected Steps of IEM which were Analysed

In order to determine if the IEM Guidelines had been adequately implemented or not, a set of selected steps were extracted from the IEM Guidelines as revised of 1992 according to which the 12 Eskom project EIAs for the period were analysed (see Table 2).

For the sake of completeness and due to the EIA process espoused by the IEM guidelines of 1989 being similar to that of the revision of 1992, the Ariadne 400/132kV substation EIA and Ariadne-Venus 400kV line first EIA, commenced when the IEM guidelines of 1989 were in existence, are also analysed against the IEM guidelines of 1992.

The IEM Guidelines of 1992 state that the Notify I&APs, Scoping, Investigation, Report and Authority Review steps are required steps for an EIA and the use of these steps for purposes of comparison was therefore compulsory for this study. In the absence of legislation and a statutory body to oversee and enforce EIA implementation, policy (especially the environmental policy of the company), review by specialists and the public, monitoring and auditing take on greater significance and therefore the implementation of these steps is also analysed for the period.

The implementation of the IEM Guidelines' requirements for Reports was not reviewed as this would entail merely ascertaining if steps already reviewed, such as scoping and investigation, had been adequately documented, however, the elaboration of guidelines as listed in the requirements for Reports are considered. The importance of the Report and its practical relevance, except for recording purposes during this period, is also questionable. The report was often too complicated and therefore inaccessible to the majority of I&APs except an erudite few, all of whom, in spite of this disadvantage, were required to use it for review purposes. The number of scientific experts who understood and were familiar with the EIA process were indeed few in KZN during the initial years of EIA implementation.

The review by Authority, Record of Decision and the Appeal stage are obviously redundant in the absence of a statutory body to orchestrate these functions. Although the then Natal Parks Board (NPB) at times fulfilled the review function and their recommendations were often considered, these were not statutoraly binding on Eskom. Eskom remained both the proponent and final decision-maker for the period. A review of the EIA methods used to evaluate impacts by Eskom are also not discussed as this has been researched elsewhere by Lawson (1996).

Thus the compulsory steps of Scoping and Investigation are assessed and in addition, the recommended steps of Establish Policy and Administrative Requirements, Review by Specialists and the Public, compilation of an Environmental Management Plan, Monitoring and Auditing are reviewed to establish compliance with the IEM Guidelines of 1989 and 1992.

Table 2: Steps of the IEM Guidelines Selected for Review

| |
|---|
| **POLICY REQUIREMENTS** |
| **ADMINISTRATIVE REQUIREMENTS** |
| **SCOPING** |
| Consultation with I&AP's (includes notification) |
| Identification of possible alternatives |
| Identification of significant issues |
| Determination of specific guidelines |
| **INVESTIGATION** |
| **REVIEW** |
| **EMP & MONITORING** |
| **AUDITING** |

## 3.5 Observation of Impacts

Another reason for the selection of the steps listed in Table 2 was that there was an expectation that a lack of adequate compliance to these steps, especially in the scoping, investigation and the EMP phases, would be evidenced by either the project having negative impacts on the environment, or the environment having negative impacts on the project or both. It is difficult to empirically evaluate an EIA's effectiveness merely in terms of compliance to a set of procedural steps. In addition, where there was overwhelming evidence that impacts had arisen during and post construction, these outcomes are also discussed in this thesis and give an additional indication of the efficacy of the EIA.

## 3.6 Collection of Data on EIA Performance and Compliance

The EIA process and detail of investigation differs from project to project as to what is appropriate and

therefore requires investigation using qualitative analysis as opposed to quantitative analysis – the latter's measurement is rigid and measurable whereas the former acknowledges the thoughts and perceptions of individuals and allows evaluation in terms of key stakeholders' experience.

Since the study addresses the qualitative rather than the quantitative contents of published works, the propositions are problem orientated rather than statistically orientated (Leedy, 1980 cited in Lawson, 1996). Thus an inductive approach was adopted. Qualitative research allows for an inductive approach which requires numerous individual pieces of evidence, which by analysis, leads the researcher to an intuitive generalisation (Lawson, 1996). It "strives to maintain a holistic view of what is being studied" (Hakim, cited in Robinson, 1998, p 409) from which trends can be extrapolated as opposed to a "highly structured" manner which attempts to "verify or disprove predetermined hypotheses" (Leedy, 1993, p 144).

Compliance to the steps was assessed and audited from first-hand observations by the author, by conducting a review of EIA Reports, information gleaned from documented consequences, interviewing the relevant project environmental officers and project members and the examination of newspaper clippings and project meeting records.
intriguing

Table 3 provides a list of Eskom employees who were interviewed in this study as opposed to merely providing a brief comment. They were involved in some way with implementing the IEM guidelines in the projects as listed.

The interviews were not conducted using structured questionnaires although the IEM guidelines provided some implicit guidance. This reduces the pitfalls associated with questionnaires which according to Robinson (1998, p 390) "restrict the way in which people can answer questions and hence the 'results' of any analysis of questionnaire responses are strongly predetermined". The interviews often entailed some form of awareness raising of the interviewee in order to facilitate extracting information. Thus the key information that was derived from those interviewed was their perceptions of the process as well as factual data which informed the researcher and was used in the analysis of the Eskom projects. The success of IEM as applied to projects in Eskom was also therefore considered as a measure of how it was understood, accepted and applied by those involved in the projects. An additional outcome of this type of questioning was that the effect and transformation IEM had on Eskom and those involved in the projects, could be explored.

Table 3: List of Eskom Project Employees Interviewed.

| Name | Responsibility | Project |
|---|---|---|
| Bothma, F | Project Manager | Hector 400/275kV substation |
| Clara, J | Environmental Planner | Hector-Klaarwater 275kV line EIA and EMP |
| De Kock, P | Environmental Planner | Ariadne 400/132kV substation EIA |
| Estment, R | Transmission Chief Planning Engineer | Responsible for planning and initiating Transmission projects |
| Funston, W | Environmental Planner | Ariadne-Hector 400kV line, Ariadne-Eros 400/132kV line and Eros 400/132kV substation EIAs |
| Greybe, P | Substation Hydrological Design Engineer | Hector 400/275kV substation and Eros 400/132kV substation |
| Ryan, L | Substation Project Design Engineer | Hector 400/275kV substation and Eros 400/132kV substation |
| Tunnicliffe, D | Transmission Negotiator | Ariadne-Hector 400kV line |
| Van der Kooy, F | Environmental Planner | Hector 400/275kV substation EMP |
| Van Praag, P | Project Finance Manager | Hector 400/275kV substation |
| Willemse, D | Environmental Planner | Ariadne-Venus 400kV line EIA and EMP |

Those with more detailed knowledge, namely the Eskom Environmental Practitioners directly responsible for the EIAs, were interviewed in more depth in terms of the guidelines. Deductions could then be made about the IEM guidelines' implementation, and even their implementability, within the EIAs conducted.

Documents in the NPB archives, previously not released, were very useful in revealing the NPB's true impressions of the EIA process in Eskom. This internal correspondence is invaluable as they were regarded by Eskom as a key I&AP and were often afforded the status equivalent to provincial review agency by Eskom and I&APs alike, for the period.

Table 4: List of those Interviewed on Aspects Related to the Implementation of the IEM Guidelines or the Projects.

| Name | Capacity |
|---|---|
| Allan, S | Department of Environmental Affairs, KwaZulu-Natal |
| Anderson, G | Archaeologist, AMAFA |
| Hatton, I | Planner, Natal Parks Board |
| McCann, K | Ornithologist, Endangered Wildlife Trust |
| Nel, J | Director, Centre for Environmental Management, Potchefstroom University |
| Pallett, M | Senior Planning Engineer, Eskom Distribution |
| Scott-Shaw, R | Botanist, Natal Parks Board |
| Seaman, M | Department of Environmental Studies, University of the Free State |
| Van Heeswijk, P | Project Design Manager, Eskom Distribution |
| Ward, R | Ecologist |
| Weaver, A | Environmental Consultant, Council for Scientific and Industrial Research |

## 3.7 Limitations and Benefits

As stated above greater emphasis was placed on certain projects corresponding to the author's involvement or due to the greater availability of information.

The six of the twelve projects where the author was either not personally involved or only very marginally involved are less well represented, than those with which the author was either indirectly or directly involved as an environmental practitioner (see Table 1). This represents some bias in the analysis. On the whole, however, information and sources are assumed to be adequate and trustworthy. This limitation does not detract from the aim of the research which is not to focus solely on a thorough assessment of the projects but rather to elicit trends and key arguments concerning the application of the steps and ultimately give an indication of success or failure in the application of IEM.

Bias is introduced by the author, since I was part of six of the twelve projects. For three of these I was the responsible Eskom environmental officer. My concern with regard to the lack of rigorous application of IEM procedure in the projects is reflected in the results of this study. The findings, it is

further acknowledged, are therefore influenced by dissatisfaction with Eskom senior management in the implementation of the IEM guidelines at times, their failure to heed the advice of environmental staff and achieve, what was, in my opinion, often practically attainable, within reasonable cost and time constraints. The time period it is acknowledged was the recent introduction of the IEM guidelines and this was a factor which also influenced my judgement on the implementation of the guidelines. From the latter perspective some may deem my stance and evaluation to even be too lenient.

Benefit is derived from the author being intimately acquainted with the Eskom project process and the people implementing the projects. Due to this intimate knowledge I also have a better understanding of the constraints of implementing IEM in Eskom. I can therefore comment on the process more pragmatically and have a better understanding of the motives and subjective aspects not conveyed by solely analysing an EIR. The mere analysis of a report does not necessarily acquaint the reader with the reality of the project and whether aspects such as identifying all pertinent issues were attained and whether all mitigation measures were satisfactorily implemented and, in the first place, implementable.

Bias is reduced to some extent by validation of the data across a large range of case studies. This results in far greater coherence and reliability in the conclusions drawn (Freeman, 2000).

## 3.8 Results

Once the analysis of the projects using the framework of IEM was completed, trends were identified and represented as a percentage in a summary table produced to synthesise all the data. Each step was given a percentage rating, which although subjectively derived and subject to the author's bias, served as a graphic representation to allow trends, which otherwise would be lost in an unwieldy and large amount of information, to be easily observed. This table provides an indication of overall compliance to the IEM guidelines by Eskom.

The concluding comments provide a concise synopsis of the main trends and problems associated with the implementation of the IEM guidelines.

## 3.9 Conclusion

The approach adopted and method employed has been described. This includes the selection of key steps of IEM as applied to the twelve case studies selected for analysis. Those interviewed, the method

of interview and bias and advantages this may have introduced have also been described.

# CHAPTER 4

# THE DEVELOPMENT OF EIA IN ESKOM AND THE BACKGROUND TO THE CASE STUDIES SELECTED

## 4.1 Introduction

This section briefly outlines Eskom's company structure and its history as a parastatal in South Africa. It then elaborates on the growth and evolution of environmental management within Eskom with specific reference to EIAs. This contextualises the analysis of the acceptance of the IEM guidelines as reflected in company policy and Environmental Impact Reports (EIRs) for the period 1989 to 1997.

## 4.2 A Brief Description of Eskom

The Government Gazette of 6 March 1923 (effective from the 1 March 1923) announced the establishment of the Electricity Supply Commission, also known previously by the abbreviations ESC, Escom (English) or Evkom (Afrikaans) and finally Eskom as of 1987. In South Africa Eskom is the decision-making authority with the statutory power to implement decisions regarding electricity generation, transmission and distribution in terms of the Eskom Act (Act 40 of 1987) and the Electricity Act (Act 41 of 1987). Eskom's vision is "to provide the world's lowest cost electricity for growth and prosperity" (Willemse, 1995a, p 1).

Eskom is divided into three major divisions or groups as a company:

- Generation is responsible for the generation of electricity via 17 coal fired, 1 gas fired and 1 nuclear power station and 3 pump storage schemes. The latter augment supply during peak periods of demand. Of direct bearing on the bulk supply of power to the areas of Durban, Pietermaritzburg and KwaZulu-Natal are the Drakensberg Pump-Storage Scheme and Majuba Power Station, the latter being located on the coal rich deposits of Mpumalanga, South Africa.
- The second division is Transmission which is responsible for the transmission, via high voltage overhead powerlines, of bulk supply from the points of generation to substations at 400 and 275 kilo Volts (kV) where it is made available to the third division - Eskom Distribution.
- Eskom Distribution distributes at lower voltages of 132, 88, 66, 33, 22 and 11kV via its own

network or grid of powerlines and substations to the end user, be it municipality, industry or individual households.

The function of substations is to optimise the carrying capacity of power lines. Since South African coal reserves are located mainly on the Eastern Highveld, the majority of power stations are located there, and power has to be transmitted over long distances. To minimise line costs and losses, electricity is transmitted at high voltages via powerlines over long distances and then lowered or transformed to usable voltages at substations. The majority of substations are of the Open Air Insulated type although different technologies are available such as Gas Insulated substations. The lifespan of a substation is usually in the order of 50-60 years, but may be increased by refurbishment of the technical components. The size of the high voltage yard terrace for a 400/275kV substation is considerable: approximately 14 ha, but a lot smaller for a Distribution 132/22kV substation averaging only approximately 2.4 ha.

All the projects (substations and powerlines) discussed in this thesis fall under either the jurisdiction of Eskom Transmission or Eskom Distribution. The most noticeable difference between Transmission and Distribution infrastructure is the size of the components. Transmission substations, due to their large size, generally have impacts of a greater magnitude than those of the smaller Distribution substations. Despite difference in size, the impacts associated with Transmission powerlines are generally comparable to those of Distribution powerlines irrespective of the size of the components. It is not to be assumed, however, that the magnitude of environmental impacts is only as a direct result of the size of the infrastructure. Environmental impacts are also due to the sensitivity of the receiving environment into which the powerline or substation is to be located and the activities associated with its construction, operations and maintenance.

In terms of engineering and direct monetary costs, high voltage overhead transmission lines are the most efficient means of bulk electricity transport and in 1995 there were 241 802 km of powerlines in use in South Africa (Eskom, 1995a). The servitudes in which these powerlines are located vary in width from 56m, for a 132kV single circuit powerline, to 110m wide for a 400kV double circuit powerline, and thus they have the potential to significantly impact on vast tracts of the South African environment.

The Machinery & Occupational Safety Act (Act 6 of 1983) addresses human safety aspects of construction and maintenance of power lines. Other legislation which made reference to the installation

of transmission lines was the Environment Conservation Act (Act 73 of 1989) which states, concerning the projects analysed herein, that they are an identified activity, which will probably have a detrimental effect on the environment. Therefore, in terms of this Act, these projects might require Environmental Impact Reports. However, because no regulations had been promulgated with regard to Environmental Impact Reports (EIRs) prior to 1997, such a report was not yet mandatory for the identified activities in terms of Section 21 (1) & (2) of Act 73 of 1989 prior to 1997.

## 4.3 An Analysis of the Evolution of Eskom Environmental Management with Particular Reference to EIA

From 1971, after the advent of NEPA, Eskom began actively tracking global trends and focused on EIA's (see Table 5) which, whilst they would not strictly comply with the current procedural requirements, nevertheless served to bring environmental considerations into the decision making process. In 1976 Eskom recognised and accepted the necessity to integrate environmental aspects into its overall business management programme. The Environmental Impact Management Division (EIM) was subsequently established in the same year to:

- formulate a corporate policy on environmental impact management;
- recommend and co-ordinate systems to achieve the desired end state of integrated environmental management;
- promote and advise on the integration of environmental aspects into Eskom's other functions and activities.

An Eskom policy on environmental impact management was approved by the Management Board in June 1980 for application Eskom-wide (Hobbs, 1990a).

Corporate Directive EV1011 formed the basis for the Environmental Impact Control Section's philosophy which was to ensure maximisation of the positive benefits whilst minimising the negative impacts of Eskom's activities and contain the negative impact of Eskom's activities on the natural and human-made environment within reasonable limits. An illustration of Corporate Directive EV1011 policy's efficacy was that an Environmental Impact Control Plan had been compiled and implemented for the Palmiet Pumped Storage Scheme by an environmental consulting firm Ekokonsult Inc., during the period 1981 to 1986, which provoked international interest (Graupner, pers comm., 1997).

A pamphlet entitled 'Databank - facts and figures on energy-related topics', produced by Escom's Communication Department (Eskom, 1985a, p 1) stated "in blending environmental conservation with the demands of technological progress, Escom is fashioning an integrated approach to engineering in South Africa".

A document entitled "Environmental Impact Control Guidelines" had been produced to contain impacts associated with transmission line construction during 1985 (Davies and Hobbs, 1985).

A presentation to the Eskom Eastern Natal Regional Engineering Conference during January, 1988 elaborated on the principle of Integrated Environmental Management. A portion is quoted to show how conversant Eskom was with the principles of IEM which were only published a year later:

> "Eskom needs to adopt an integrated multidisciplinary planning approach to any new project, which may affect the environment. Integrated Environmental Management is a concept that ensures that environmental considerations are taken into account from the first time that a need is first identified. Then modifications to early proposals, or alternatives can be looked at before a commitment is made to one course of action, and major expenses are incurred" (Gray, 1988, p 3).

It is noteworthy that the term Integrated Environmental Management was already being used in Eskom during the 1980s.

The response of Eskom to the shifts taking place as a result of the global environmental movement is reflected in the following statement:

> "It can be anticipated that growing environmental awareness in Southern Africa will result in increasing scrutiny of Escom's impact on the environment. Adverse reactions may cause delays leading to critical shortages and increased costs. Whilst the public will generally acknowledge that the principle function of Escom is to provide an abundant supply of electricity at cost, Escom must also acknowledge through policy and deed the public's right to insist on sound environmental management. .... Just as reliability became a criterion against which plans and

actions were measured, another criterion of equal importance must now be given comparable, explicit status - the environment" (Eskom, 1985b).

The first policy was revised in 1988 as Corporate Directive EV1011 (Hobbs, 1990a). The Environmental Policy, Rev. 2 of 1988, made mandatory the incorporation of environmental considerations into all of Eskom's activities, and in 1991 this led to a centralised management system. This was followed by the promotion of an Eskom-wide awareness of the benefits of a system of Integrated Environmental Impact Management and the compilation of Environmental Impact Control Plans and their implementation in construction projects and programmes at the level of individual Business Units. To this end all of Eskom's Business Units had been visited during 1988 and 1989 to market the principles of Environmental Impact Management (EIM). After attending the World Energy Conference in Montreal, Canada in 1989, Dr I C McRae, Eskom's then Chief Executive, confirmed the strategic importance of environmental issues and their management to Eskom as well as the energy sector. He fully supported the direction in which EIM was developing within Eskom and together with the management board, provided for the leadership and future profile of EIM within the organisation. A General Manager (subsequently to be replaced by a Corporate Environmental Manager) was appointed as environmental "ombudsman" to ensure appropriate EIM performance within Eskom. The line functions of Eskom Generation, Transmission and Distribution, were assigned accountability for their own environmental management and performance.

By 1988 the International Union of Producers and Distributors of Electrical Energy (UNIPEDE), of which Eskom is a member, had approved a "Charter for the Electricity Sector" which stated the intention to establish common policies on issues including the environment. In 1989, the Commission of the European Communities published its document (COM (89) 369) "Energy and the Environment" which called on energy related industries to publish codes of conduct to demonstrate the steps they would take to protect the environment. Accordingly, the UNIPEDE Group of Experts on Environmental Policy prepared a "Statement of Environmental Policy" which includes the action UNIPEDE members must take to protect the environment. During September 1992 the Executive Director of Eskom Transmission circulated this Statement of Environmental Policy and Code of Conduct within Eskom "for perusal and guidance" (Forbes, letter, 1992). This policy stated that the electrical industry should include "environmental factors in planning and to subject major new developments to an assessment of their environmental effects and to make publicly available these assessments".

In the late 1980s Eskom became the first company from Africa to be granted an Associate Membership of the International Environmental Bureau (IEB) a special division of the International Chamber of Commerece. The principal objectives of the IEB are to provide a networking link between leading companies in the field of environmental management (Eskom, 1990a).

Subsequently Eskom became a signatory of the Business Charter for Sustainable Development in 1991 which is comprised of 16 principles. Key principles considered pertinent to this research are:

- Corporate Priority: To recognise environmental management as among the highest corporate priorities and as a key determinant to sustainable development; to establish policies, programmes and practices for conducting operations in an environmentally sound manner.
- Integrated Management: To integrate these policies, programmes and practices fully into each business as an essential element of management in all its functions.
- Process of Improvement: To continue to improve corporate policies, programmes and environmental performance, ...
- Employee Education: To educate, train and motivate employees to conduct their activities in an environmentally responsible manner.

(Business Charter, cited in Hoogervorst, 1996, p 30)

Policy at Eskom thus prompted the carrying out of the first EIAs. The environmental impact assessment for the linking of Apollo-Nyala substations (undated) across the Maria van Riebeeck Nature Reserve to the south-east of Pretoria, marked the first formal environmental study for a linear development. Examples of the first EIA's were for the site selection of Tutuka, Lethabo, Matimba and Majuba power station sites (1980), and the routing of power lines e.g. George-Knysna (undated), Matimba-Pluto 400kV (1985), Muldersvlei-Stikland 400kV line (1990), Poseidon-Grassridge 400kV line (1990), Kendal-Midas 400kV line (1990) and the Poseidon-Neptune 400kV line (1990) (Hobbs, 1990b). The identification of sites for potential and future nuclear power stations introduced the principle of broad public community involvement and public authority consultation across the whole of South Africa.

In May 1989 the Transmission Land Survey Department appointed its first Environmental Planner as a forerunner of the Transmission Environmental Section, a subdirectorate of Transmission Land Survey and answerable to the Transmission Land Survey Manager. The first Environmental Impact

Assessment undertaken by this department was the Matimba-Spitskop 400kV powerline (date unknown). The Transmission Environmental Management Committee (TEMCO) was founded in February 1991 but was never to fulfil any purpose. By 1994 the staff complement comprised 5 environmental planners. The formation of the Transmission Environmental Management Section coincided with the commencement of the launching of the projects required for the upgrading of bulk electrical supply to Durban, Pietermaritzburg and the Southern part of KwaZulu-Natal and the then northern Transkei, by Transmission. This department took over the environmental responsibility for all new Transmission works as of 1989. Similarly Eskom Distribution created the Distribution Environmental Management department as a sub-division of the Distribution Land Survey Department in KZN during 1991.

Initially the 1988 policy focused entirely on the activities associated with the construction of infrastructure. This was supplanted during 1993 (revision 3) with the overall Environmental Policy covering general aspects of the business and the eventual focus during 1995, revision 5, on the creation of an all-encompassing Environmental Management System (EMS). Other aspects such as EIAs were then covered in individual policy and procedure developed as of 1994.

Table 5 shows the rapid revision of environmental policy during the 1990's which not only exemplifies the growing attention and commitment to Environmental Management within Eskom, but also reflects the rapid transformation and development of environmental management in South Africa as a whole, during this period.

The following gives a further indication of the extent to which environmental management was being developed and transformed within Eskom up until 1995:

- from 1990 onwards environmental auditing was introduced into the organisation.
- during 1991/1992 Eskom's Chief Executive Officer assisted with the formation of the South African Industrial Environmental Forum (IEF) which was based on similar organisations established in Germany and the USA.
- in 1992 a Corporate Environment Affairs Manager was appointed to co-ordinate and give the organisation strategic directions in terms of environmental management.
- an Environmental Liaison Group was established in 1992 which is representative of all Eskom groups (Generation, Transmission and Distribution) with the purpose of advising the Eskom Management Board on all environmental affairs.

Table 5: The IEM Guidelines Relative to the Development of EIA Policy and Legislation Internationally, within South Africa and Eskom

| | INTERNATIONALLY | SOUTH AFRICA | ESKOM |
|---|---|---|---|
| 1960's | Awareness that development affects the environment | | |
| 1970 | NEPA | | |
| 1972 | Stockholm Conference | Cabinet Committee established | |
| 1973 | Canada EIA legislation | | |
| 1974 | Australia, Malaysia EIA legislation | EPPIC | |
| 1976 | France EIA legislation | Council for the Environment | Environmental Management established |
| 1978 | Philippines EIA legislation | | |
| 1980 | | White Paper on Environmental Policy | Environmental Policy Rev. 1 |
| 1982 | | Environmental Conservation Act 100 of 1982 | |
| 1984 | Japan EIA legislation | Committee on IEM appointed | |
| 1985 | UK EIA legislation<br>European Commission Directive on EIA | | |
| 1986 | New Zealand EIA legislation | | |
| 1987 | Brundtland Commission<br>Asian Development Bank, Envl. Unit | | |
| 1988 | EU Directive on Environmental Assessment<br>Sri Lanka EIA legislation | | Environmental Policy Rev. 2 |
| 1989 | Norway EIA legislation<br>World Energy Conference, Montreal<br>World Bank Directive on Environmental Assessment | Environment Conservation Act (73 of 1989)<br>**IEM Guidelines Produced** | Transmission Environmental Management established |
| 1990 | Germany EIA legislation<br>World Bank Environmental Policy. | | |
| 1991 | Business Charter for Sustainable Development<br>UNECE Convention EIA | | Environmental Policy Rev. 3 |
| 1992 | Thailand EIA legislation<br>Rio Declaration on EIA | Minerals and Mining Act (EMPR)<br>SA Industrial Environmental Forum<br>**IEM Guidelines Revised** | |
| 1993 | Nepal EIA legislation | EMS - S ABS 0251. | |
| 1994 | India EIA legislation | Draft EIA legislation | Environmental Policy Rev. 4<br>EIA Policy & Procedure Rev. 1 |
| 1995 | | CONNEPP | Environmental Policy Rev. 5 |
| 1997 | | **EIA Regulations promulgated** | Environmental Policy Rev. 6 |
| 1998 | | National Environmental Management Act 108 of 1998 | |
| 1999 | | | EIA Policy Rev. 2 |

## 4.4 Case Studies Selected

Worldwide growth in Environmental Management had resulted in the adoption of EIA by the South African government and simultaneously Eskom who were often abreast of nationally promoted environmental developments. The period 1989-1997 saw not only the introduction of the IEM guidelines to South Africa and Eskom but also coincided with the bulk upgrading of electricity supply to KZN by both Eskom Transmission and Distribution Groups. All the projects, as indicated in Table 6, are significant in terms of their urgent requirement, magnitude and cost. In addition KZN may be considered, when compared globally, to generally be a highly sensitive and environmentally diverse

environment proving challenging to any development (Willemse, 1995a). Therefore projects conducted in KZN, due to this environmental sensitivity, had a greater requirement for EIA and the application of the IEM guidelines.

The diversity of environmental officers who undertook the EIAs, seven in all, also makes this an interesting study and reflects Eskom's commitment to the IEM guidelines if a single procedure and not that of an individual nor an ad hoc interpretation of procedure was applied. The Environmental Impact Study (EIS) for Hector substation was conducted by consultants, and the Ariadne-Venus 400kV line EIA (2) and the Ariadne-Hector 400kV line EIA were partially conducted or assisted by consultants. All of the remaining EIAs were conducted "in-house". This makes the analysis of these case studies beneficial and relevant for the future should self-regulation be adopted.

The projects discussed were also not without controversy. This study includes the Ariadne-Venus 400kV line first EIA and the repeat thereof which is notably Eskom's most difficult and costly EIA for a Transmission line to date (Willemse, pers comm., 1998). When it was forced to be repeated it incurred project delays, increased project costs, jeopardised the supply of electricity to a population totalling 6 million people, supply to two major cities and numerous smaller towns, industrial development and potentially threatened the Government's Reconstruction and Development Programme which sought to electrify previously disadvantaged communities.

Eskom succeeded in playing a key role in ensuring the success of the Government's Reconstruction and Development Programme (RDP) subsequent to 1994 by endeavouring to provide previously disadvantaged communities with electricity (electrify an additional 1.75 million households by the year 2000). This demand as well as industrial development, had necessitated the expansion of Eskom infrastructure during the 1990's throughout the country most particularly in KwaZulu-Natal. Although this period was one of political transition and associated uncertainty, it is assumed that this should not have detracted from Eskom's commitment to the implementation of its EIA policy and the IEM guidelines. To the contrary since EIA was a relatively new innovation in the 'New South Africa' there was an optimum environment to experiment with new democratic processes as opposed to the previous dictatorial and authoritarian mode of planning. It is acknowledged, however, that there was extreme urgency associated with these projects due to the increased power requirements, the vast capital outlay in the form of international loans and the need to recoup on this investment, as well as the RDP requirements having to be met expeditiously.

### 4.4.1 Eskom Transmission Expansion within KwaZulu-Natal 1989 to 1997

Power generated at coal-fired power stations on the Eastern Mpumalanga Highveld, such as Majuba Power Station, is transported at 400 and 275kV (Eskom Transmission) to substations closer to the end user where it is transformed to lower voltages and distributed (Eskom Distribution) at 132, 88, 33, 22 or 11kV to the end customer for industrial or domestic use.

It was decided by 1989 that two new Transmission 400kV substations were needed to inject additional power into the Durban and Pietermaritzburg areas respectively. Additional power was to be brought into KZN from the power stations on the Mpumalanga Highveld. This date coincided with the release of the IEM guidelines of 1989. Their establishment also required that numerous new powerlines be built to and from these substations in order to integrate them into the existing power grid (Figure 2).

Table 6: Summary of the Project EIAs Analysed

| Case Study | Locality | EIA Dates | EMP dates | Construct | Project Cost | EIA Cost |
|---|---|---|---|---|---|---|
| Ariadne substation (Tx) | Thornville (Pietermaritzburg) | 02/91-12/91 | 05/94-09/94 | 05/93-02/96 | R78 Million | |
| Ariadne-Venus 400kV line (1) (Tx) | Estcourt to Thornville | 04/91-02/94 | repeat EIA | delayed | | |
| Hector-Klaarwater 275kV line (Tx) | Hammarsdale to Durban (23km) | 05/92-12/94 | | | | |
| Ariadne-Venus 400kV line (2) (Tx) | Estcourt to Thornville (121km) | 02/94-10/95 | 03/97 | 06/97-05/98 | R94 Million | R5 Million |
| Ariadne-Hector 400kV line (Tx) | Thornville to Hammarsdale (32km) | 04/94-07 /95 | No EMP | 06/96-03/97 | R54 Million | R550 000 |
| Hector substation (Tx) | Hammarsdale | 05/94-02 /95 | 02/95 | 11/9-04/ 96 | R112 Million | R40 000 |
| Pongola-Vergenoeg 132-kV line (Dx) | Pongola to Commondale (62km) | -08/95 | 06/98-07/98 | 07/98-03/99 | R17 Million | |
| Ariadne-Bulwer 132kV line (Dx) | Thornville to Bulwer (65km) | 06/94-12/95 | stopped | not built | | |
| Ariadne-Eros 400kV line (Tx) | Thornville to Harding (120km) | 02/95-02 /96 | No EMP | | | |
| Eros substation (Tx) | Harding | 08/96-02 /97 | 06/96 | 02/97-03/98 | | |
| Kokstad-Mount Frere 132kV line (Dx) | Kokstad to Mount Frere (63km) | 08/95-02/96 | 03/97-07/97 | 10/97-09/98 | | |
| Mount Frere substatio (Dx) | Mount Frere | 08/95-02/96 | Rehab Spec. | 07/98-12/98 | | |

*Venus Substation as a Supply Point*

It is not considered necessary to fully explore the rationale for the location and construction of the Venus substation as this transpired prior to the IEM Gudelines of 1989. What is pertinent in electrical terms, is that it had been constructed prior to 1989 to bring 400kV supply further south in anticipation of meeting future power requirements for Durban and Pietermaritzburg, previously supplied at 275kV.

By 1989, when the first IEM guidelines were released, the following Transmission requirements were known:

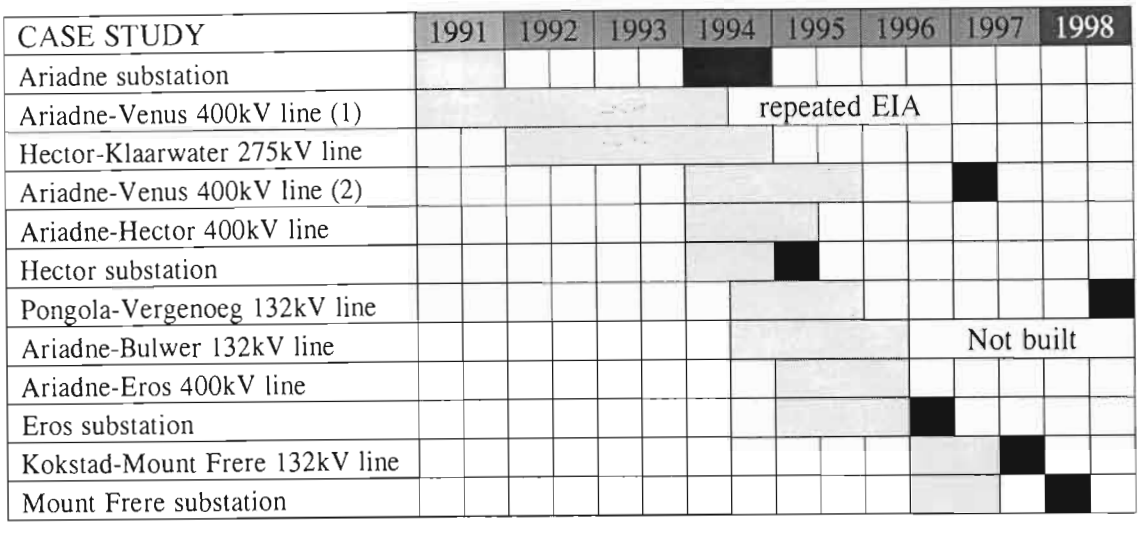
- Venus substation was already located and operational near Estcourt, KZN and was seen as the source of any new powerlines required south to Pietermaritzburg, Durban, the KZN South Coast and the Eastern Cape;
- A diminutive 5ha site had been procurred at Hammarsdale during 1980 for a proposed substation to supply Durban (to be named Hector substation);
- A substation, to be called Ariadne substation, was required to be located on the southern side of Pietermaritzburg near the developing load centre; and
- the need for additional supply southwards for the electrification of the then northern Transkei (Eastern Cape) and KZN South Coast was recognised.

(Estment, 1994).

With a thorough foreknowledge of the electrical requirements for a large proportion of KZN, it was decided to progressively construct infrastructure and increase supply from Venus substation in the north, southwards to Pietermaritzburg (Ariadne substation), Durban (Hector substation) and the South Coast and Eastern Cape (Eros substation) in an electrically logical fashion (see Figure 1).

The EIAs took from approximately 4 months to three and a half years to complete with an average duration of approximately two years. Seven of the ten EIAs occurred around the period 1994 to 1995 with a marked variation in costs associated with the EIAs especially when compared with the overall project cost. This variation in cost and duration might already be indicative of inconsistency in the implementation of the IEM guidelines.

Table 7: Approximate Chronological Order and Duration (to the Nearest 6 Months) of the EIAs and EMPs of the Selected Case Studies




*Ariadne Substation and accompanying Lines*

It was estimated that by March 1995 the existing 132kV system feeding the southern part of Pietermaritzburg and the Natal Midlands, would become fully loaded requiring additional infeed. Without additional power there would have been the inevitable consequence of blackouts in Pietermaritzburg and the KZN Midlands and much required electrification and development curtailed (Estment, pers comm., 1998). This necessitated the construction of the Ariadne substation at Pietermaritzburg.

Ariadne substation (terrace size approximately 500m X 400m) on the outskirts of Pietermaritzburg, developed at a cost of approximately R78 million, was the first project requested by Transmission Expansion Planning (TEP) during February 1991 for the reinforcement of supply to Pietermaritzburg. Initially numerous options existed to supply the proposed Ariadne substation. Either a line from Venus substation, Estcourt at 400kV could be constructed or it could be supplied from Mersey substation east of Pietermaritzburg or via the existing 275kV Transmission grid running past the south western side of Pietermaritzburg (Estment and Bruce, undated).

The location of Ariadne substation was relegated by TEP to only the southern or south-western side of Pietermaritzburg close to Pietermaritzburg's developing load centre, and it was decided by 1992 to supply it with a new 400kV line from Venus substation. A second powerline from Venus to Ariadne substation is also envisaged for the future. It was assumed that it would be possible to obtain a servitude for one Ariadne – Venus 400kV line through the Impendle and Fort Nottingham areas west of the N3 national road (Eskom, undated-a). The investigations, construction and commissioning of the substation was planned to coincide with the completion of the Ariadne-Venus 400kV line by March 1995.

Estment, Transmission's Chief Planning Engineer, expressed the urgency associated with the Ariadne substation should it have been delayed: "Should Ariadne be delayed for any significant period this would have a negative effect on the quality of electricity supply to the greater Durban and Pietermaritzburg area, the Natal (now KZN) North and South coastal areas as well as to the Natal Midlands. The Pietermaritzburg city centre load and Natal Midlands load is presently unfirm so a delay to Ariadne will increase the risk of blackouts to these areas should faults occur on the existing 132kV lines feeding these areas during peak load periods. It is therefore important to realise the potential consequences of such delay as it affects more than just the area supplied by Ariadne itself". (Estment and Bruce, p 7, undated).

The first phase commenced early in 1991 with the environmental investigation of Ariadne substation being conducted by the Environmental Planning Section of the Eskom Civil and Building Division. Transmission, due to resource constraints, did not undertake the EIA. Construction commenced on the substation during March 1993 and was completed by March 1995.

New Transmission and Distribution lines associated with Ariadne substation also reviewed here are the Ariadne-Venus 400kV line, Ariadne-Hector 400kV line, Ariadne-Eros 400/132kV line and the Ariadne-Bulwer 132kV line. The latter was never built.

*Hector substation and accompanying Lines*

Initially it was envisaged that 2 X 400kV lines were required to bolster supply to Durban via a proposed substation to be called Hector at Hammarsdale. Hector 400/275kV substation was originally planned in the late 1970's and a site at Hammarsdale had already been purchased by 1980. The Hector-Mersey 400kV line, built shortly thereafter during 1982, passing in close proximity to the site

as well as the close proximity of the two existing 275kV lines would allow the substation's easy integration into the existing power grid once constructed. The EIA for the Hector-Klaarwater 132kV line was undertaken solely by Eskom and completed by December, 1994 in anticipation of Hector substation's construction at the given locality as stipulated in 1980 at Hammarsdale. The construction of Venus substation, the reduction in load growth between 1985 and 1992 and the proposed construction of Ariadne substation, however, had permitted the delay in Hector's construction to the late 1990s.

Hector, however, became necessary when it was required to bolster supplies to Pietermaritzburg by backfeeding the beleagured Ariadne substation due to delays being experienced on the Ariadne-Venus 400kV line EIA. There was also no further scope for optimisation of the existing 275kV system to the Durban area which had become voltage stability limited (Eskom, 1995b). By 1994 it was stated that Hector was expeditiously required to reinforce the whole Durban as well as Pietermaritzburg area (Estment, 1994, p 36). Agreement was reached on 29 June 1994 with Durban electricity for the completion of Hector and two associated interconnecting lines (Estment, 1994).

It was originally anticipated during 1980 that a two-transformer substation with a terrace size of approximately 200 X 250m (5ha) was required. The load, however, had grown by 1994 to require a four-transformer substation requiring a terrace 550 X 300m (16.5ha) in extent.

The construction of Hector formed a critical part of a larger Transmission Network Development Plan comprising the construction of an additional 94km of 400kV and 275kV powerline (Ariadne-Hector 400kV and Hector-Klaarwater 275kV lines) and the upgrading of other substations to accommodate its integration into the existing network (Figure 2). This highly strategic substation is one of the largest of its kind (tubular busbar air insulated substation) in South Africa.

A project release for transmission reinforcement of greater Pietermaritzburg and Durban areas at a total expenditure of R238,5 million was discussed and approved at the Operational Management Board Meeting held on 20 September 1994 of which Hector Substation formed a part – a then estimated R 124 million.

Originally the Hector substation was planned to be constructed by the end of 1996 over the generally accepted period of 27 months as required for a substation of these dimensions. The time period for the environmental study and construction of the substation was expedited and construction completed

within 18 months and the Ariadne- Hector 400kV line also constructed ahead of schedule. This allowed one transformer at Ariadne to be backfed from Hector substation at 132kV by 26 July 1996 in order to help diminish the potential for a blackout in Pietermaritzburg and accrue revenue from an otherwise non-productive asset. The former was also avoided by load shedding and customers encouraged and rewarded (by cheaper electricity tariffs) for using bulk electricity supplies during non-peak periods (Pallett, pers comm., 1996).

*Eros substation and accompanying Lines*

Initially called Erebus, Eros substation was required to reinforce the South Coast and East Griqualand and was, according to TEP, to be built on the northern rim of Oribi Gorge near Oribi Gorge Hotel by 1997 (Estment, 1994). Eros substation was subsequently located away from the environmentally sensitive area of Oribi Gorge and placed within the proximity of Harding. This also entailed either the construction of a 400kV line from Ariadne or a 275kV powerline from Hector substation. By the end of 1994 this option remained to be finalised but ultimately it was decided to supply Eros via two 400kV lines from Ariadne substation - the first to be constructed and energised by 1997 and the latter constructed by 2008 depending on load growth in the region.

Eskom Distribution was also required to replace the existing Thornville-Richmond-Ixopo 88kV line of which 68% of the structures were condemned (Stewart, pers comm., 1995). Due to the increasing difficulty in acquiring servitudes Transmission and Distribution decided to locate both a new 132kV line and 400kV line in the same servitude using shared structures. A joint plan was achieved and a new multi-circuit tower designed, which was able to accommodate both one of the Ariadne-Eros 400kV Transmission lines and a new Distribution 132kV line. The latter was required to turn in and supply Richmond, Ixopo and Umzimkulu replacing the condemned 88kV line.

### 4.4.2 Eskom Distribution Expansion within KwaZulu-Natal - 1989 to 1997

Simultaneously, with the growth and upgrading of the Transmission network and to accommodate the new load requirements, Eskom Distribution Group needed to create its own additional infrastructure for the period 1989 to 1997. The projects selected represented interesting scenarios illustrating the degree to which the IEM guidelines were applied.

*Kokstad-Mount Frere 132kV Line*

The Kokstad-Mount Frere 132kV Line was required to increase supply, ultimately originating from Eros substation and the existing Kokstad substation to a new substation at Mount Frere, which is approximately halfway to Umtata, enabling electrification projects to continue in the region (portion of the Eastern Cape formerly Transkei).

*Ariadne-Bulwer 132kV line*

The Ariadne-Bulwer 132kV line was originally required for strengthening supply in the Bulwer and Underberg agricultural areas and townships. However, the project has been put on hold and only half the line constructed post 1997.

*Pongola-Vergenoeg 132kV Line*

The Pongola-Vergenoeg 132kV line was required from the existing network south of Piet Retief at Commondale from the Vergenoeg 132/22kV substation to meet the increased load required for sugar cane irrigation and farming in the vicinity of Pongola.

## 4.5 The Need to Conduct a Full EIA for the Projects Analysed

Only two of the projects studied, Ariadne substation and the first EIA attempted for the Ariadne-Venus 400kV line (also known as Ariadne-Venus 400kV line first or (1) EIA), were conducted under the IEM guidelines of 1989. These projects are analysed for purposes of continuity as they constituted the first in the bulk upgrading of Transmission supply to KZN. The lack of compliance to the IEM guidelines of 1989, needs to be understood as it had future ramifications, such as it resulted in the repeat of the Ariadne-Venus 400kV line EIA and subsequently greatly influenced the application of the IEM guidelines of 1992 in KZN for the period 1992 to 1997.

All the projects analysed in this study were acknowledged by Eskom to require a full EIA and could not be categorised according to the IEM guidelines of 1992 as requiring 'no formal assessment' or an 'initial assessment' as:

- Eskom acknowledged that their magnitude and significance and therefore potential for significant impacts warranted a full EIA.
- During September 1992 the Executive Director of Eskom Transmission circulated a Environmental Policy and Code of Conduct by the UNIPEDE Group of Experts on Environmental Policy, within Eskom "for perusal and guidance". Its policy stated *inter alia*: "To include environmental factors in planning and to subject major new developments to an assessment of their environmental effects and to make publicly available these assessments".
- In May, 1991 the Eskom Environmental Impact Management Policy, EV1011, Revision 3, was approved and stated as one of its objectives: "Conduct EIA's for all policy decisions, significant projects and programmes as required and will involve all affected parties and stakeholders". All these projects constituted major developments or significant projects.
- Similarly Eskom's Chief Engineer (responsible for project planning and the upgrading of bulk supply to KZN for the period) gave the assurance that he was aware of Eskom's environmental policy and the need for project EIA's as of 1989 (Estment, pers comm., 1997).
- EIA policy, ESKBAAA9, August 1994 states: Eskom's Corporate Directive for Environmental Impact Assessment (EIA) requires EIAs to be carried out for all development projects.
- The IEM guidelines of 1992 (Guideline Document 1, p 11) list "electrical substations and transmission lines having equipment with an operating voltage in excess of 30 000 volts (30kV) amongst the activities which most probably would require a full EIA especially if they also impact upon any of the listed sensitive environments". In terms of the IEM guidelines of 1992, all these projects fell within the list of identified actvities for which an EIA is required and all impacted upon more than one of the listed environments thus warranting that a full EIA be conducted.

In addition to the requirement for a full EIA the requirement to conduct the preliminary steps of the EIA for these projects to Develop Proposal, Classification of Proposal and only then conduct an Environmental Impact Assessment is deemed unnecessary. All Impact Assessment stages are blended into one Plan and Assess Proposal stage as recommended by the IEM guidelines (DEA, 1992a, p 7).

In the light of the above, any neglect in terms of the steps prescribed by the IEM guidelines of 1992 for a full impact assessment, is deviant from the IEM guidelines of 1992.

## 4.6 Eskom Acceptance of the IEM Guidelines

Before Eskom implementation of the IEM guidelines can be appraised it is necessary to ascertain the extent to which they were accepted and promoted as the means to conduct an EIA within the company.

Eskom in a document entitled: "Eskom and Integrated Environmental Management" enthusiastically stated that "Integrated Environmental Management has proven itself to work for Eskom. Educational programmes are being launched at present throughout the country. The reality of Integrated Environmental Management is becoming a day by day lifestyle in Eskom" (Eskom, 1985b).

Eskom also produced a comprehensive document entitled: "Guidelines for Environmental Impact Assessment" (Hobbs, 1990a). This provided detail on how to conduct EIAs. It referred to the IEM guidelines of 1989 as "comprehensive procedural guidelines relating to Integrated Environmental Management (incorporating EIA)" (Hobbs, 1990a, p 2). It not only acknowledged the guidelines but fully supported their recommendations. This document uses the term 'Integrated Environmental Management', and notes the need for EIA to be linked to the project's "critical path" and states that "an EIA should be organised to be supportive of the numerous decisions to be made about the project ... this implies that it should be initiated early enough to provide information to improve design and locational decisions. Problems must be identified and communicated before irreversible decisions are taken" (Hobbs, 1990a, p 5). This highly informed and advanced document emphasises the need for EIAs to be undertaken at "the earliest stages of policy decision-making and project conception" (Hobbs, 1990a, p 7). It also comprehensively elaborates on the basic aspects of an EIA such as stakeholder participation and defines significance, scoping and the environmental impact control programme. It lists the needs for qualified multi-disciplinary staff, administrative resources, institutional arrangements ("a clear procedure for integrating the EIA study into the decision-making process must be established"), review, monitoring and enforcement powers, provision of finance and adequate time (Hobbs, 1990a, pp 15-16). This document placed Eskom at the forefront of EIAs for the period and abreast of the IEM guidelines' requirements.

Eskom environmental policy, culminating in specific EIA policy in 1994 (Table 5), was similar in many respects to the IEM guidelines. This further substantiates that Eskom accepted the IEM guidelines but was also a potential source of confusion as it was not clearly prescribed which assumed precedence. Some of the similarities between the IEM Guidelines and Eskom policy are illustrated below.

Initially Eskom 1988 environmental policy focused entirely on the activities associated with EIAs and the construction of infrastructure such as powerlines and substations. This was supplanted during 1993 with the overall environmental policy applicable to the business as a whole and the eventual shift in focus to the creation of an all-encompassing Environmental Management System (EMS) exemplified by revision 5 of 1995. Aspects such as EIAs were then covered, in 1994, in individual policy and procedure. There was a shift in emphasis therefore in policy from project-specific EIAs to an EMS for the company as a whole. This resulted in a brief period during 1993 when no EIA specific policy and procedure existed until EIA policy and procedure was passed during 1994.

Eskom's Corporate Directive (EV1011) of 1988 required EIAs to be carried out for all significant development projects. This, the second revision of Eskom Environmental Policy, the Environmental Impact Management Policy, EV1011, Revision 2 of January, 1988, already encompassed the principles and concepts of IEM as listed in the IEM Guidelines of 1989. It focused exclusively on projects and the project cycle into which it attempted to indelibly integrate, by means of a detailed corporate accountability matrix, environmental responsibility. Specific functions were delegated to designated managers and line functions.

Eskom policy matched the commitment to ensure that environmental concerns be acted upon and considered in the planning stage of a project as enunciated by the IEM guidelines of 1989 (Council for the Environment, 1989a). The Eskom policy, Rev 2 of 1988, detailed the procedure of integrating environmental consideration into the project process or installation life cycle, as it was then known.

The Eskom policy of 1988 provided for a full EIA to be implemented at a strategic level during the planning phase which was to be reiterated at the project site/route selection phase. This once again conforms to the IEM guidelines of 1989 (Council for the Environment, 1989a, p 4) which states that "IEM is intended to guide, rather than impede, the development process by providing a positive, interactive approach ... from the earliest stages of planning to the final operational phases. ..... Irrelevant studies can then be avoided ... ... saving developers time effort and money". This repetition of the EIA at two stages in the Eskom project process - firstly at a strategic level during the Planning phase and then at the more specific project phases of location, design, construction and operations and maintenance via the Environmental Management Plan (EMP), had the potential to environmentally 'fine-tune' the project and therefore matches the expectations laid down in the IEM guidelines of 1989 (Council for the Environment, 1989a).

The IEM guidelines of 1989, in its section on Decision-making and Management relies on the existence of a decision-making authority in whom the responsibility for decision-making has been vested (Council for the Environment, 1989a). No reference is made to a specific authority in Eskom Environmental Policy as none existed in South Africa at the time (Eskom, 1988). This only materialised at the end of 1997, however, this deficit is adequately and perhaps more practically addressed in the Eskom policy by relying on the necessity to consult with authorities and internal and external stakeholders (Eskom, 1988)

Eskom's Chief Engineer (responsible for project planning and the upgrading of bulk supply to KZN) gave the assurance that he was aware of Eskom's environmental policy and the need for project EIA's, thus the request from Eskom Transmission Expansion Planning for the Ariadne substation and Ariadne-Venus 400kV line EIAs (Estment, pers comm., 1997 and Hepburn, letter, 1991).

In May, 1991 the Eskom Environmental Impact Management Policy, EV1011, Rev. 3, was approved and stated as one of its objectives "to practise and promote integrated environmental management to achieve sound business performance and stewardship of the country's heritage and assets". Henk van Tonder (pers comm., 1997), who had participated in the 1988 policy's revision, holds that Eskom's interpretation of the term "integrated environmental management" was synonymous with that espoused by the IEM guidelines of 1989.

A point which pertinently reflects compliance with the principles of the IEM guidelines of 1989, is also made in the section of the policy dealing with Environmental Management Practice, whereby Eskom commits to:

- Conduct EIA's for all policy decisions, significant projects and programmes as required and will involve all affected parties and stakeholders. The findings of these documents will be submitted for review by independent parties and will be made available for public comment whenever appropriate.

(Eskom, 1991a).

Revision 3 of 1991 differed from Revision 2 of 1988 in that it no longer included an environmental accountability matrix nor did it define the process diagrammatically whereby environmental management would be integrated into the project cycle. The policy of 1991 became more generic and less explicit in terms of integrating environmental management and the project process.

The general Environmental Management Policy, ESKBAAD6, Revision 4 of April 1994, shows a deviation from EIA and IEM and places emphasis on the development of an Environmental Management System (EMS) which assumes precedence thereafter. It merely states: "Eskom will integrate environmental management into our business by establishing an environmental management system .... ".

By 1991 after the Ariadne substation EIA and due to the increasing emphasis on policy, the need for an EIA specific policy within Eskom had been realised (De Kock, pers comm., 1997). This policy was circulated for review in December 1993, and was authorised by management in either April or July 1994 (both dates have been noted). In 1994 EIA's were included in policy and therefore became mandatory. All EIA's were to follow the Environmental Impact Assessment Procedure, published in August 1994 in terms of the Eskom Environmental Impact Assessment Policy of 1994. EIA policy had been in circulation for comment as of December 1993 and its existence and content therefore ought to have been known. The policy denotes the following need:

> "To include environmental considerations in all policy decisions, projects and programmes and to use the Eskom EIA Procedure, for preparation of all ElAs to ensure a common approach and adherence to a minimum standard of performance"
>
> (Eskom, 1994c, p 1).

The reference to this policy and procedure in EIAs and ultimately compliance with, was subsequently requisite.

The IEM guidelines of 1992 list electrical substations and transmission lines having equipment with an operating voltage in excess of 30 000 volts (30kV) amongst the activities which most probably would require a full EIA. Similarly Eskom EIA Policy of 1994 insisted on conducting EIAs for projects operating in excess of 33kV.

The first Eskom EIA policy of 1994, in its preamble, directly refers to and references the IEM guidelines of 1992:

> "Environmental Impact Assessment (EIA) is not yet mandatory in South Africa. The Guideline Series for Integrated Environmental Management ([EM) produced by the

> Department of Environment Affairs (1992) and the draft regulations for the Environmental Conservation Act (Act No. 73 of 1989) are indications of the government's commitment to enforce IEM procedures for certain development projects, including electricity generation, transmission and distribution. In the light of these developments, it is imperative that Eskom positions itself to meet these new challenges" (Eskom, 1994a).

The Eskom Environmental Impact Assessment Procedure, in support of the EIA policy, was available as of February 1994 and authorised by August 1994. It emulates the IEM guidelines of 1992 as illustrated by the following extracts:

> "Eskom's Corporate Directive for Environmental Impact Assessment (EIA) requires EIAs to be carried out for all development projects. This document provides a procedural framework on how EIAs must be conducted to ensure quality, uniformity and standardisation within Eskom. It ensures that the EIA procedure is incorporated into the initial stage of project planning and that the environmental consequences of a proposed project are identified and taken into consideration. It also attempts to integrate the EIA procedure with the existing technical and economic planning procedures within Eskom. ... ...
>
> The intent of this procedure is to ensure that Eskom will meet the standards laid down by the Government as a minimum requirement and give confidence to Eskom's Executive that the Environmental Impact Assessments conducted and reviewed by Eskom are consistent with Eskom's environmental commitment and can be accepted by any reviewing authority" (Eskom, 1994b).

In conclusion it is clear that Eskom's policy and procedure emulates the IEM Guidelines and compliance to these "will meet the standards laid down by the Government as a minimum requirement" (Eskom, 1994b, p 2). That is complying to Eskom's policy and procedure as of 1994 surpassed the requirements of the IEM guidelines but conformance to Eskom policy and procedure prior to this would have met the requirements of the IEM guidelines due to the similarity between the two.

What becomes confusing is whether the IEM guidelines assumed precedence over Eskom general environmental or EIA policy and Eskom EIA procedure as illustrated by the quotes below:

> "The Department of Environment Affairs recently published the attached 6 volumes on the Guidelines for Integrated Environmental Management ....., it is recommended that you study these guidelines thoroughly and apply them in all appropriate projects or those which impact on ecosystems as listed in Volume 1" (Visser, letter, 1992).

The first draft EIR for the Ariadne-Venus 400kV line stated that "The Integrated Environmental Management (IEM) procedure, as first advocated by the Council for the Environment (1989a), and later refined by the Department of Environmental Affairs (1992), is followed as far as possible by Eskom in the planning of new transmission lines. ... . Eskom is committed to the IEM procedure, as well as to transparency and accountability in its planning" (Willemse, 1994, pp 1-2).

A protocol established between Eskom Distribution and Natal Parks Board (NPB) (McClintock, letter, 1994a) stated that: "time constraints and other pressures could possibly curtail the established IEM procedure as conducted by Eskom". Further correspondence from the NPB to an EIA consultant working on Eskom's behalf stated: "For the sake of transparency and in terms of the IEM Guidelines as recommended by the Department of Environmental Affairs and Tourism, these procedures need to be in place" (McClintock, letter, 1995). The reference to an Eskom IEM procedure as well as the IEM guidelines shows that it was common and accepted practice by Eskom and one of its key I&APs in KwaZulu-Natal viz. the NPB, to comply with both.

Despite the existence of Eskom EIA policy and procedure of 1994 Transmission Environmental Management (a sub-section of the Department of Land Survey) further developed its own IEM procedure (Funston, 1995a, p 9).

The Durban Distributor (responsible for Distribution in KwaZulu-Natal at the time) formulated its own Environmental Policy which read: "To practise and promote integrated environmental management to achieve sound business performance and stewardship of the region's heritage and assets" (Eskom, undated-b). The IEM Guidelines of 1992 were directly referenced in this document. This was followed by the Distribution Group's Environmental Statement, Revision 0 of July 1994 (p 1) which referred to IEM as follows: "Environmental management is seen as an integral part of our daily business. The Strategy to achieve this is: Practice and promote Integrated Environmental Management by conducting

Environmental Impact Assessments for all sensitive projects and formulating and implementing Environmental Management Plans" (Eskom, 1994d).

It was apparent that the IEM guidelines were accepted by Eskom and it was anticipated that they would not only be accepted but also complied with. But despite this plethora of policy and statements and apparent confusion it is assumed that Eskom policy, especially as of 1994, as deliberated above, was still meant to carry more weight and authority than the IEM guidelines for the period and should have as a minimum requirement been referenced when conducting EIAs. The significance of this is to be analysed in the next chapter.

## 4.7 Conclusion

The KwaZulu-Natal Transmission and Distribution projects which transpired after 1989 were critical in terms of electrical expediency and cost and were implemented during the commencement of IEM in South Africa. They were therefore subject to a drastic change in the South African and Eskom appreciation of the impacts new developments have on the environment and how EIAs were to be conducted in terms of the IEM guidelines. From the analysis of the above projects, it is possible to ascertain the degree, to which Eskom voluntarily applied the IEM guidelines in its Transmission and Distribution Groups in the province of KZN, for the period 1989 to 1997.

# CHAPTER 5
# PROJECT ANALYSIS

## 5.1 Introduction

This chapter analyses the EIAs conducted by Eskom in terms of the requirements of the IEM guidelines. As previously stated the steps analysed are the citation of relevant policy, the administration of the EIA, scoping, investigation, review, the EMP and auditing. Appropriate case studies have been selected to evaluate and analyse different stages for the sake of brevity.

## 5.2 Policy

### 5.2.1 IEM Compliance and the Citing of Policy

The IEM Guidelines emphasise the need "to indicate compliance with administrative, legal and policy requierements" (DEA, 1992c, p 10). It was considered that company policy assumed a very authoritative role in the absence of EIA legislation at the time.

The potential for confusion, regarding which assumed precedence existed, as Eskom EIA policy and EIA procedure were extremely similar to the IEM Guidelines' underpinning principles and its procedural aspects. However, in order to ascertain whether the IEM Guidelines was complied with an assessment of whether Eskom environmental policy was listed in the EIRs was undertaken.

As reviewed in Chapter 4 above there is sufficient evidence in Eskom policy to reflect Eskom's commitment to the IEM guidelines of 1989 and 1992.

Eskom's environmental policy of 1988, was sufficiently compliant and consistent with the principles of IEM for the entire period from 1988 until February 1991, when the request for the environmental feasibility study for Ariadne substation and the first Ariadne-Venus 400kV line EIA was placed. Thus prior to the Ariadne substation's implementation and the bulk reinforcement of supply to Kwa-Zulu Natal (KZN) as a whole, Eskom policy reflects that the company was exposed to the principles and concepts of IEM for a minimum period of three years. This places Eskom abreast of the development of the IEM guidelines.

*Ariadne 400/132kV substation*

Little mention was made of Eskom environmental policy at the commencement of the upgrading of bulk electrical supply to KZN in the first EIA conducted for Ariadne substation. Although both the Environmental policy of 1989 (Revision 2) and 1991 (Revision 3) might be considered relevant for the EIA which commenced in 1991, little direct reference to Eskom policy was made in the EIR, neither was this a requirement of the IEM guidelines of 1989 (Council for the Environment, 1989a). The only mention made was when the Eskom Environmental Policy, Revision 3 of May 1991, was read to I&APs during a public meeting held in August, 1991.

The Report, under the heading "Approach to the Study" stated: "The study broadly followed the guidelines set out in the Council for the Environment (1989a) document on Integrated Environmental Management (IEM)" (De Kock, 1991, p 5). The IEM Guidelines of 1989 document is also referenced in the reference section of the report. In alluding to comply with the IEM Guidelines of 1989 a Class 1 EIA was therefore required.

The Ariadne substation feasibility study acknowledged compliance with the IEM Guidelines of 1989 but did not refer to Eskom policy.

*Ariadne-Venus 400kV line first EIA*

In the Ariadne-Venus 400kV line Environmental Impact Assessment Summary Report (Willemse, 1995b, p 3) Eskom states: "In the early stages of the EIA (referring here to the first attempt at the EIA), Eskom followed the Integrated Environmental Management (IEM) procedure advocated by the Council for the Environment in 1989". The first Ariadne-Venus 400kV line EIA Report does not directly reference the IEM guidelines of 1989 but uses the terminology: "The integrated environmental impact study process for the planning of a linear project ...." (Eskom, Undat ed-a).

Neither the EIA process followed, nor Eskom's announcement in July 1993 of a route for a transmission line (to the west of the N3 highway), gained the full acceptance of the public and landowners. Eskom stated that due to its commitment to the IEM procedure, as well as to transparency and accountability in its planning, it would retract the decision on the transmission route (Willemse, 1994).

The IEM guidelines of 1992 were then used as the basis for review and revision of the Ariadne-Venus 400kV line EIA contributing to the perception within and without the company that the guidelines were regarded by Eskom as the authoritative EIA procedure with which it should comply rather than corporate environmental policy. This once again is a contravention of IEM and actually opposes the ethos of integration.

*Ariadne-Venus 400kV line repeat EIA*

In the Ariadne-Venus 400kV line (2) EIA, Eskom Environmental Policy was not referenced, however, compliance to the IEM guidelines of 1992 was clearly stated (Willemse, 1995c). The Ariadne-Venus 400kV line repeat EIA was the most costly EIA conducted by Eskom to date, costing approximately R5,5 million (Willemse, pers comm., 1998). All laws which had bearing on the environment and which were applicable to the project were reviewed as well as any policies by organisations including those active in the previous KwaZulu homeland. In total 38 were cited. This exhaustive task was not completed again for any other Eskom EIA of the period, however, no mention of Eskom generic environmental management policy nor Eskom EIA policy was made. Eskom's EIA policy and procedure had been formulated by 1994.

*Hector-Klaarwater 275kV line*

The Hector-Klaarwater 275kV line EIA report (Clara, 1994, p 4) (the production of which coincided with the construction of Hector substation) states that: "As part of Eskom and Durban Electricity Council's commitment to the Integrated Environmental Management procedure, this environmental impact assessment (EIA) is being undertaken to minimise the impact of the transmission line on the environment". This statement was reiterated in the Summary of the Draft EIR sent to I&APs in February 1995. It is presumed that the use of the term Integrated Environmental Management refers to the IEM guidelines of 1992. The Eskom Environmental Policy of 1995 was quoted and referred to in the EMP. It is considered, however, that more substantive reference should have been made to relevant Eskom EIA policy.

*Hector 400/275kV substation EIS*

The only Transmission EIA to reference Eskom environmental policy for the period 1992 to 1997, was the so-called Environmental Impact Study for Hector substation (Gouws, et al, 1995a) which was the

only EIA conducted entirely by an external consultant. Just prior to the tender for the Hector EIS being awarded to an external environmental consultant on 6 May 1994, Revision 4 of the Eskom Environmental Management Policy of April, 1994 was authorised and the EIS, therefore, subject to this policy. However, the EIS did not reference this policy but references Revision 3 of 1991 where part of the preamble is quoted in the report (Gouws, et al, 1995a).

The acknowledgement of and compliance to the IEM guidelines of 1992 is borne out by the fact that the Hector substation EIS report states compliance to the IEM procedure and references it. The IEM guidelines of 1992 are alluded to on page 1 of the Introduction: "In terms of the Eskom policy towards the responsible management of the environment, the Land Survey Division is committed to Integrated Environmental Management" (Gouws, et al, 1995a, p 1). The EIR also stated that "the methodology used in this study is based on the Integrated Environmental Management Procedure as drawn up by the Department of Environmental Affairs (1994)" (Gouws, et al, 1995a, p 3). The definitions of technical terms in the report are a direct replication of those used in the guidelines.

The facilitator responsible for public scoping during the Hector EIS, states in the brief to interested and affected parties that "in terms of the integrated environmental procedure laid down by the Department of Environmental Affairs, Eskom must commission a study into the significant environmental impacts of the proposed Hector substation" (Gibson, 1994, p 1).

*Pongola-Vergenoeg 132kV line*

The Distribution project EIRs referenced Eskom general environmental policy and EIA policy to varying degrees, copies of which were also made available for public scrutiny at public scoping meetings. An ambiguity, however, is apparent in the Pongola-Vergenoeg 132kV line EIA report (Govender, 1995) as both the IEM Guidelines of 1989 and the IEM Guidelines of 1992 are referenced in the Bibliography. The Eskom Environmental Management Policy, Revision 5 of 1995, was also appendixed in the report. It might be argued, however, that the EIA policy, Revision 0 of 1994, was the more appropriate document to reference for EIAs. Eskom Environmental Management Policy, Revision 5 of 1995 was generic and although superficially of relevance, focused predominantly on the creation of an Environmental Management System and made no direct reference to EIAs.

*Kokstad-Mount Frere 132kV line*

The Kokstad-Mount Frere 132kV Line and Mount Frere Substation EIAs referenced the following Eskom Environmental Policy:

- Eskom Environmental Management Policy;
- Eskom Distribution Group Environmental Statement;
- Eskom Environmental Impact Assessment Policy.

These policies were made available at the public meetings with I&APs. Compliance to the IEM Guidelines of 1992 was also apparent as all the basic principles of IEM were copied verbatim in Chapter 3 of the report.

### 5.2.2 Trends Associated with the Reference to Eskom policy and the IEM guidelines

Although Eskom policy to conduct EIAs was in place it is clear that the external IEM guidelines were regarded more highly than internal Eskom policy. As a result when Eskom EIA policy was compiled in 1994 its importance and requirements largely went unnoticed.

Even when reference to policy was markedly consistent and well done this did not guarantee a good EIA on 6 out of 12 occasions.

This also shows the complexity of having an in house company policy as well as the IEM guidelines. The process needs to be streamlined and a single set of documents applied to avoid confusion.

## 5.3 Administrative Requirements

### 5.3.1 Introduction

The IEM guidelines do not address the problems of administration which are anticipated as a direct result of attempting to implement the guidelines. Administration is referenced to in a very restricted sense as the administration of the EIA itself, or in broad terms as the administration of the EIA by a government administrative authority. The necessity of the correct EIA administration and resultant integration into the project process via distinct links has been expounded upon in Chapter 2. This

section will highlight the problems encountered as a result of poor EIA administration, as well as the benefits of good administration.

### 5.3.2 EIA Administration

By January 1995 the following allowance for the formal integration of environmental management into the Transmission project process had been made:

- During the Concept Phase allocation was made for the Land Survey Department to conduct a Public Participation process, an Initial EIA and Preliminary Route and Site Identification.
- During the Definition Phase Land Survey (i.e. Transmission Environmental Management) could be requested to define the study area and gather information from authorities, public and experts; determine the route and site; undertake a detailed EIA and provide input into the project schedule.
- During the Execution Phase Land Survey are required if necessary to provide an Environmental Impact Management Plan (EMP) and undertake inspections during execution (construction) against the EMP (Eskom, 1995c).

Eskom Distribution similarly formalised the integration of EIA into the project process post 1997. Its discussion is therefore beyond the consideration of this thesis.

### 5.3.3 A Review of the Administration of EIA in Project Design and Implementation

This section reviews the administration of the EIAs and its integration into the project process for the various case studies.

In 1993 Eskom acknowledged that "all major projects undertaken by Eskom are reviewed in terms of their potential impacts on the environment according to Eskom's EIA proedure. However, current planning processes do not allow sufficient lead time for environmental impact assessments, their documentation and public review before final decisions are made" (Eskom, 1993a, p 11).

*Ariadne 400/132kV substation*

The environmental officer for the Ariadne substation was constrained to only conduct a feasibility study even though the project warranted a full EIA. This illustrates the administrative control Management exercised over the implementation of the EIA regardless of policy or procedure.

*Ariadne-Venus 400kV line*

Similarly Eskom attempted to cut corners in the first attempt at the Ariadne-Venus 400kV line EIA by instituting an Eskom procedure as opposed to a procedure such as delineated in its environmental policy or the IEM Guidelines of 1989 which Eskom had adopted (Clara, pers comm., 1999). Eskom's initial approach to assessment and the evaluation of alternatives differed from that advocated in the IEM Guidelines of 1989. The IEM procedure advocated by the Council for the Environment (1989a, p 13) requires that: "In addition to the proponent's proposed action, the most viable alternative actions should be formulated for comparison in the coming assessment stage". However, a review of the Transmission IEM/EIA process by an external environmental consultant revealed that:

> "the impression was gained from the documentation available, that Eskom has an informal approach to the selection of a single corridor for more detailed assessment, followed by a second if the first proved unsuitable and, if necessary, subsequent corridors thereafter. Corridor selection was perceived to be based on an arbitrary choice which would inevitably lead to a biased decision" (Lombard and Associates, 1993, p 2).

Thus Eskom could still limit the influence of environmental management in routing powerlines to what they or other departments such as Planning deemed the most preferable route and hence the environmental officer was 'forced' into justifying their selection.

In the repeat of the Ariadne-Venus 400kV line EIA the Environmental Evaluation Unit of the University of Cape Town, despite the distance and cost, was contracted as consultants to advise on the implementation of the procedure and the compilation of an EIA report. This was an attempt to comply with the IEM Guidelines of 1992, gain experience in their implementation as well as dismiss the possibility of bias in the process.

While this expensive and exhaustive lesson in IEM was clear in the Ariadne-Venus 400kV line repeat EIA it did not result in instant reform of Eskom Management who were still driven by project deadlines i.e. cost and time constraints.

*Hector-Klaarwater 275kV line*

It is clear from the project team for the Hector-Klaarwater 275kV line EIA and the EIA for both the Eskom and Durban Electricity sections of this powerline that the project was well planned and thought through. The EIA was conducted by Eskom on behalf of both parties. The project team included planners, project management, design personnel, a negotiator, public communications officer and a public consultant advisor. No time constraints were imposed so the EIA could run its course (Clara, pers comm., 1999). Thus the administration of the EIA and the Eskom environmental officer were not imposed upon by pressing time constraints as the construction and energising of the powerline was dependent on the successful construction and energising of three other major projects viz. the Ariadne-Venus 400kV line, which had been delayed for three years while the EIA was being repeated, Ariadne-Hector 400kV line and Hector substation. However, this record of good administration was blemished when the environmental officer was unable to monitor the project's construction and the EMP's implementation as he was required elsewhere.

*Hector 400/275kV substation*

Hector substation and the Ariadne-Hector 400kV line had to be expedited due to the delay experienced in obtaining the Ariadne-Venus 400kV line route and the necessity to energise Ariadne substation, which was a R78 million asset not generating revenue. It was also required to service Pietermaritzburg, which was in desperate need of additional electricity supply, to prevent black-outs and facilitate industrial development. This, it must be noted, would only partially alleviate the consequences of the delay experienced in having to repeat the Ariadne-Venus 400kV line EIA.

> "Delays being experienced in acquiring the servitude for the Ariadne-Venus line have resulted in blackouts of increasing frequency and extent in Pietermaritzburg and the (Natal) Midlands. As a contingency plan, it was proposed to advance the construction of the Ariadne-Hector line to minimise the consequences of the delays in completion of Ariadne-Venus (due by early 1995) at Thornville. Hector substation at Hammarsdale is due for completion in late 1996" (Funston, 1995a, p 3).

Similarly the TEP Planning Manager stated:

> "Unless transmission strengthening was carried out in Southern Natal by the winter peak of 1997, the quality of supply would drop to unacceptable levels. Although the erection of Hector substation had been delayed for several reasons in the past 14 years it was required urgently by end 1996/early 1997 due to the delay in the Ariadne-Venus 400kV line and could not be further delayed by other reinforcements" (Bruce, letter, 1994).

Thus there was extreme urgency to construct Hector substation and the Ariadne-Hector 400kV line. Originally the Hector substation was planned to be constructed by the end of 1996 over the generally accepted period of 27 months as required for a substation of these dimensions. The time period for the environmental study and construction of the substation was expedited and construction completed within 18 months and the Ariadne– Hector 400kV line also constructed ahead of schedule.

Hector substation is located in an area where low cost residential housing and light industry are distant neighbours. It borders directly onto agricultural land. Eskom did not foresee that the construction of a substation here would engender the same objections from I&APs as experienced on the Ariadne-Venus 400kV line EIA. Thus administrative requirements for the Environmental Impact Study (EIS) (so-called as time and other constraints such as the lack of consideration of alternatives did not allow for a full EIA) for Hector substation were not adequately attended to. Initially an Eskom environmental officer preoccupied with the Ariadne-Venus 400kV line EIA was tasked with the Hector substation environmental study. He was later temporarily replaced by the environmental officer preoccupied with the Hector-Klaarwater line. Neither environmental officer, due to their existing work load, could devote themselves to the R119m (estimated) project and this resulted in the decision to appoint a consultant on 6 May 1994. Once the environmental consultant's contract expired after completing the Hector EIS by February, 1995, she was replaced by a third Eskom environmental officer during March, 1995 after the substation's construction had commenced. The inevitable result was a breakdown in continuity and lack of familiarity with previous environmental investigation and procedure, compounded by the limited time period allowed for the environmental study. A reactive rather than proactive approach ensued.

There was an expectation that Environmental Management would impose mitigatory measures prior to the project's implementation phase and finances made available for this. However, this never materialised directly due to the lack of available environmental staff and the diminished time made available for environmental investigation (Van Praag and Bothma, pers comm., 1997).

The consultant acknowledged in the report that: "this study, together with the study done by .... for the Ariadne substation, are regarded as being pioneering work. Lessons learnt from these will, hopefully, lead to the establishment of improved standards for substation environmental management" (Gouws, et al, 1995a, pp 1 and 59). This acknowledgement was shared by Project Management: "The approach of placing environmental constraints on substation construction is a new concept and the effect of this risk is yet to be determined" (Eskom, 1995b, point 12.2). This lack of experience should have warranted additional resources, such as specialists and more time be made available for environmental studies, not less, in order to err on the side of caution.

The EIS and the EMP for Construction were issued during February 1995, after the construction contract had been awarded and earthworks and terracing had commenced on 11 November 1994. This was three months too late to provide meaningful input into Hector substation's Project Design or Construction or to allow the inclusion of 'environmentally' contractually binding clauses for construction. These imposed time constraints and poor administration were therefore in part responsible for environmental damage such as large scale soil erosion. The shortening of time allowed for the EIS could have been partially remedied by appointing a larger consultant team, however, this did not transpire.

A mere R40 000 was spent for a consultant for the EIS on the R119 million project compared to the R550 000 spent on the EIA for the R50 million Ariadne-Hector 400kV line and as much as an estimated R5 million spent for the EIA on the R55 million Ariadne-Venus 400kV line. This shows the disproportionate and inappropriate allocation of funds for an EIS for the Hector 400/275kV substation.

*Ariadne-Hector 400kV line*

Eskom investigation commenced during April 1994 on the Ariadne-Hector 400kV line EIA. Although no official notification of a project team was made, two Eskom employees were appointed to oversee the EIA. One was the Eskom environmental officer and the other an assistant on public relations. For fear of landowners once again stopping the project, as had transpired on the first attempt at the

Ariadne-Venus 400kV line EIA, Eskom conformed to IEM procedure and appointed an external consultant to: "provide an evaluation of the environmental impacts of various potential Transmission line routes and thereby assist Eskom in the process of final line route selection" (Nicholson, 1994, App. 1). The Ariadne-Hector 400kV line EIA crossed extensive sugar cane farms and which already had numerous large (88, 132 and 275kV) powerlines criss-crossing them. Cane fires result in faults on powerlines and therefore canelands are best avoided. The other alternative, which is highly disadvantageous to farmers, is that cane-free servitudes must be negotiated.

Eskom relinquished the final decision-making role it had traditionally occupied in the routing and negotiating of the line route and allowed the consultant to oversee the public participation process and to elicit a decision from the I&APs with which Eskom would attempt to comply. The early involvement of I&APs and the use of an independent consultant for the Ariadne-Hector 400kV line EIA contributed to a sense of objectivity and helped allay suspicions from landowners who then supported the IEM process adopted. This administration of the EIA, however, also introduced bias into the EIA as certain landowners who were in the majority, dominated the process and ultimately influenced the routing of the line away from their farms. The line, as a result, was routed and negotiated with little conflict. It appears that by abdicating from a decision-making role, Eskom took the line of least resistance and ensured that, in a community of predominantly sugar-cane farmers, where great opposition could have been evoked, a powerline route was expeditiously negotiated (albeit, away from the farming community). In effect the I&APs made the decision and Eskom merely facilitated the procedure to obtain it.

The line was routed away from the farmers' lands, in response to their strong and overwhelming majority at public meetings, and placed in very undulating and inaccessible terrain. Its construction necessitated the design of a whole new tower/pylon by Eskom to accommodate the terrain and proved costly to Eskom and the environment as access and soil erosion were problematic as a result. Thus the cost was born by both Eskom and the environment and the few I&APs who were in a minority and had their view of the valley spoiled by the powerline. The process was affected by unequal representation but still allowed Eskom to meet its project deadlines. Thus Eskom had used the administration of the EIA process to meet its immediate need of project deadlines.

*Ariadne-Eros 400/132kV line EIA*

The Ariadne-Eros 400/132kV line EIA was a massive undertaking for a double-circuit line from Thornville to Harding +- 120km covering a study area of huge proportions. Yet Eskom investigation commenced during February 1995 and was scheduled to end by the 20 October 1995 - a mere 9 months. The Eskom environmental officer was assisted with the EIA by an Eskom surveyor. A project plan compiled at the project's commencement noted every individual's task, for example an engineer was called on to provide technical criteria. The entire project team was drawn solely from Eskom and totalled six people. An Eskom Distribution employee, familiar with communicating with Tribal Authorities, was used to undertake public consultation and inform the Tribal Authorities of the proposed powerline and elicit routes through tribal areas (Funston, pers comm., 1998).

No environmental consultant or specialist was appointed to assist with any aspect of the EIA. There was no open day conducted for this EIA as this had proved ineffectual in eliciting public comment on the Ariadne-Hector 400kV line EIA (Funston, pers comm., 1998).

As the Ariadne-Eros 400/132kV line EIA was a joint Transmission and Distribution project and also due to its vastness, the services of the local Eskom Distribution environmental officer were also utilised to give presentations to Farmers' Associations, however, the majority of the project was conducted by the Eskom Transmission environmental officer and surveyor.

A month (August 1995) was given for comment on the briefing letter and to answer a questionnaire during the consultation process - this means that only a week was given to respond if the delay experienced due to postage is taken into account. This is verified by the NPB who had only received and circulated the letter internally by 18 August 1995. Insufficient time was also allowed to review additional alternative line routes for comparative purposes - a requirement of the IEM Guidelines of 1992.

The lack of sufficient administrative planning and the insufficient allocation of time and resources for such a massive project, became apparent when the EMP could not be compiled prior to construction due to time constraints. The project also included the environmental studies for the location and construction of Eros 400/132kV substation at Harding - in itself a monumental task.

*Eros 400/132kV substation*

The Distribution environmental officer, responsible for studying the Hector substation post construction, volunteered his services to help compile the EMP for Eros substation to prevent a re-occurrence of the erosion and impacts which had transpired at Hector and was also responsible for monitoring the EMP's implementation on behalf of Transmission. It was merely fortuitous that the Distribution environmental officer could accommodate this task being simultaneously preoccupied, for a period of time, in the nearby vicinity. Thus little of the administration requirements had been adequately catered for.

*Ariadne-Bulwer 132kV line*

For the Ariadne-Bulwer 132kV line EIA a consultant was employed to undertake the administration of public meeting venues, posting letters, and to facilitate liaison with I&APs. The duration of the various phases of the EIA was clearly scheduled. The EIA was to enjoy the benefit of approximately 18 months duration and the area was thoroughly known to the Eskom environmental officer prior to commencement of the EIA. Eskom Distribution Planning gave ample time to conduct the EIA. This, however, was by default rather than by design and the project was never built.

*Kokstad-Mount Frere 132kV line*

For the Kokstad-Mount Frere 132kV Line EIA and associated substation an EIA team, comprised of Eskom technical personnel, was constituted by the Eskom environmental officer for the EIA. In total six Eskom personnel and a consultant were allocated to the team as scheduled. This request was stipulated in writing in advance to Departmental Heads. The environmental officer appointed a consultant to undertake the administration of public meeting venues, posting letters and to facilitate liaison with I&APs.

The duration of the various phases of the EIA was planned and scheduled. The initial period required and requested for the EIA was 6 months (which was already short for an EIA for 64km of powerline - and compounded by the Eskom Distribution environmental officer also attending to other duties such as the EMP formulation and monitoring for Eros substation). This time period was rejected by Eskom Management and shortened to 4 months. There was no sound reason given for this shortening of time other than it had minor cost implications. The EIA still took 6 months to complete and merely

continued beyond the time allocated proving the accuracy of the environmental officer's prediction. The request for a specialist to undertake erosion related analyses for +- R6000 was rejected as being too expensive and unnecessary by management. This illustrates the power of Eskom management who were not environmental officer's by profession but who could dictate their requirements not understanding the importance of a thorough EIA or the need for adequate compliance to procedure.

### 5.3.4 Trends Associated with the Administration of EIAs

Erroneous project EIA administration might reflect either purposeful negligence and inappropriate prioritisation, or a lack of experience with EIAs resulting in a mis-allocation of resources and time necessary to undertake substantive and appropriate EIAs. It is thus expected, concerning the latter, that with progress and experience gained from past EIAs over the period discussed, greater accuracy in administering EIAs by providing adequate and sufficient time and resources would be attained. This trend, however, never materialised.

The administration of EIAs/IEM Guidelines, was at the discretion of the proponent namely Eskom. Other members of Eskom management, who were not environmental officer's by profession, could dictate and exercise power over the EIA process and the implementation of IEM (not just the decision). Thus EIAs were not administered at times by a knowledgeable individual, conversant with a process such as the IEM Guidelines.

Often the IEM guidelines were implemented and properly administered where landowners, with the ability to delay the project, existed. Thus the guidelines were explicitly implemented due to an environmental imperative.

When IEM is correctly administered it can facilitate the subsequent stages of the project, such as negotiating servitudes. However, the use of the EIA to attain another goal such, it was shown, can conversely increase the project's potential to incur major environmental impacts. It's primary goal of minimising environmental degradation had been subverted.

Where time constraints existed, a thorough knowledge of IEM administrative requirements would have been beneficial in determining which aspects of the IEM process were more significant and should have been prioritised in the limited time availabe. The whole ambit of the guidelines should not have

been attempted under such circumstances but only the appropriate steps which could be of benefit and influence what remained of the project.

The inclusion of EIAs strategically during planning stages was also a luxury not afforded with the EIA being consistently administered too late in the project process.

The lack of time or resource allocation shows a clear attitude by Eskom management of either misunderstanding the significance of the EIA and/or prioritising other issues when considered more pressing.

Primarily internal resources of varying levels of skill and education/training were used to conduct the EIAs. This is not an optimum scenario as IEM was in its infancy and greater tutelage was required which may have been provided by the use of more knowledgeable consultants.

By 1995 Eskom Transmission had progressed and started to formalise the interaction of the environmental section with the project process at various points of decision-making. This followed later with Distribution, but the level of authority of the environmental officer in terms of decision-making was not concomitantly raised.

## 5.4 Scoping

### 5.4.1 Introduction

The IEM guidelines define scoping as "a procedure for determining the extent of and approach to an Impact Assessment" which involves the following:

- Involvement of relevant authorities and interested and affected parties;
- Identification and selection of alternatives;
- Identification of significant issues to be examined in the Impact Assessment and
- Determination of specific guidelines or terms of reference for the Impact Assessment

(DEA, 1992b, p 5)

It also states that scoping will be conducted by the proponent/their consultant or a multi-disciplinary group. The document then makes the requirement for the provision of background information,

adequate involvement of authorities and I&APs and elaborates on the techniques of how scoping is to be conducted. That is more specifically the various public participation techniques available for consultation. The scope of the impact assessment also has to be determined which entails the identification and selection of alternatives, the identification of significant issues and the determination of any specific guidelines for the impact assessment.

A formal government authority for making decisions and supervising EIAs was not in existence for the period but numerous other government departments were consulted. The NPB, to a large extent, fulfilled the function of an environmental department as a result of their familiarity with IEM and their expertise on the bio-physical aspects of the environment.

As the powerlines and substations affected both advantaged and disadvantaged communities it was further considered imperative in this study to determine the extent to which either had been consulted and whether the techniques employed were respectively appropriate.

### 5.4.2 Analysis of Consultation Conducted for the Various EIAs

*Ariadne 400/132kV substation*

For Ariadne substation it was initially decided in the feasibility study to embark upon a comprehensive public participation process due to the existing political unrest in the area (De Kock, 1991, p 2). However, this was later reduced to a "key informant" approach due to time constraints and the adverse political situation. Eventually, a consultant was appointed and an advisory panel was formed to represent the interests of the [1]black communities and local authorities. They were not consulted again. Ultimately the 'affected public' was limited to the landowners surrounding the single 'Eskom' preferred site post selection (i.e. the eventual site at Thornville, Pietermaritzburg). No response was obtained from letters sent to these few landowners "and no further attempts were made to involve the public" (Klopfer, 1996, p 4).

[1] Although not wishing to perpetuate the iniquities of apartheid this study finds it important to differentiate between blacks and whites as the time period being dealt with was still under the influence of apartheid.

*Hector-Klaarwater 275kV line*

During August 1992, that is coinciding with the IEM guidelines of 1992 being circulated within Eskom, the first letters were sent to I&APs notifying them of the proposed Hector-Klaarwater 275kV line project and during October 1994 a press release was placed in local newspapers. The letter to I&APs included a background briefing document explaining the need to strengthen the electrical system in KZN. Eskom used the postal system, personal visits and public meetings for engaging with I&APs.

No reference to direct consultation with Black residents in the area is evident. However their political and planning representatives were consulted.

*Ariadne-Venus 400kV line*

For the first attempt at the Ariadne-Venus 400kV line EIA an "Initial Consultation" was conducted which was a notification by Eskom to some landowners of its intention to build two 400kV lines from Venus to Hector substation. This was followed by letters to certain, but not all, I&AP's (dated 20 December 1991) and a press release in prominent KZN newspapers (during January 1992) all of which provoked limited response.

Without adequate consultation of I&APs certain conclusions had been drawn. A report titled: Ariadne – Venus 400kV line Environmental Impact Study Part 1. The concluding comments or recommendation of this report read:

> "It is suggested that the western alternative (line route) is investigated in more detail. It is anticipated that problems regarding the acquirement of servitudes will be experienced and this could delay the project. It is therefore essential that an extensive and objective environmental study should be done without further delay. This should include comprehensive consultation with interested, but most important, all affected parties" (Eskom, undated-a).

Eskom, had effectively avoided scoping, as a decision on a final corridor in which to locate the powerline was made without consultation with I&APs. Further study on other alternatives was also stopped. This preferred (western) corridor was then announced on the 16 March 1993 and four weeks

was given for public response. The landowners reacted and opposed this decision vehemenently, causing a major outcry in comparison to the limited response to the previous notification. This resulted in I&AP's accusing Eskom of bias (Lombard and Associates, 1993). They refused to accept the Eskom preferred corridor and general mistrust and dissension reigned.

The strong reaction from landowners, especially in the vicinity of Nottingham Road, which followed the announcement of the initial corridor, was an indication that the public involvement in the assessment process had not been sufficiently comprehensive (Lombard and Associates, 1993). This neglect of scoping was acknowledged by Eskom: "The initial investigations for this line started in 1991 and reached a peak during 1993. At this stage the EIA ran into serious public concern. Several insufficiencies in the process that was followed were identified, the most important of these being insufficient public involvement in the EIA process" (Willemse, 1995d, p 77).

Strong objections, particularly by the Nottingham Road community and the NPB, at a public meeting on 28 July 1993, were raised against the exclusion of other alternatives to the east of the N3 highway. At this meeting Eskom agreed to review the alternatives at a greater level of detail, in the light of additional information obtained from the I&APs. The initial problems with inadequate scoping and omissions in available data, pointed out at this meeting with I&AP's, were addressed by the establishment of a Joint Review Committee, the holding of two workshops, the gathering of further information from I&APs, the involvement of specialists and additional field work.

During the ongoing scoping process which followed, a further two more alternative corridors were identified. Additional data gathering for all of the proposed corridor alternatives took place during September and October 1993 (Lombard and Associates, 1993).

In addition to the I&APs originally notified during the first attempt at the Ariadne-Venus 400kV line EIA, a comprehensive list of I&APs was compiled and contacted by letter for consultation during the repeat or second attempt at the Ariadne-Venus 400kV line EIA (Ariadne-Venus 400kV line EIA (2)). Letters by irrate I&APs to the newspapers (The Natal Mercury, October 5, 1993; The Daily News, 26 November 1993) and an appearance on prime time TV (the rarity of Wattled Cranes along the anounced route was televised in the television programme "Agenda") had also spread controversy and interest in the EIA and helped inadvertently publicise the project.

All local authorities, government departments and local farmers' associations were identified as I&APs. This list was further expanded by media releases and written contact with new interest groups identified by the known interest groups. The I&APs list grew from 200, during the early stages of consultation, to 650 and in addition 3500 electricity account holders in the study area were communicated with by post on a regular basis.

The scoping process was most thorough and the process discussed in the EIR is briefly summarised below:

- a public consultant was appointed;
- an executive summary of the draft EIR was sent to I&APs and representatives of constituencies;
- a comprehensive briefing letter and map was sent to I&APs informing them of the project progress, means of interaction, etc.;
- the draft EIR was first made available for public comment at 15 venues during March 1995;
- a press conference was held and advertisements placed in 10 newspapers including one newspaper for black readers;
- the Eskom team was availble for consultation at a local hotel for 6 days and attended 3 public meetings in different localities;
- the KZN Government Conservation Portfolio Committee, Minister of Economic Affairs and Tourism (03 August 1995) and Minister of Environment and Traditional Affairs were all personally briefed;
- the I&APs were kept informed by flyers in letter boxes and 5 newsletters keeping the I&APs informed of the EIA's progress;
- the project was also announced on Radio.

(Willemse, 1995c)

Subsequent to the draft EIR being published in March 1995 the revision of the Environmental Impact Assessment Report (EIR) (i.e.the third EIR) was placed for I&AP comment and numerous facets of the above process were repeated in order to ensure that no I&APs were ommitted.

The I&APs response was considerable and their comment noted. The comments and questions were synthesised and compiled in a separate document entitled "Comments Report" (Environmental Evaluation Unit, 1995a). The answers to these questions were synthesised in a separate lengthy document (Environmental Evaluation Unit, 1995b).

The I&APs, as a result of the detailed scoping exercise, contributed to issues and alternatives. The draft EIR was revised as a result, but little change to the consultative procedure followed was requested. The repeat of the EIA and ultimately the thorough implementation of IEM on the Ariadne-Venus 400kV line, was only undertaken at the insistance of 10 to 12 wealthy, erudite, white landowners (Willemse, pers comm., 1997). In spite of Eskom going to extreme lengths to ensure they had contacted all landowners at least one was overlooked and was unaware of the project upon negotiations.

After the repeat of the Ariadne-Venus 400kV line EIA a perception prevailed that: "Eskom is one of the forerunners in the environmental planning of linear developments .." (Willemse, 1995d, p 77). However, in contradiction, one of the six findings of the advisory panel, which was responsible for making the final decision, stated: "Eskom should be more proactive in encouraging and enabling disadvantaged communities to participate in the planning process of Transmission line projects" (Breen, et al, 1995, p ii).

*Hector 400/275kV substation*

On the Hector substation EIS, due to the lack of time allowed for the Environmental Impact Study, (EIS) the notification of and consultation with I&AP's happened simultaneously. Twenty-five I&AP's were contacted telephonically during the week July 25, 1994 by a consultant contracted to undertake the public scoping process. During the same week all twenty-five I&AP's identified were telefaxed or posted a briefing paper. The briefing paper outlined the project and impacts identified. It simultaneously requested that formal responses should reach the facilitator by 21 August 1994, allowing less than a month for comments. Media announcements in the press, on television and on radio were used even though these means of notifying and consulting I&APs had not been successful on the first Ariadne-Venus 400kV line EIA. Of the 25 I&AP's consulted only 5 responded. The option was made available to meet with interested and affected parties where necessary to clarify information.

*Ariadne-Hector 400kV line*

The Ariadne-Hector 400kV line EIA EIR, conducted concurrently to the Ariadne-Venus 400kV line EIA (2) and Hector substation EIS, states: "The most important phase of any environmental study

revolves around consultation with the affected public. Eskom has endeavoured to involve the public early on in the process, and every subsequent stage" (Funston, 1995a, p 11).

During August 1994 the landowners in the study area were contacted by letter and informed about the project and advertisements placed in the local newspaper. I&AP's could submit comments in writing or visit what was termed a 'roadshow' where I&AP's could speak to the Eskom environmental officer at an easily accessible point and air comments and concerns. Where possible, requests to personally visit members of the public were honoured. A summary document of the public comments was then submitted to I&AP's for perusal and further comment.

In spite of the process followed minor objections arose during the negotiation phase from the Cato Ridge community who stated that they were unaware of the consultative process (Tunnicliffe, pers comm., 1997). A single landowner complained that he was unaware of the consultation phase and oblivious to Eskom's intention until faced with the negotiation to purchase.

None of the powerline passed through tribal owned land. It was considered by Eskom, however, to be a successful EIA attributable to the thoroughness of the public participation process and the I&APs involvement in the decision-making process.

*Ariadne-Eros 400/132kV line EIA*

The Ariadne-Hector 400kV line EIA had taught Eskom not to devolve power and relinquish authority to I&APs as this could easily bias the process in favour of the more vociferous party (Funston, pers comm., 1998).

During August 1995 a briefing letter was circulated to all Eskom customers in a vast study area together with a map and questionnaire. The letter was also circulated in Zulu for the benefit of black residents (the majority of whom are most probably illiterate). The NPB criticised the process saying that it was too short a space of time in which to comment. Presentations were given to what were regarded as key stakeholders via small group meetings, however, this did not target the vast study area which previously received briefing letters but focused mainly on the corridors in which the two required powerlines were to be located. Organisations and local authorities were visited during the process of gathering information.

Six Tribal authorities were addressed via tribal meetings using an Eskom interpreter. The intentions of the project and EIA process were conveyed (Funston, pers comm., 1998). No document exists substantiating this activity nor was it recorded in the EIR. Where possible, requests to personally visit members of the public were honoured. I&APs who showed the slightest objection were given special attention to negate any delays and opposition. (Funston, pers. comm., 1998).

The study area did not, in the briefing letter, show possible corridors and evoked a poor response of only +- 6%. The presentations to and consultation with organisations such as farmers unions, however, elicited a +- 51% response. In spite of this three significant I&APs were not identified and neglected in the process. They subsequently lodged a complaint to this effect.

The Ariadne-Eros 400/132kV line EIA Report did not list the I&APs consulted, making the verification of the EIA's consultation process difficult.

*Pongola-Vergenoeg 132kV line*

The scoping for the 74km Pongola-Vergenoeg 132kV line EIA was highly problematic. A press release advertising the proposed line was placed in local newspapers of the towns of Vryheid and Pongola. Certain key I&APs (total of 10) were sent a copy of a very brief Preliminary Environmental Report and a letter informing them of the proposed project.

The report states: "Due to the poor response to the press release and the general acceptability of the project, by the majority of I&APs in the area, it was deemed unnecessary to hold public meetings" (Govender, 1995, p 5). The EIR of the Preliminary EIA does not substantiate as to how the "the general acceptability of the project" nor how the 'majority of I&APs' was determined. It appears that the perception by Eskom that Pongola wanted the supply was substantiated by the poor quality of supply being experienced by Pongola sugar cane farmers. Eskom Sales and Customer Services wrote: "With the last failure of the Impala/Pongola 132kV line the complaints are now coming in, in writing. Pongola farmers are again threatening to go to the Minister and we have proved the viable contribution these farmers make. The customers who have been affected have included Mkhuze and Makathini substations which is the entire northern Zululand" (Olivier, e-mail message, 1996). Thus the need for electricity advocated the acceptability of the project to all (especially the vociferous voice of a few farmers owning large tracts of land and whose business interests were at risk) and this substantiated circumventing an adequate consultation process. The powerline ultimately only crossed two farms and

the rest of the powerline (+- 64km) was placed on tribal land. Thus white farmers who were influenced by any negative impacts were in the minority and they stood to gain whereas black I&APs only gained marginally but carried the majority of negative impacts due to the location of the powerline.

It is also apparent that the press release was considered adequate to inform all residents and landowners in the study area – specifically in relation to the predominantly illiterate black population. The percentage of I&APs that read local newspapers in this rural community, is also an incorrect assumption. It is stated that consultation prevailed through interviews, consultations, telephonic enquiries and verifications through site visits. There is no record of these activities in the EIR.

The EIR contradicts itself in that in the Introduction it states: "... initial investigations have revealed that the biophysical impacts could be of moderate significance. However, the social and cultural impacts are expected to be more significant" (Govender, 1995, p 1). The I&APs were then, in spite of this implied significance, largely ignored and not consulted on the alternatives and issues.

It is clear that insufficient consultation with I&APs materialised especially in the black tribal areas. The surveyors negotiating a line route were the only Eskom contact with the local tribal people and authorities i.e. at no point in the EIA were they consulted and thus routing for the majority of the line was not subject to IEM guidelines. The request by the NPB and the Wildlife Society to be involved in further planning was never fulfilled and they were therefore prevented from providing further input/comment. The rapidity of this EIA and lack of scoping was considered beneficial by Eskom managers as it expedited the project.

*Ariadne-Bulwer 132kV line*

I&APs on the Ariadne-Bulwer 132kV line EIA were notified via letters and the EIA announced in local newspapers. Feedback was requested via a questionnaire. The NPB and conservancies were regarded as key I&APs. The NPB was regarded as an authority in the lack of a statutory body and afforded special attention and accommodated via site visits. All government departments were offered the option of comment via attendance at two public meetings and via the completion of a questionnaire. The questionnaire helped direct and inform the response of authorities and I&APs in terms of IEM as their knowledge of the process was assumed to be lacking. The recipients of the powerline – Eskom Distribution's Operations and Maintenance Department, were initially responsible for assisting with

identifying potential corridors. Numerous site visits were conducted with landowners to assess possible alternative corridors and identify issues. Thirteen tribal meetings were attended on Saturdays so that a maximum number of I&APs could be addressed via the tribal system. An Eskom interpreter and photographic material was used to present the project and allow for questions and feedback. A briefing letter was also translated into Zulu.

An initial public meeting with authorities and I&APs at Byrne Valley was well attended by white I&APs and enlightened them on the study area, alternatives, known issues and the process to be followed. This included elaborating on the planning requirements, IEM requirements (the Eskom environmental officer from the Ariadne-Venus 400kV line facilitated this presentation), technical details, etc. At the second meeting the findings, feedback from I&APs and the Eskom preferred corridor were presented. The I&APs present then reviewed the process and gave their decision on a preferred corridor.

At both meetings none of the three tribal authorities attended, even though they were invited, exemplifying the need for the environmental officer to attend Tribal Authority meetings. Predominantly at these meetings the male representatives from the Tribal Authorities gave input, even though all present at the meetings, tribesman and women as well as the authority, were invited to give input.

*Kokstad-Mount Frere 132kV line*

During the Kokstad-Mount Frere 132kV Line EIA letters were sent to all landowners and a list of I&APs. It was pertinent that a map was compiled with possible alternative powerline corridors drawn on it. It was envisaged that this would evoke a response where past experience showed apathy on the part of I&APs at the initial stages of the project e.g. Ariadne-Venus 400kV line EIA (1). This was done to prevent delays caused by issues being raised late in the process. When line routing commences delays become extremely costly and cannot be accommodated. Representatives of the three tribal authorities were consulted, local agricultural extension officers and local magistrates were notified in writing and contacted in person regarding the proposed power line. The EIA was also announced in local newspapers. The newly formed Department of Environmental Affairs in the Eastern Cape (Kokstad branch) and the NPB were regarded as key authorities and afforded special attention and accommodated via site visits.

All government departments were offered the option to comment via attendance at two public meetings (04/12/96 and 24/01/97) and/or the completion of a questionnaire. The questionnaire enlightened authorities and I&APs about IEM as its questions directed adherence to the IEM Guidelines of 1992 and attempted to evoke written response on alternatives and issues. Specific input into the process to be followed, however, was not opened up for comment by I&APs as required by the IEM guidelines.

At the initial public meeting authorities and white I&APs were informed about the study area, alternatives, issues and the process to be followed. It evoked a good response even though some reticence and suspicion prevailed initially. At the second meeting it was apparent that trust had developed and I&APs realised that the process was transparent and a lot of cooperation with identifying additional issues, evaluation and a preferred alternative was given.

However, at both meetings none of the three Tribal Authorities, even though invited, were present. In order to accommodate their comment, tribal authority meetings were attended where the project was presented. As the powerline directly benefited the communities it passed through it met with no negative comment and its construction, in previously disadvantaged areas devoid of electricity and requiring employment, was welcomed.

### 5.4.3 Trends Associated with Consulting with I&APs

The provision of information such as the need and desirability of the project and diagrams and photographs illustrating existing infrastructure was generally well done. However, there was limited education and training of I&APs, especially for disadvantaged black communities about the project's impacts and their right to provide input to the EIA process.

Consultation with regional provincial authorities such as the NPB for the bulk upgrading of supply to KZN for the period at a strategic level was not considered. However, at project level authorities were consulted.

Variations in scoping/consultation differed according to individual Eskom environmental officers with respect to thoroughness, intent and time constraints. Alternative routes placed on a map proved to be a useful tool and helped evoke response from I&APs.

Inadequate scoping can not only contribute to delays but can also contribute directly to mistrust which hampers later stages of the EIA and the project. It was also found that inadequate scoping can cause conflict between communities as well.

It appears admissable and inevitable that, even with a thorough scoping process some I&APs will always be overlooked.

Although Eskom consistently stated that it recognised consultation as important it was poorly undertaken in the previously disadvantaged black communities. As the majority of Blacks did not have land tenure they were largely dictated to or ignored during scoping.

It is presumed imperative in South Africa that for this peiod white and black communities should have been approached differently during scoping. In South Africa, for the period, the landscape was clearly defined physically between black and white and it was expected that consultation would be organised upon these lines. However certain EIAs overlooked this reality and failed to adjust the consultative process and method accordingly. Thus in most EIAs consultation with black communities was inadequate.

Table 8 shows the preferred techniques used by Eskom to reach landowners and tribal authorities. Another aspect evident in Table 8 is that the efficacy of the techniques used is largely unknown especially when applied to previously disadvantaged communities.

At times it was found necessary to conduct two public meetings as well as individual one-on-one meetings with key white I&APs. The first public meeting was introductory and informative, followed up by individual meetings with landowners and subsequently followed by a meeting where decisions were made and discussed. The first meeting was usually treated by I&APs with apprehension and suspicion and met with opposition. However, once the landowners were convinced of transparency and any suspicions dispelled, they then cooperated with the process showing the necessity of conducting consultation thoroughly and using appropriate techniques.

Numerous techniques were employed for white I&APs and perhaps the most successful was presentations at specially arranged workshops, farmers associations and one-on-one meetings with landowners. Questionnaires and newspaper and radio reports achieved a limited response whilst the American practice of 'road shows' achieved such poor response that it was discarded.

The use of letters informing a vast study area during the Ariadne-Eros 400/132kV line EIA scoping exercise did not improve feedback and this shows that the importance of the method employed is critical and not the number of I&APs targeted and reached.

Eskom came to regard the fact that if consultation had transpired it had complied to the IEM guidelines regardless of the response it engendered. Thus the responsibility for consultation was shifted from the proponent viz. Eskom to the I&APs irrespective of the suitability and efficacy of the consultative method employed. Research was never conducted to ascertain the best method of consultation and what this entailed.

Table 8: Synopsis of the Public Participation Tools and Techniques Employed and their Estimated Effectiveness.

| Technique | Measure of the Efficacy of the Technique Used | | | |
|---|---|---|---|---|
| | authorities | landowners | white parties | black parties |
| one-on-one | Effective | Effective | Not Used | Not Used |
| questionnaires | Partly Effective | Partly Effective | Partly Effective | Not Used |
| newspaper | Unknown | Unknown | Unknown | Unknown |
| radio | Unknown | Unknown | Unknown | Unknown |
| 'road shows' | Ineffective | Ineffective | Ineffective | Not Used |
| existing forums | Ineffective | Partly Effective | Ineffective | Partly Effective |
| public meetings | Partly Effective | Partly Effective | Partly Effective | Ineffective |
| flyers in zulu | Not Used | Not Used | Not Used | Unknown |
| using specialists | Effective | Effective | Not Used | Not Used |

No formal procedure for scoping in black communities was developed by Eskom nor was its efficacy tested. Black communities were only approached through the tribal system i.e. tribal meetings and meetings with tribal chiefs and indunas. Although it was surmised that tribal meetings were representative of more than just the tribal authority this assumption remained untested and not professionally informed. The same lack of substantiation of techniques applies for illiterate black communities approached with conventional methods suitable only for comparatively erudite white communities.

The lack of and inadequate consultation conducted on black tribal occupied and owned land shows that the focus remains on those who own land and not necessarily its occupants. This shows that consultation remains aligned with the company's objectives and not environmental objectives or socially acceptable ethics per se.

The need for professional skills to be appointed during consultation are obvious for a company such as Eskom. It is apparent that the requirements of consultation, even as briefly outlined in the IEM guidelines, were not complied with by Eskom nor their consultants.

Consultation became a focal point as it appeased I&APs who had the potential to delay or stop projects and then subsequent processes such as negotiation, construction and even operations and maintenance were then conducted far more amicably with landowners. Thorough scoping of powerlines was therefore conducted where strong opposition from landowners was envisaged.

The issues and trends identified in this study are consistent with international and local literature reviewed. Suspicion, mistrust, bias, inadequate consultation with disadvantaged communities, apathy to respond on the part of I&APs, delays due to inadequate consultation, inappropriate consultation methods, causing division in communities as a result of scoping, and the unpredictability of consultation are all apparent. The lack of flexibility in a project driven process to accommodate the unpredictability of consultation was one of the more repetitive and apparent discrepancies which arose as scoping was often glossed over or ignored when time did not allow. These issues also support Van der Kooy's (1996b) hypothesis that issues in consultation experienced in LDCs are similar to those experienced in DCs.

### 5.4.4 Identifying Possible Alternatives

This section reviews the assessment of alternatives in the twelve case studies.

*Elimination of Strategic Alternatives*

The option existed prior to the IEM Guidelines of 1989,

When the projects began for the bulk strengthening of supply to KZN it was already known that, Pietermaritzburg, Durban, the South Coast and the then northern Transkei were to be upgraded and required additional bulk supply in the form of substations and supply lines. The review of alternatives,

be they fundamentally different forms of energy supply e.g. nuclear power, solar power, etc. or incrementally different approaches such as alternative powerline routes, substation locations, different design options for powerlines and substations, available at a strategic level, was not undertaken. The Eskom environmental officers were precluded from influencing planning in the region at a strategic level. The IEM Guidelines of 1989, however, made allowance for reviewing policies and programmes and not merely just individual projects. Eskom environmental policy, however, was constrained to the mere consideration of individual projects at this point in time.

*The Consideration of Alternatives at the Level of Individual Projects*

*Ariadne substation*

The environmental officer had been constrained to locating the substation to the south or south west of Pietermaritzburg. The study was to include:

> "A preliminary investigation into various feasible substation sites and routes for new Transmission lines; and a more detailed assessment of the impact of selected alternatives and the selection of preferred routes" (De Kock, 1991, p 2).

For Ariadne substation, a feasibility study was conducted in the area south-west of Pietermaritzburg, and using a Global Information System, 19 feasible sites were identified. This excluded the consideration of the 3 larger 400kV powerlines to and from these sites but took into account the proposed Distribution 132kV lines within the proposed substation's immediate vicinity. The study could not, due to time constraints, consider these proposed Distribution lines emanating from Ariadne substation, in any detail. This was only a feasibility study and the environmental, technical and economic criteria of the 19 feasible sites were therefore only superficially investigated (De Kock, 1991).

The feasibility study recommended that an EIA to conduct more detailed investigation into 5 of the 19 identified sites, was required. This, it was recommended, should include the investigation of the powerlines to and from the proposed sites and complete the public participation programe which had already commenced. Without further consultation with environmental management, 3 of the sites were eliminated leaving 2 remaining for consideration and ultimately one was chosen. The process was once again predominantly based on criteria other than the environment (Estment, 1994).

The substation site was also selected in a study separate to that of its 400kV supply line. The two are integrally linked and constitute a single project although different in scope of work and in terms of environmental impacts. The Ariadne substation was to remain without power from the Ariadne-Venus 400kV line, which was to be delayed for environmental reasons, for three years. The R78 million asset of Ariadne substation was constructed according to schedule and stood idle, resulting in a R37 million loss to Eskom per annum (Eskom, 1995d). Not included in these losses was the temporary and expensive transfer of one of the transformers to another substation (Umfolosi substation) as it was considered too costly to allow such an expensive asset to stand idle and not generate revenue.[2] Thus the substation should have been assessed in conjunction with its associated powerline i.e. all alternative routes for the powerline as well as all alternative sites for the substation should have ideally been considered simultaneously to avoid the delay created by of separate environmental assessments.

Thus an incomplete and piecemeal approach to the EIA resulted in a series of events which had the ability to affect major socio-political agendas such as the electrification of townships.

Eskom knew of the Transmission and Distribution lines required to exit the substation at its planning and knew of their general destination. With this foreknowledge and the influence the location of the substation would have had on these multi-million Rand projects, greater holistic planning and investigations of a wider area for the substation at a more strategic level could have transpired, such as the identification of environmentally sensitive areas or land uses impacting upon or impacted upon by powerlines for a given radius from the substation site. Perhaps today a strategic environmental assessment would have been considered for such an influential project.

*Ariadne-Venus 400kV line EIA*

The use of fundamentally different alternatives such as nuclear or solar energy were not considered nor alluded to in the first Ariadne-Venus 400kV line EIA. It was assumed that only alternative routes i.e. incrementally different as opposed to fundamentally different alternatives for the powerline, were to be considered in an EIA report. Subsequent to the conclusion that only alternative corridors were to be considered the environmental officer further focused the EIA by stating that only one of the future two 400kV lines required would be investigated as the simultaneous investigation of the two powerlines ultimately required was too complex (Eskom, undated-a).

Options for routing the line were further reduced when alternative routes were constrained to being solely located on the western side of the N3 highway. The area east of the N3 was precluded by TEP (not environmental management or I&APs) as an existing 400kV powerline and numerous 275kV lines were located there already. The reasoning not to locate the next powerline close by those existing was to minimise common cause failure due to factors such as storms which sweep the area and deter easy sabotage of both lines, which would seriously affect supply to Pietermaritzburg and Durban. It was assumed that a route down the western side of the N3 was feasible and construction was commenced on Ariadne substation with this assumption in mind. The routing of the Ariadne-Venus 400kV line to the western side of Pietermaritzburg was also favoured as it was a shorter route than on the eastern side and therefore less costly.

TEP found it financially preferable to break the line at Ariadne substation before routing it further to Eros substation and Hector substation and therefore discarded the alternative to tee-off a possible Venus-Hector 400kV line (i.e. Estcourt to Hammarsdale as opposed to an Estcourt to Thornville, Pietermaritzburg line), an approximate saving of R40 million (Estment, pers comm., 1997). Once again this decision was reached without considering environmental implications.

The area was flown on the 17 and 18 September 1992 and a total of four alternative routes on the western side of the N3, which had the potential to accommodate a powerline, were identified (Eskom, Undated-a). A final western route was subsequently selected at a meeting with TEP on 6 October 1992. A detailed investigation was only to be undertaken on the Eskom prefered corridor. The selection of this prefered corridor was based on the premise that the study area (only west of the N3) was "fairly homogenous" (Clara, pers comm., 1999). This route was sufficiently distanced from the existing lines east of the N3 to allow a second future 400kV line to be located inbetween. Its selection was strongly biased in terms of electrical criteria and future planning requirements.

Eskom had suggested that a single western line route, route C through the highly scenic and environmentally sensitive areas of Fort Nottingham and Impendle, was most favorable and required further detailed impact assessment (Eskom, Undated-a). Eskom had already at this stage narrowed the alternatives and alternative routes to a single preferred corridor about 10km wide and thereby precluded any other viable alternative routes for further comparison.

[2] A single transformer then cost approximately R7 million

Thus a majority of the decisions taken during the Proposal Generation Stage had not been conducted in consultation with Eskom Environmental Management, I&APs or any other authority during the early stages of planning.

Eskom's initial approach to assessment and evaluation of alternatives differed from that advocated in the IEM Guidelines of 1989. The IEM Procedure requires that: "in addition to the proponent's proposed action, the most viable alternative actions should be formulated for comparison in the coming assessment stage" (Council for the Environment, 1989a, p 8). The impacts associated with all alternatives are hereby assessed so that the evaluation of alternatives is as unbiased as possible in the decision-making process. However, a review of the Transmission IEM process by environmental consultants revealed that: "The impression was gained from the documentation available, that Eskom has an informal approach to the selection of a single corridor for more detailed assessment, followed by a second if the first proved unsuitable and, if necessary, subsequent corridors thereafter. Corridor selection was perceived to be based on an arbitrary choice which would inevitably lead to a biased decision" (Lombard and Associates, 1993, p 2).

A preferred (western) corridor was then announced on the 16 March 1993 and four weeks given for response. The landowners reacted and opposed this decision vehemenently. This resulted in I&AP's accusing Eskom of bias and refused to accept the Eskom preferred corridor (Lombard and Associates, 1993).

The lack of thorough consultation with I&AP's, inadequate documentation of the assessment and evaluation process and the neglect of the other alternatives and their comparison in an open manner, resulted in a "decision perceived by I&AP's to be biased and a sceptical attitude among some of the affected groups was inevitable" (Lombard and Associates, 1993, p 7).

During the repeat of the Ariadne-Venus 400kV line EIA Eskom, in response to comments and questions by I&APs, was made / agreed to review all fundamentally different alternatives such as solar energy, power stations, hydro-electricity, overhead lines versus underground cables, recycling existing servitudes, demand side management, etc. In addition other incrementally different alternatives viz. alternative corridors in which to locate the line were identified by I&APs. Seven alternative corridors located on both sides of the N3 were identified. They were reviewed and circulated on a map sent to I&APs who then suggested an eighth. The potential impacts of concern were assessed for each corridor so that they could be compared. All were made to converge on the already constructed Ariadne

substation whose location in terms of the effect it had on the routing of the powerline was never questioned.

*Hector-Klaarwater 275kV line*

The Hector-Klaarwater 275kV line EIA used the concerns and suggestions of I&APs in conjunction with information gleaned for the study area and engineering and economic requirements of the project, to identify 3 alternative corridors or routes. These alternative routes were concluded after consultation with I&APs.

*Hector 400/275kV substation*

Due to the extreme time constraints for Hector substation, Eskom environmental staff were only briefly consulted via one site visit on the location of Hector (Estment, pers comm., 1997). Neither were specialists consulted regarding this decision. The conclusion was based predominantly on electrical, cost and time constraints. Eskom TEP did not allow the contemplation of alternative sites for Hector substation (whose site they already owned and had purchased in 1980) for the following reasons:

"the extra line length (which equates to cost) if a more distant site were used; implications for voltage stability and extra losses due to additional line length away from existing infrastrucure; the favorable location of the site only 2km from the N3 national road and access for construction and maintenance off an existing tarred provincial road; the "surmised" environmental impact of the extra lines precluded a more remote site from serious consideration; the location, adjacent to the existing Hammarsdale industrial area, was said to minimise its environmental impact; the site was close to the existing 400 and 275kV lines which permitted them to be turned into the substation with ease; and sites of suitable topology and dimension were said to be rare in the area especially due to the presence of housing elsewhere (Gouws, et al, 1995a). A TEP report emphatically concluded that "no other feasible and cost effective site exists in the area, due to additional line length and therefore additional cost ..... An even greater motivation thus exists to make the maximum possible use of the existing Hector site" (Estment, 1994, p 37).

All of the planning of Hector and associated projects had already been undertaken based on the assumption that the site remained as located during 1980. This was without consideration of

subsequent changes in environmental criteria and environmental policy by 1994. The Hector-Klaarwater 275kV Line EIA, already well in progress, had been conducted under the assumption that Hector's site remained as is, and was completed during the latter half of 1994 prior to the Hector EIS being finalised (Clara, 1994). Locating the substation elsewhere would have radically affected the routing of the Hector-Klaarwater 275kV line and this reinforced maintaining the substation at the 1980 location.

Eskom environmental staff were only briefly consulted via one site visit on the location of Hector (Estment, pers comm., 1997). Specialists were also not adequately consulted. The conclusion was based predominantly on electrical, cost and time constraints. Thus the statement in the EIR regarding choice of site read: "it is assumed, for purposes of this study, that no alternatives will be considered, unless very substantially motivated". (Gouws, et al, 1995a, p 5) despite environmental parameters having become increasingly stringent. The land requirements for the substation also increased from 5 ha to 18.15 ha and ultimately, to 100 ha to accommodate the turn-in lines.

Likewise with regard to the choice of technology, it was stated in the introduction of the Hector substation EIA report that: "It is assumed, for purposes of this study, that Eskom has decided in favour of a certain type of technology, and that no alternative technology will be considered, unless very substantially motivated" (Gouws, et al, 1995a, p 5). The alternative technologies available were either to use a strung busbar air insulated substation (AIS), a tubular busbar AIS, or a gas insulated substation (GIS). The GIS would occupy an area of 250 X 150m as opposed to the much larger AIS of which both types of the latter occupy approximately 550 X 300m. The Briefing Letter to I&APs stated: "Having considered all factors, Eskom's preferred option is AIS technology using Tubular Conductor Busbars" (Gibson, 1994).

Preliminary design had already been completed by 01 June 1993 at a cost of R307 312 thereby further alienating the option to either re-design the substation or locate it elsewhere. The only means left to provide meaningful input into the project therefore, was to recommend mitigatory measures for construction at the selected site in the limited time available.

*Ariadne-Hector 400kV line*

During the Ariadne-Hector 400kV line EIA, where scoping was following a more environmentally correct procedure, two alternatives corridors in which to locate the powerline were suggested to

Eskom from the participation process and from landowners in the area.

I&APs, and more specifically landowners who stood to lose profits, as well as the independent environmental consultant effectively determined the alternative line routes. It is obvious that the landowners with sugar cane farms whose productivity would have been negatively affected by Eskom biased the selection of alternatives. Eskom could have offered a more technically feasible and less costly alternative route (Funston, pers comm., 1998). Alternatives which had less of a negative influence on other aspects of the environment such as aesthetics and bio-physical aspects also could have been identified.

*Ariadne-Eros 400/132kV line*

For the Ariadne-Eros 400/132kV line EIA technical alternatives such as building a coal-fired power station, the use of solar energy and the option to cable underground which had been mentioned in the Ariadne-Hector 400kV line EIA report were reiterated verbatum in the Ariadne-Eros 400kV line EIA report (Funston, 1995a, p 4; Funston, 1995b, p 4). This was in turn a paraphrasing of the comment on these fundamentally different alternatives obtained from the second Ariadne-Venus 400kV line EIA report.

The map of the vast study area circulated to I&APs, did not have any proposed corridors drawn on it. Extreme difficulty had been experienced in trying to obtain a route for the first section of a proposed 132kV Distribution line between Ariadne substation and Richmond, ultimately to proceed to Ixopo and Umzimkulu. No EIA had been undertaken as no Distribution environmental officer was available for the task in 1994 and Distribution Survey had attempted to negotiate a route. The route, due to landowner opposition, was too long, not financially viable and doubled back on itself in order to reach Richmond. It was termed by Distribution as the "shepherd's crook route" and due to its shape and extreme cost, discarded (Timm, pers comm., 1995).

The difficulty of obtaining new servitudes was sufficient motivation for a joint Transmission and Distribution venture whereby a multi-circuit tower was designed on which to string both a 400 and a 132kV line (Moors, letter, 1994). This is in contradiction to the ruling which prevailed until 1994 that Distribution and Transmission lines were not to parallel each other closely for more than a 1km to prevent magnetic induction. This renders the adjacent line 'live', even if switched off, and makes maintenance extremely dangerous (Van Rooyen, pers comm., 1993). This negated the need for a third

Eskom powerline servitude through the same area and was therefore automatically also presumed to be environmentally preferable (Pallett, pers comm., 1995). As as a result a 400kV line was constrained to 'accompany' the 132kV line on very large structures and made to turn-in at substations at the towns of Richmond, Ixopo and Umzimkulu before proceeding separately to Harding (see Figure 2). Whether this is preferable or not is debatable, but the issue remains that its environmental impacted was not assessed.

Two corridors, with minor variations between Ariadne and the Mkomazi River were derived from issues identified during the public scoping phase as well as those identified by Eskom. Both corridors would ultimately be required to accommodate powerlines and thus a true comparison of alternative corridors to determine which was preferable was not being conducted.

A third alternative considered was to recycle the existing 88kV servitude to Harding which was to be dismantled. It could be widened to accommodate the second 400kV line to Eros substation. This was quickly discarded as parts of this line are still required to remain operational.

Only two corridors to accommodate the two proposed powerline servitudes from Mzimkulu to Harding were investigated. According to the environmental officer little opportunites existed for alternative corridors beyond Richmond (Funston, pers comm., 1998). This is in spite of the consideration of alternatives being an imperative in terms of the IEM Guidelines of 1992. The environmental officer conducting the EIA however, claims that: "What was done was what was deemed practical and necessary" (Funston, pers comm., 1998).

The decision to neglect the consideration of alternative options must be undertaken in consultation with I&AP's. Eskom largely arrived at this conclusion alone, on the basis of access and topographical constraints (Funston, 1995b, p 19). However, the two proposed corridors were disclosed and discussed at the various public meetings and appeared to be accepted by all I&APs without the need for consideration of additional alternatives (Funston, pers comm., 1998).

Despite the assurance of negotiating the route in record time, delays were experienced in acquiring the route due to the opposition of white landowners (Richardson, pers comm., 1996). The negotiator was even persuaded by white landowners to attempt to route the powerline at least 15km north of the boundaries of the corridor identified by the EIA. This passed through a black tribal area (Richardson, pers comm., 1996). Black tribal areas did not present the obstacles to Eskom where tenure ultimately resides with the tribal authority, nominal compensation is paid and permission to occupy is easily

obtained and granted. On predominantly white held land a servitude has to be acquired and the property purchased from the individual landowner often after long and difficult negotiations, at great cost and delay. This practice of exceeding the boundaries of the servitude identified by the EIA was stopped by the Distribution environmental officer as it entailed eventually routing the line through the highly sensitive Byrne Valley. A previous Eskom Distribution EIA, the Ariadne – Bulwer 132kV line EIA, had revealed that the route through Byrne Valley imposed on inter alia Podocarpus forests, habitat of Blue swallow, hiking trails, large tracts of timber plantations, undulating terrain, and scenic landscapes. This also shows that the EIA had not exhausted the consideration of all feasible alternatives and irrefutably indicated a preferred corridor / alternative.

The consideration of one or two additional corridors for comparative purposes, even if they were largely untenable, would have substantiated the use of the two acceptable corridors and, for a project of such vast magnitude, was deemed a necessary requirement. The EIA should have also endeavoured to substantiate placing two powerlines in one servitude on a single set of structures as opposed to two separate lines.

*Eros 400/132kV substation*

The joint consideration of the line and Eros substation locality as part of the Ariadne-Eros 400/132kV line EIA was an improvement on the Ariadne-Venus 400kV line / Ariadne substation and Ariadne-Hector 400kV line / Hector substation EIAs where the EIA for the substation was conducted separately from the associated substations. Eskom had, although undeniably more difficult, attempted to offer holistic, concurrent and synergistic development of preferred alternative sites / localities for powerlines and substations simultaneously. This practice was also less costly and less time consuming as merely one EIA was conducted for two projects.

Eight technically feasible substation sites were autonomously selected by Eskom for presentation to select local authorities and I&APs in the vicinity of Harding. The possibility of locating the substation near the Oribi Gorge Nature Reserve was disallowed for environmental reasons. This decision was concluded at a strategic level prior to the EIA's commencement.

*Pongola-Vergenoeg 132kV line*

The study area for the Pongola-Vergenoeg 132kV line EIA, approximately 65km long by 40km wide,

and the four alternative corridors identified affected numerous landowners and tribal authorities and their residents. The EIR further stated: "Due to the high variance in land usage and the sensitivities in the area, six alternative corridors have been proposed". Two strategic alternatives to supply Pongola from other substations besides Vergenoeg were discarded without any environmentally founded comment on the decision (Naidoo, 1997). The alternative powerline routes 'assessed' were all proposed by Eskom. The I&APs and especially local communities (noteably black) were totally disregarded in their selection.

The EIA disregarded any of the previous corridors and avoided evoking any significant input/opposition from I&APs and went according to what was most probably the route of least resistance through the black tribal areas avoiding the privately owned game farms and a large provincial game reserve. This avoidance became very noticeable during construction when the line was placed in inaccessible areas rather than attempting to negotiate with private game farm owners where access and terrain was suitable. There was inadequate comparison of alternatives.

*Ariadne-Bulwer 132kV line*

Alternatives for the Ariadne-Bulwer 132kV line EIA to be investigated were initiated when Eskom identified certain 'no-go' areas (such as forestry and very steep and long slopes) in which it was extremely costly and difficult to construct and maintain a powerline. Using the remaining areas three corridors were proposed and groundtruthed using site visits by air and vehicle, and verified via feedback from a questionnaire to I&APs. Various variations of the three alternative corridors were also proposed by using interlinking corridors. The I&APs accepted the alternative corridors proposed by Eskom and did not profer any additional ones. It was hoped that by Eskom being first to profer potential corridors greater initial response and the identification of alternatives and issues would be evoked – especially from those affected. This was indeed the result regarding issues but no additional corridors were proposed.

The identification and investigation of alternatives within the black tribal authorities' area, however, even though some response had been received from the Area Magistrates, was predominantly at Eskom's discretion.

*Kokstad-Mount Frere 132kV line*

The identification of alternatives by Eskom for the Kokstad-Mount Frere 132kV Line EIA was

conducted on the same basis as the Ariadne-Bulwer 132kV line EIA and elicitted a similar response in the white and black areas to what had transpired previously. The selection of alternatives was thorough and, due to a thorough scoping exercise, was supported by I&APs. The I&APs proffered invaluable support and made the final negotiation of the line route with landowners far more amenable. The identification and investigation of alternatives within the black tribal authorities's area was solely at Eskom's discretion, with Eskom avoiding the task of empowering communities to make the decision.

### 5.4.5 Trends in the Scoping of Possible Alternatives

The identification of alternatives showed the need for strategic environmental assessment (SEA) earlier in the planning process when the whole upgrade of supply to KZN was being considered rather than a piecemeal approach for individual projects. Certain alternatives were common to all the projects and their consideration could have been documented in a single separate document, which should have accompanied individual project EIAs.

EIAs were conducted on a project-by-project basis irrespective of their interconnectedness and reliance upon each other for successful operation. Subsequently, however, an improvement was noted as the alternatives for a powerline and its substation were considered simultaneously.

There was a tendency to locate the powerline in a single corridor and preclude as many alternatives as possible. Where Eskom already owned the land their was also an unwillingness to engage in the comparison with alternative sites.

Alternative powerline routes through black areas were predominantly selected by Eskom and the favoured one chosen by Eskom with little consultation with the local tribal authority. Thus the consideration of alternatives was usually undertaken when there was sufficient pressure and when I&APs inadvertently questioned the location of a powerline. Consistently those other than the environmental officers in Eskom, made the decision to preclude any further consideration of alternatives.

Where all alternative routes had been openly evaluated, the final routing/siting was understood and supported even by all including Eskom personnel which benefited the project's implementation.

The guidelines pose three questions concerning alternatives against which the adequacy of the EIA may be determined. These questions are concerned with how alternatives should be identified, what the reasonable range of alternatives that should be considered is and what level of investigation should be applied to each alternative (DEA, 1992b). These questions were not adequately and consistently addressed in the majority of the earlier Eskom projects. The ability to forego the consideration of alternatives was never adequately deliberated within Eskom.

### 5.4.6 Identification of Significant Issues

According to IEM principles a broad definition of the term environment must be adopted. This includes biophysical, socio-economic, cultural, historic and political factors. Significant issues have to be identified in consultation with I&APs, specialists, literature sources, etc. (DEA, 1992b).

*Ariadne 400/132kV substation*

The identification of significant issues for the Ariadne substation EIA was incomplete as only a feasibility study of 19 sites was conducted. Further to this and with particular reference to the Thornville site, which was selected as the final site, the feasibility study had made this comment: "... investigate slope of site in more detail. Social issues are extremely important" (De Kock, 1991, p 48). However, the EIA did not adequately address all the issues related to the site.

Further, Eskom, as part of the hurried purchase of Ariadne and limited identification of issues, inheritted six families who remained resident on the property. The old farm houses were also not demolished when the property was purchased and the result today is the problems of attempting to evict approximately fifty squatters in addition to the original six families (Leibrandt, pers comm., 1999).

The purchase of the site for the substation resulted in a whole farm (and not just the area required) having to be purchased as well as the business 'Thornville Engineering' located thereon. The blue gum trees in which a large flock of heron were nesting were almost felled during construction and have been subsequently removed. The EIA shows a thorough lack of adequate identification of issues which in retrospect appear very obvious.

*Ariadne-Venus 400kV line*

For the first attempt at the Ariadne-Venus 400kV line EIA the procedure which Eskom had used to arrive at the selection of a preferred corridor, precluded the need to undertake a survey of issues for the whole study area. All that was required was the study of issues within the preferred corridor. During the repeat of the Ariadne-Venus 400kV line EIA the I&APs contributed significantly to the raising of issues due to a very thorough scoping process amplified by the controversy surrounding the routing of the line, which had raised public awareness and interest in the project. Numerous specialist reports were compiled for the study identifying issues in the study area. The majority of the Ariadne-Venus 400kV line was eventually routed on the eastern side of the N3 proving the ineptitude of the initial EIA to identify significant issues.

*Hector-Klaarwater 275kV line*

During the Hector-Klaarwater 275kV line EIA numerous issues were identified predominantly via the study of existing literature and consultation with I&APs. A shortcoming was that no specialists were utilised to identify and further elaborate on issues identified (Clara, pers comm., 2000).

*Hector 400/275kV substation*

Despite the fact that the consultant stated that "This study, together with the study done by Fritz Klopfer for the Ariadne substation, are regarded as being pioneering work" (Gouws et al, 1995a, p 1) the majority of issues, in hindsight, were generally adequately identified. What was to overshadow this was the inappropriate assignment of significance to these issues and inadequacy of their investigation as a result.

Georgedale substation, an AIS substation in existence for over 30 years, a mere 6km away, situated in a similar environment and experiencing similar problems such as run-off induced soil erosion, was not referred to in determining which issues are significant and should be investigated. The assessment of the existing substation would have highlighted the significance of certain issues requiring more detailed investigation.

*Ariadne-Hector 400kV line*

For the Ariadne-Hector 400kV line EIA Eskom had identified the issues via the public consultation phase and in order to assist with the analysis of the different alternatives, contracted an independent environmental consultant to ascribe significance. The consultant was appointed so that Eskom would not appear to I&APs to unduly influence or bias the decision.

The terrain in which the powerline had been constructed proved to have significant design and construction implications. This was inadequately considered during the EIA process and not mentioned in the EIR. The design and construction of the line was more difficult and expensive as a result (Funston, pers comm., 1997). This was also partly due to there being poor representation on behalf of the bio-physical aspects of the study area by organisations such as the NPB and an overwhelming presence of landowners with a vested interest who stood to be adversely affected.

Certain issues such as aesthetics were overlooked. There was an attempt to remedy this at a later stage which proved almost impossible e.g. in an attempt to mitigate the imposition on the view of a certain landowner the towers were moved and hidden behind hills only leaving the conductor visible (Funston, pers comm., 1997).

*Ariadne-Eros 400/132kV line*

For the Ariadne-Eros 400/132kV line EIA I&AP's helped identify significant issues within the minimal time period allowed, however, the NPB comment on the Ariadne-Eros 400/132kV line EIA report expressed the following concern that the draft report did not conform to the requirements of an environmental impact assessment report as given in the Department of Environmental Affairs documents, for the following reason:

i) Environmental concerns have not been identified within the proposed corridors. All that has been stated is a description of concerns within a broad study area.

(Osborn, letter, 1996).

*Eros 400/132kV substation*

For the eight technically feasible substation sites for the proposed Eros substation, autonomously

selected by Eskom, Eskom predetermined the issues against which the sites were evaluated. These were subject to perusal by landowners. The sites selected took into account the effect of the incoming and outgoing lines on the timber plantations prevalent in the area. Eskom also wished to remain close to the existing 132kV infrastructure. An increase in distance from it would increase project costs as well as costly compensation for servitudes through existing timber plantations. These issues had significance from an Eskom perspective.Timber and aesthetics, in the limited scoping process, were also considered to be the main issues by the Harding Town Council. Other issues such as the substantial flock of 40 Crowned Crane that frequented the selected site and the wetlands which were displaced and influenced by the substation, were mentioned. This substation also had the same potential as Hector substation to result in massive soil erosion due to run-off. The EIR gave no indication of the locality nor did it record the issues raised for the other seven sites. The prefered practice of conducting an EIA for a substation and powerline together was adopted but the adequate identification of issues suffered greater neglect.

*Pongola-Vergenoeg 132kV line*

The significant issues for the Pongola-Vergenoeg 132kV line were ascertained by a helicopter flight, limited site visits, studying orthophotography and maps. Greater familiarisation with the environmental aspects and interrogation of the predominantly Black I&APs of the area was necessary.

An example of the inadequacy of scoping for issues was that approximately 5km of the line was routed through Lowveld Woodland. This was later removed in its entirety and transformed into sugar cane fields, which coincided with the powerline construction nearing completion. Eskom, however, had, at great expense, attempted to avoid cutting the trees. This costly and time consuming exercise was totally wasted and the proposed clearing of the trees could have been easily identified during scoping. The fires from the sugar cane, which is burnt regularly, now threaten the longevity and integrity of the woodpole structures upon which this line is built. This shows that Eskom had not adequately considered the future planning of the area.

The massive dongas, 8 to 15m deep, and dolerite dykes which all slowed construction due to problems of access were never identified in the EIA. Overcoming these obstacles had serious environmental implications e.g. crossing a donga by bulldozing it closed creates the potential for lateral erosion of the donga and massive soil erosion is inevitable as a result.

*Ariadne-Bulwer 132kV line*

Familiarisation with the area and its issues and the ground-truthing of alternative line routes required numerous site visits from the Eskom environmental officer together with technical personnel as well as three flights of the entire study area. Time was not a constraint.

Numerous issues materialised for investigation as a result of scoping with I&APs and the NPB. The presence of Blue Swallow and Blue Crane nesting sites, hiking trails, wetlands, indigenous forests, amongst others were identified as key issues during the Ariadne-Bulwer 132kV line EIA.

*Kokstad-Mount Frere 132kV line*

On the Kokstad-Mount Frere 132kV Line identification of issues such as soil piping in tribally held land, was reliant on the expertise of the Eskom environmental officer and agricultural advisory officers for the area. However, on white-owned farms the landowners and NPB proved very adept at identifying significant issues which were gleaned via a questionnaire and a public meeting. The familiarisation with the area and issues and ground-truthing of alternative line routes required numerous site visits together with technical personnel as well as a helicopter flight of the study area. The EIA however neglected to identify the presence of a small yet significant historical site viz. the church built at Brookes Nek, which was to be negatively affected by a late reallignment of the powerline.

### 5.4.7 Trends Regarding the Identification of Issues

Broader issues, common to all projects in the region, were overlooked due to the limitation of only considering issues on a project-by-project basis.

The environmental officer's identification of issues was constrained by the limited time and cost available during projects and the elucidation of issues by particular individuals (environmental officers) varied. There was thus a lack of the use of scientific specialists to undertake the identification of common issues even though Eskom environmental officers consistently failed to accurately identify all issues. Social scientists should have been used to identify sensitive social issues in previously disadvantaged communities.

There was no investigation of existing Eskom infrastructure to help determine significant issues in similar environments. Hence an understanding of longer term cumulative impacts was also not identified.

Issues were often identified in general terms and not enough differentiation was made between pertinent issues requiring more investigation and those that could be discarded or merely referenced.

### 5.4.8 Determination of Specific Guidelines for Procedure

*Ariadne 400/132kV substation*

At the time legislation and a single authority did not exist to administer and enforce the IEM Guidelines of 1989, therefore the screening procedure and decision on the level of EIA investigation to be adopted, was at the discretion of Eskom.

For Ariadne substation Eskom decided, without input from the environmental officer, on the procedure to be followed. Thus only a feasibility study was conducted. A consultant was appointed at Eskom's discretion and an advisory panel was formed to represent the interests of the communities and local authorities. The panel requested that Eskom select preferred sites together with associated transmission lines, and present these alternatives to I&AP's for comment (De Kock, 1991; Klopfer, 1996). The requested meeting and presentation of the 5 sites and their detailed impact assessment for review was never undertaken by Eskom. The 5 most suitable sites arrived at out of a potential 19, were not presented to I&AP's even though an expectation had been created for their discussion and presentation to the panel.

The environmental investigation conducted was considered by the environmental officer, to only fulfil the requirements of a feasibility study and did not fulfil the requirements of an EIA of Class 1 status which was what was required (De Kock, pers comm., 1997). This is substantiated in the report where from the outset the need for the detailed Class 1 EIA, in terms of the IEM Guidelines of 1989, was acknowledged (De Kock, 1991).

Thus Eskom suppressed further environmental investigation oblivious of its need to comply with its own policy, the IEM Guidelines of 1989 and the Eskom environmental officer with the result that the EIA remained merely a feasibility study.

*Ariadne-Venus 400kV line*

At the commencement of the Ariadne-Venus 400kV line EIA (1), no specific guidelines had been agreed upon. Eskom adhered to its variation of the IEM guidelines which did not include scoping for specific guidelines from I&APs nor educating them in this task. This differed greatly from the repeat of the EIA. As a result of the inadequacies and shortcomings pointed out by I&APs on the first attempt at the Ariadne-Venus 400kV line EIA the following steps were agreed upon with I&APs for the repeat Ariadne-Venus 400kV line EIA (2):

- to assess and expand the information base;
- to assess alternative supply options;
- to request the assistance and guidance of an EIA consultant; and
- to compile a comprehensive Draft Environmental Impact Report for public comment before the final decision is made.

*Hector-Klaarwater 275kV line*

For the Hector-Klaarwater 275kV line EIA no inference is present in the EIR that the process was subject to input by I&APs. However, the assistance of a public consultant advisor who was also responsible for Ariadne-Venus 400kV line, Ariadne-Hector 400kV line, Hector substation EIA consultative processes, was employed so it is assumed that specific guidelines could be accommodated and the level of communication entered into regarding the selection of alternative line routes supports this conclusion.

*Hector 400/275kV substation*

Preliminary design had already been completed by 01 June 1993 at a cost of R307 312 thereby further alienating the option to accommodate any additional guidelines for the EIA. The only means left to provide meaningful input into the project therefore, was to recommend mitigatory measures for construction at the selected site in the limited time available (Burger, letter, 1994). Unfortunately the consultant had attempted the time consuming task of public consultation and attempted to document the whole process as opposed to attending to what was still practically possible and of significance in the limited time available. This was contradictory to the environmental consultant's brief to conduct only

an EMP for an AIS. The citing of research by Transmission Design and the inordinate emphasis and time given to this detracted therefore from the real emphasis of the study in the limited time available.

The Head of Transmission Design, WJ Meintjes, in conclusion to his letter dated 06 June 1994, with regard to the Hector 400/275kV substation, stated that:

1. Planning must realise that the days of building projects without consideration of the effect on the environment are gone forever and that sufficient time must be allowed for proper environmental assessments.
2. TMC (Transmission Management Committee) reconsider all the consequences before proceeding.
3. the project be delayed to allow sufficient time for investigation of alternative sites or splitting the proposed substation if the GIS option is not acceptable.
4. should 2 and 3 not be acceptable management board must be made fully aware of all the consequences that Eskom will be exposed to should they proceed with the present proposal.

The Transmission Design Manager warned in conclusion that ".. should we go ahead on this basis we will have to live with the never ending consequences of soil erosion and possible mud slides" (Meintjes, letter, 1994). This prediction has materialised. This shows that the process followed was even acknowledged within Eskom to be inadequate by those other than Environmental Management, however, no accommodation was made for their warnings.

Concern was again expressed as follows (these letters were never sent yet drafted to the then Executive Director of Transmission):

> "Ek rig hoerdie skrywe aan jou welwetend dat dit die spreekwordelike kat in die duiwehok gaan los laat, maar die erns van die saak en die moontlike konsekwensies wat ons huidige beplanning op die lang duur vir Eskom en sy publieke beeld inhou noop my om jou to versoek dat hierdie saak jou persoonlike aandag geniet. Ons is besig om 'n mal perd op te klim wat gaan agter opskop en ek versoek dat die TMC (Transmission Management Committee) behoorlik oor die saak besin alvorens dit aan die Bestuursraad voorgele word".

and again in the letter states:

> "Once the construction work has started, it is only necessary for one person to complain to the media about the environmental damage. This could then initiate a snowball effect which invokes a public outcry against Eskom which will make the Venus-Ariadne episode look like a Sunday School picnic. The job can be stopped halfway with insistence on rehabilitation of the area" (WJ Meintjes, letter, 1994).

Mr Meintjes' letters, very frankly expressed his concerns to the then Eskom Executive Director of Transmission, on the consequences of expediting the project. On requesting permission to use the letter he stated that it remained a statement of fact irrespective of it having been delivered or not and clearly expressed his apprehensions (Ryan, pers comm., 1997).

A letter from the NPB entitled: "Eskom-NPB Joint Planning" highlights the lack of adequacy in the planning phase with respect to the consultant's terms of reference, detail of research required, and adequate time allotment for environmental studies:

> "... The concerns you raised regarding the involvement of the Board in these development projects have served to highlight for all of us the various pitfalls, as well as potential solutions to problem areas, which will be enormously useful to us as we move into new projects. In this regard, I have the following observations:
>
> (ii) the scoping meeting should be directly relevant to the drafting of consultants' terms of reference. This means that the studies conducted are appropriate to the decisions being taken;
>
> (iii) Board staff will provide any information which is readily available in reports, publications or other documentation. It is the consultant's responsibility to provide the balance of the information, and to appoint sub-consultants where necessary. It is not possible for Board staff to perform work on behalf of the consultants for projects where the Board is the official provincial review agency;
>
> (iv) a sufficient time period should be allocated for the completion of site assessments and review of reports. Certainly from the Board's point of view, a number of specialists are required to review the reports, and are not necessarily available if the review is required at short notice. It is usually in the interests of the client that reports are

thoroughly reviewed, and this is another means of obtaining advice from the nature conservation agency.

(v) The findings of the investigation and the mitigation report should be finalised prior to the commencement of construction, and preferably after a meeting of the developer and the lead interested and affected parties.

Thank-you again for your willingness to engage in discussion regarding the Board's involvement. It will certainly be mutually advantageous if we can jointly develop a protocol which can speed up these projects, without compromising the integrity of the environment, or incurring unnecessary cost" (Sandwith, letter, 1995).

Some of the NPB recommendations, such as to employ an ecologist, were relayed to Eskom and eventually adopted but too late to provide meaningful input into the substation's design and construction (Moir, letter, 1994b). The request for adequate time to review the EIS was not accommodated.

The above gives a clear indication that the procedure followed and time allowed was acknowledged within Eskom and beyond as being totally inadequate. Yet this request went unheeded.

*Ariadne-Hector 400kV line*

Both the EIA for the Ariadne-Hector 400kV line and Hector substation were being conducted concurrently yet the Ariadne-Hector 400kV line EIA received far more time, funding and thoroughness. Eskom appointed a consultant to conduct scoping, ascertain alternatives and facilitate the procedure for making a final decision. The perception is that perceived ladowner opposition to the powerline drove the adherence to the IEM Guidelines and special conditions as opposed to compliance to policy.

*Pongola-Vergenoeg 132kV line*

As full consultation during the Pongola-Vergenoeg 132kV line EIA with key I&APs was not entered into specific guidelines could not be determined.

*Ariadne-Bulwer 132kV line*

During the Ariadne-Bulwer 132kV line EIA the first public meeting with I&APs stipulated the procedure to be followed. The I&APs appeared to accept the procedure Eskom proferred and did not dispute or add to it. The one-on-one approach with I&APs more than dispelled any suspicions and afforded Eskom co-operation from I&APs. This was to result in discontent when the Ariadne-Eros 400/132kV line EIA was conducted in overlapping areas, without the same amount of attention being accorded to certain of the I&APs.

*Ariadne-Eros 400/132kV line EIA*

For the Ariadne-Eros 400/132kV line EIA no specific guidelines were entered into at a grand scale. Personal requests or requests on a smaller scale which had little bearing on overall procedure, such as made by certain I&APs, were afforded greater emphasis. No invitation was made for I&APs to influence the process nor were they enlightened to do so. It is considered that the process was top down. This opinion is reinforced by the fact that none of the NPB's requests for additional and more detailed studies were complied with.

*Kokstad-Mount Frere 132kV line*

For the Kokstad-Mount Frere 132kV Line EIA the procedure for the EIA and schedule to be followed was described to I&APs. Thus there was little determination of specific guidelines in consultation with I&APs especially due to time constraints. The request by the Eskom environmental officer for two months additional time was ignored by Eskom management, as was the request for a soil specialist. General compliance to IEM was, in spite of this imposition, adequately achieved. The "process followed and standard of assessment" was commended by the Eskom environmental auditor and "noted of being of a high standard within Eskom" (Lucas, letter, 1997). There was no opposition from I&APs, however, Eskom management refused to accommodate the one error regarding routing the line away from a historical church at Brookes Nek when this was discovered later in the project process. Other specific requests, timeously submitted, were noted and easily accommodated.

### 5.4.9 Trends Associated with the Scoping for Specific Guidelines for Procedure

Scoping for specific guidelines was not actively sought. Eskom by and large dictated the procedure to

be followed and did not always enlighten I&APs about their right to influence the EIA process. The impression is gained that were it not for the ability of landowners to delay projects, Eskom could have circumvented the IEM procedure and the demands of I&APs as and when it wished.

Where there was strong potential for opposition Eskom made allowances and developed specific guidelines. The general trend, however, was not to open the procedure up for debate.

## 5.5 The Investigation of Significant Issues

The investigation is not meant to be haphazard but, after consultation with I&APs, "guided by the scoping decisions and is intended to provide the authorities with enough information on the positive and negative aspects of the proposal and feasible alternatives, with which to make a decision" (DEA, 1992a, p 7).

Information, according to the IEM guidelines "should be no longer than is necessary to understand the effects of the proposed development or alternatives and should be commensurate with the importance of the feature and potential impact" (DEA, 1992c, p 12). Information which is not pertinent should be discarded. Furthermore the information supplied has to include the following:

- statement of impact or effect
- brief description of impact or effect
- list of I&APs affected
- statement of criteria for determining significance
- significance of impact or effect without mitigation
- suggested measures for mitigation or optimisation measures
- degree of confidence in prediction

(DEA, 1992c, p 13)

*Ariadne 400/132kV substation*

During the investigation of environmental factors associated with the Ariadne substation EIA only a feasibility study was conducted and the environmental, technical and economic criteria of 19 feasible

sites superficially investigated (De Kock, 1991). The feasibility study recommended that an EIA into 5 of these alternative sites and their associated lines be conducted.

The first Ariadne Venus 400kV line EIA, states: "The final option selected was for a substation integrated at 400kV, to be called Ariadne. This was after exhaustive environmental and topogaphical studies had been completed" (Eskom, 1993b, point 1.3). This shows the difference that existed between what the Eskom environmental officer perceived to be a feasibility study as opposed to other departments who perceived it to be an 'exhaustive' study. The Transmission Expansion Planning Report stated: "A detailed investigation led by Land Survey (not Eskom environmental management) showed that only two feasible sites (of the five) existed which met all criteria for suitablity" (Estment, 1994, p 9). Thus the feasibility study's recommendation of further investigating the 5 remaining sites was considered adequate and not subject to further review and scrutiny and formed the basis on which to make a final decision. No further investigation was allowed and the EIA was not concluded (De Kock, pers comm., 1997).

The Transmission Expansion Planning Report continued: "An on site inspection on 25 June 1992 showed that the southern site was the more suitable of the two sites" (Estment, 1994, p 9) i.e. the number of suitable sites was narrowed from 5 to 2. Although the reasoning mentioned in the report, such as consideration of the potential for violence, suggests cognisance of the issues identified in the feasibility study, predominantly electrical and economical reasons were given for the preferred selection of the site near Thornville.

The final statement in the report read: "The social impact assessment initiated ....must be concluded for the final site and transmission lines' route selection. It would be extremely dangerous to ignore these social issues" (De Kock, 1991, p 48). The social implications were therefore ignored. The construction of a new substation could have given the appearance that a particular politically alligned sector of the population was being favoured over a rival faction in terms of employment opportunites or electricity, and this could have halted the project or even exacerbated the violence already prevalent in the area.

*Ariadne-Venus 400kV line*

On the Ariadne-Venus 400kV line EIA (first attempt) only detailed investigation was undertaken on the Eskom prefered corridor by means of site visits, consultation with I&AP's and the use of specialists.

The latter request for this had been made subsequent to the EIA becoming controversial and a review thereof requested. This is therefore considered not part of the initial or first EIA. Reports on Oribi buck, birds, the veld and agricultural practices were obtained. This was subsequently found lacking on numerous counts and investigation intensified especially for the crane species in the study area during the repeat of the EIA. This study was continued post construction and was only finalised years later showing the limitations associated with investigations for project EIAs.

For the Ariadne-Venus 400kV line EIA (repeat) numerous biophysical, social and economic issues, in response to comments of I&APs, were investigated in an attempt to focus the current as well as future EIAs on only the more significant issues to be investigated.

As a result of this thorough EIA, the need for a study into the impact of Eskom powerlines on the three species of crane in the KZN Midlands was realised and extended into a five year national study funded by Eskom. Funding approximated R3 million (McCann, pers comm., 1998). Numerous beneficial innovations and procedures were developed to limit the impact of Eskom powerlines on birds nationwide as a result of this single study. This supports the use of detailed studies which can be applied to generic issues at a national scale.

It is obvious how little emphasis is placed on the need for adequate and detailed investigations. The use of the Wattled Crane issue was exploited emotionally by I&APs as was to become evident in years to come (McCann, pers comm., 1998). This further supports the need to conduct adequate investigations and base decisions on a stronger scientific and more objective basis.

*Hector-Klaarwater 275kV line*

On the Hector-Klaarwater 275kV line EIA the only advancement and reduction in time on the thoroughness with which issues were investigated was that specialist consultants should have been appointed to deal with specific aspects of the environment (Clara, pers comm., 1999). Although the issues had been thoroughly investigated according to existing literature no specialists were consulted in this regard. There was an assumption therefore that the Eskom environmental officer was sufficiently capable of such a task, at the time, negating the need for specialist studies.

*Ariadne-Hector 400kV line*

On the Ariadne-Hector 400kV line EIA information gathered by Eskom was given to the consultant who elaborated on it. The only investigation or specialist study conducted within the study area was that on the geology and geotechnical conditions in order to ascertain design criteria for towers. Certain publications (literature) and experts were consulted on future development within the study area and the NPB was consulted on the biophysical component.

*Hector 400/275kV substation*

The lack of investigation associated with Hector substation due to time constraints was to result in extreme environmental degradation. Subsequent studies, post construction commencement, were to emphasize this oversight (Ward, 1996; Burger, 2000b).

Unlike Project Management who were unaware of the risk of undertaking construction without first considering the environmental consequences, Transmission Design were very aware of the environmental risks being taken (Ryan, pers comm., 1997). When Transmission Design began investigating the site they were in possession of an internal environmental brief entitled: "Substation: Environmental Design Requirements" which alerted them to environmental impacts specific to substations (Visser, 1993). The Design Department objected to the project's lack of environmental input and endeavoured to make up for this neglect (Ryan, pers comm., 1997). They focused on three concerns or issues which they surmised were important, namely, time constraints, visual impact and soil erosion. Their awareness and willingness to consider environmental criteria when designing substations was heightened by the controversy surrounding the Ariadne-Venus 400kV line EIA. They investigated the environmental implications of using alternative technologies. The use of a Gas Insultaed Substation (GIS) was compared to an Air Insulataed Substation (AIS). The GIS was considered as it has the advantages of being physically smaller, possesses higher reliability and requires less frequent maintenance than conventional outdoor switchgear. The smaller physical size results in a much smaller substation site being required and less visual and physical impact on the environment. Less extensive earthworks would have thus been required at the Hector site and it would not have been necessary to deviate the existing 88kV lines (Estment, 1994). But this comparison of alternative technologies was to be of little avail when the costs of a GIS were deemed prohibitive by Eskom management.

The consultant appointed an archaeologist and an ornithologist. An archaeological survey of the site revealed no artefacts of significance. A preliminary report by the ornithologist on the rare Blackrumped Buttonquail concluded that: ".. any measures which minimise the loss of grassland will be of value, .... The best mitigatory measure would be a 2-3 year study by a full-time researcher ..." (Berutti, 1994, p 69). This request was dismissed by Eskom but should have at least ensured that the loss of grassland be minimised.

A synopsis of the Head of NPB's Biodiversity Department's comment on the draft EIR, is quoted below and clearly expresses disdain for the lack of investigation of environmental issues:

> "In the Executive Summary it is stated that it was the purpose of the report to study the impacts of the proposed substation on the environment. To achieve this purpose, a comprehensive ecological evaluation of the site is necessary. Our general comment on the report is that there are significant errors of fact and interpretation in the ecological analysis of the site. This generalised and flawed overview of the site does not assist in anticipating potential negative impacts of the proposed development and subsequent mitigation recommendations" (McClintock, letter, 1994c).

The EIS ended with the emphasis on the inadequacy of the studies:

"Incomplete or Unavailable Information – It must be reiterated that this study is of a pioneering nature. Very little research exists on the impacts of substations on the natural environment. Public participation only very recently became part of environmental management. Therefore even knowledge about perceived impacts is inadequate. ... It was not considered necessary to appoint specialists to study plants and fauna as the existence of rare/endangered species is small. Continued monitoring by substation staff is advisable" (Gouws, et al, 1995a, p 59).

The environmental consultant for Hector EIS attempted to justify the lack of the appointment of specialists by reasoning that: "... time was extremely limited. This limited to a certain extent the number of specialists we could involve in the project. Eskom is doing far more than many other companies for the environment and certainly more than required by law at the moment. It is therefore not the place of the consultant to spend the client's money without proper motivation" (Gouws, et al, letter, 1994b). It is valid that the appointment of specialists was indeed constrained by time, however, it remains the responsibility of the environmental consultant to recommend their appointment

dependent on the sensitivity of the receiving environment, irrespective of time constraints. Eskom environmental policy did not promote the position of undertaking minimal investigation.

The argument to not appoint specialists in order to curtail 'unnecessary' costs to the client is also considered circumspect. The EIA for the Ariadne-Venus 400kV line cost a minimum of R2 028 387. This figure is considered incorrect by the environmental officer concerned with the Ariadne-Venus 400kV line second EIA, as it excluded numerous environmental costs placed in other accounts and a more accurate estimate was approximately R4 194 000 on a project which cost R94 012 755 (Willemse, pers comm., 1997). The Ariadne-Hector 400kV line EIA, which was alligned with IEM standards, amounted to R455 674 on a R54 920 602 project. Even the extreme significance of Hector substation which was to supply about 6 million (roughly 15% of South Africa's then total population) warranted the additional expense. Similarly savings on early development, since the project was brought forward by a year, gained Eskom R37,79 million in revenue (Eskom, 1995b). The inconsistency of expenditure is not justifiable when compared with the amount spent on project's of lower cost. Only R40 000 was allocated for the environmental consultant's appointment at Hector substation (this excludes any fees for the two specialists appointed) on a project initially estimated at costing a total of R119 635 999. This shows that Eskom was being extremely frugal when spending on environmental investigation at Hector. The money spent on the further rehabilitation and control of soil erosion in the year 2000 exceeded R1 000 000 including survey, subsequent research post construction and the installation of gabions to partially repair and contain damage. A substantial amount of money could therefore have justifiably been spent on research and preventative measures rather than trying to fix damage after the fact. It is also difficult to attach a cost to environmental damage such as soil erosion and the species loss which transpired. The cost of the loss of 7 897$m^3$ soil and siltation downstream is difficult to estimate as it cannot be replaced and the financial implications due to damaging the ecosystem cannot be measured.

Key issues that were identified in the EIS were the visual intrusion, destruction of grassland habitat, threat to the endangered Black-rump Buttonquail, due to loss of habitat, erosion of soils and the nuisance value of construction activities to residents. In spite of recommendations to investigate further the endangered Black-rump Buttonquail only investigations into the botanical composition of the site were to be undertaken at the request of the NPB. This transpired only subsequent to the review of the draft EIR after construction had commenced on 19/12/95.

What was thought to be a degraded *Aristida junciformis* grassland (sour grassveld of low significance and value) from superficial examination (Gouws, et al, letter, 1994b) was to reveal a botanically significant site worthy of conservation - 650 plant species have been recorded to date (Ward, pers comm., 1997).

The botanical report emphasised the following:

- the central drainage (which came to be known as the 'kloofie') and its slopes should be conserved, not only for the sake of the good examples of trees and other interesting plants (such as one of the taller Hibiscus fuscus recorded for this region) lining the watercourse, but also for the stabilising influence this has on the slopes below the current earthworks;
- the grasslands around the substation should be conserved as an asset to science and education in general; and
- final discharge of stormwater from the site after construction should be such that it will not damage existing vegetation downslope. This would cause the loss of individual plants, some of which may be of scientific value, and most importantly, it would initiate gulley erosion leading to costly remedial measures being implemented in the future

(Ward, 1995).

These findings were presented too late to have any significant bearing on the project and all of these negative predictions have materialised.

The use of a tubular busbar AIS instead of the steel lattice busbar AIS lowered the substation height from 25m to 10m and has succeeded in making it far less conspicuous against the backdrop of the hillside on which it is situated. This significantly decreases its aesthetic impact, especially from the N3 national road from where it is now hardly visible. This mitigation measure, however, was as a consequence of the Eskom Design Department's initiative and not as a result of the EIS undertaken by the environmental consultant. In spite of Eskom Design adequately lowering the substation and mitigating its visual impact there still remained an inordinate emphasis on the aesthetics of the substation by the environmental consultant. This, it is surmised, may be attributted to her background as a landscape architect. She continued to emphasise the need to plant trees to conceal the substation oblivious to the fact that the receiving habitat was a grassland and it would be immensely difficulty to establish and maintain trees by Eskom maintenance due to watering costs, depth of soil immediately below the substation, fire prevention, etc. The botanist's comment contradicted this recommendation

as the area was a natural grassland unsuitable for planting trees. Trees (funded by a grant from Holland) subsequently planted have all been destroyed by fire.

The consultant's opinion of the site and the investigation of issues was based solely on the following statement and a single site visit by NPB personnel: "Screening was done with the help of the Parks Board: ..... Apart from the Black-Rumped Buttonquail, they both said that there was nothing specifically sensitive about the site" (Gouws, et al, letter, 1994b). This was refuted by an NPB Planner who stated: "I have made some enquiries regarding the preliminary discussions on the Hector substation, and wish to confirm that at no stage during the scoping exercise conducted with the consultant was it stated by Board staff that an ecologist was not required for the baseline study. It was stated that the site was degraded, but that there were biological components which required further ecological assessment" (Sandwith, letter, 1995).

Another of the Natal Parks Board's comments was: "... .. the Board needed to assess whether proposed mitigation or restitution measures would adequately protect nature conservation interests relative to the project. To make these assessments, the Board required data of a sufficient standard and accuracy which, unfortunately, were not forthcoming in the study" and "The shortcomings of the assessment are many, and perhaps the greatest concern is that it does not provide a firm basis for assessing the significance of impacts or determining recommendations which would result in a successful development. Eskom has the opportunity to develop a model substation on this particular site if all possible mitigation, construction and post-construction management measures were documented and implemented" (McClintock, letter, 1994c). Thus the investigation was considered by the NPB, a highly reputable body of scientists, to be inadequate.

The consultant used the excuse that "no long term studies exist of the fauna and flora of the area" (Gouws, et al, 1995a, p 59). The onus, however, rests with Eskom and its consultant to undertake the necessary studies where none previously existed.

Upon completion of the terrace cut, vast portions of the banks were washed away on two occasions, associated with the high rainfall experienced during March 1996 resulting in large-scale deposition on the slopes of the central drainage and shallow slopes below the substation - an area approximating 10 000m$^2$ in extent. This included the inundation of the wetland below. After the heavy rains during July 1996, Umgeni Water, complained about the volume of water that emanates from the substation platform. After the heavy rains in July (127,5mm for the month), the underscouring of Reno

mattresses began at one point along the pipeline below the Eskom property. Umgeni Water expressed concern that runoff from the substation platform area could damage the pipeline (Van der Kooy, 1996a). Runoff eventually caused the pipeline to break in 1999 (Burger, 2000b).

The removal of vegetation and hardening of a large portion of the catchment surface due the substation's construction, irreversibly altered its runoff regime. Five pipes discharge water immediately below the substation terrace. This water is collected from the platform as well as a portion of the high cut-bank behind the substation - an area totalling approximately 22 ha in size. In order to prevent the myriad of gullies which had begun to form throughout the veld, the discharge from the 5 outlets was canalised to one point at the top of the central drainage line, referred to as the kloofie. The EIS stated that this region receives some of the highest rainfall in the country. The average number of days that rain could be expected in a year is 73 days spread through every month of the year, with +- 71% in the summer period from September to March. However, this general information is of little benefit to design engineers. Subsequent interrogation and easy interpretation of records revealed more pertinent information. Beckedahl (1998, cited in Burger, 2000b) stated that climate records for the area show that high intensity rainfall is not uncommon, with on average at least one storm per annum with intensities of more than 50mm per hour lasting in excess of one hour, and storms of 80mm per hour intensity on average once every 2.3 years. Burger (2000b) measured run-off for four storm events between 1997 and 1999. Run-off readings were highly variable but ranged from an estimated 2.4 l/s to 3631 l/s. Other readings are noted in Table 9 below.

The Hector EIS report neglected to adequately estimate the volumes of run-off to be associated with the rainfall events once the substation was constructed and thus failed to recommend adequate and very costly but necessary mitigatory measures. It merely stated that "stormwater management should be an important factor in this study, and if the stormwater is managed properly, it will prevent land and watercourse erosion, ... " (Gouws, et al, 1995a, p 23). It also did not indicate that this would result in the impact of erosion beyond the substation's immediate boundaries and its potential to seriously erode neighbouring property.

The erosion processes evident were also previously confirmed by Brink (1981, cited in Burger, 2000b) who noted that slope stability problems are common in the area - associated with the residual soils and weathered rock materials. The soil material effectively "liquefies" when saturated, to cause failure. Miss S Rienks in consultation with Prof. Hughes, Department of Agriculture, University of Natal, Pietermaritzburg and Mr V Roberts, Soil Scientist, Department of Agriculture, Cedara, both verified

the high erosivity of the substrate and its inability to stabilise under the water volume and velocities experienced.

Table 9: Discharge for Random Rainfall Events - Octobe r 1997 to December 1999.

| Date | Time | Rainfall (mm) | Flow (l/s) |
|---|---|---|---|
| 26/11/97 | 08h23 | 25 | 20.4 |
| 27/11/97 | 07h15 | 44.5 | 58.9 |
| 27/11/97 | 16h00 | | 47.1 |
| 27/11/97 | 18h00 | | 160.0 |
| 29/11/97 | 14h45 | 11.5 | 24.0 |
| 30/11/97 | 19h00 | 5.5 | 2.4 |
| 01/01/98 | 14h30 | 54.5 | 77.8 |
| 01/01/98 | 16h00 | | 137.9 |
| 16/02/98 | 13h00 | 42 | 40.8 |
| 16/02/98 | 14h20 | | 35.6 |
| 17/02/98 | 17h00 | 19 | 12.5 |
| 21/12/99 | 24h00 | 134.5 | 3631.0 |
| 22/12/99 | 06h30 | 64 | 309.7 |
| 22/12/99 | 07h00 | | 756.0 |
| 22/12/99 | 08h00 | | 520.8 |
| 1 : 50 year flood | | | 2835.0 |

The EIS with respect to geology stated general information. During geological tests the Eskom geologist noted that the sandstone rock is highly variable and the weathering pattern (an indication of hardness) is irregular. With depth the sandstone profile changes from a very soft, to soft to medium-hard rock. The weathering pattern of the profiles obtained, dictated a deeply weathered sandstone profile to the centre and southern portion of the site (Grove, 1994). This highly weathered zone (very soft rock) coincides with the point at which the water has been canalised at the top of the kloofie and its presence has been confirmed by its rapid erosion and the failure of the Reno mattresses laid there.

The removal of vegetation cover for a substantial portion of the catchment area above the kloofie, within the kloofie and for access roads and a fence has also noticeably contributed to erosion.

The channel, which has scoured adjacent to the wetland below the substation, has resulted in its erosion and dysfunction due to desiccation and may lead to Eskom's prosecution as it is on the adjacent landowner's property.

It is obvious that such large-scale erosion is changing the landscape and not only denuding it of substrate and vegetation but will also have a myriad of cumulative impacts over time, which will detrimentally effect biodiversity. It is apparent that the loss of grassland and wetland plant species results in a reduction in habitat diversity, questionably affecting the survival of other species such as the endangered resident Black-rumped Buttonquail. This species has subsequently been sighted on two occasions between 1996 and 1998.

The lack of investigation largely reflects the inexperience of the environmental consultant. No mention was documented in the EIS of the flurry of correspondence entered into between the NPB and Eskom concerning the inadequacy of environmental investigations. The review of the draft document by the Head of Biodiversity (NPB) was not included in a revised and final report. The comment was scathing and some of its recommendations such as to employ an ecologist were relayed to Eskom and adopted but too late (McClintock, letter, 1994).

In conclusion Hector is a good example of trying to deal with a problem and its irreversible consequences once they have arisen, rather than conducting adequate studies prior to construction resulting in adequate mitigatory measures being incorporated into substation design.

*Pongola-Vergenoeg 132kV line*

For the Pongola-Vergenoeg 132kV line EIA the report stated, with respect to the alternative corridors, that "no 'detailed analysis' of significant issues transpired although the potential for soil erosion and socio-cultural impacts were considered by the environmental officer conducting the EIA, to be problematic. The EIR concluded that "while the bio-physical impacts are not expected to be significant, the socio-cultural impacts could be the overriding factor determining the success and progress of this project" (Govender, 1995, p 16). This was, due to the lack of investigation, merely an assumption. Only a few 'socio-cultural incidents' materialised during construction, but these were the exception. However, by comparison the bio-physical impacts and obstructions to construction proved very significant and significantly influenced construction. These impacts continue to influence the maintenance of the powerline. This finding shows the inadequacy of the investigations. The direct result was that at a late

stage of the project large scale alterations to tower locality and type had to be made. This was directly attributable to the massive and deep dongas of the area, large expanses of black clay soils rendered impassable in inclement weather, wetlands, outcrops of boulders preventing passage of construction vehicles, wide impassable dolerite dykes, long steep slopes, indigenous trees and an endemic tree species which grows on the dolerite dykes, all affected design and access to the line. The lack of adequate integration of environmental concerns, at the outset necessitated moving the line just prior to construction to prevent excessive destruction of the environment and enable construction to continue in a sustainable manner. This task was left to an environmental officer who took over just prior to construction commencement replacing the environmental officer who had conducted the EIA. The implications for construction were delays and a poorer product by the end of the project which could have been avoided. The continual re-routing of the line at such a late stage created tension between the environmental officer, surveyors and project management and often alterations had to be substantiated by lengthy written motivations and site visits often with senior management in attendance. This proved costly on a project extremely distant from Eskom Distribution Engineering Head Office.

Initially the construction contractors thought it permissable to bulldoze access roads through the numerous dongas (many of which were in excess of 10m deep), dykes and river crossings. A specialist consulted during the compilation of the EMP warned that this would have the potential for lateral spread of erosion, destruction elsewhere and this 'quick-fix' was disallowed (Botha, pers comm., 1997). The implication was that additional costs were incurred due to unexpected delays for construction when circumnavigating these and other obstacles.

Permission (from authorities) was only granted to use a bulldozer to do minor alterations to allow passage through a single donga where this was seen not to exacerbate the potential for sideways erosion. Importation of some materials and equipment and construction, as a result, had to be done by very costly means using a twin-bladed helicopter which could lift the large poles at a cost of R22 000.00 / hr.

*Ariadne-Bulwer 132kV line*

For the Ariadne-Bulwer 132kV line EIA the predominant issues were adequately investigated. The investigation met with the acceptance and approval of the NPB who were integral to investigations as the study area covered Podocarpus forests, hiking trails, wetlands, blue swallow and blue crane nesting sites. Of interest was the discovery of an area of high botanical diversity by the Eskom environmental

officer which upon referral to the NPB botanist proved to be the best preserved relic of Natal Midlands Mistbelt Grassveld and was a last remaining refuge for an endangered plant species (Scott-Shaw, pers comm., 1997). The initial portion of the powerline which has been constructed has been placed over this area, with special precautions for construction, in order to protect it from land invasions. In essence the powerline is protecting the area's bio-diversity. The NPB specialists provided invaluable support on ornithological and botanical issues. The conservancy also contributed considerable local knowledge such as hiking trails, archaeological sites, etc. The KZN Bureau of Natural Resources commented on the natural resources of the tribal area (Burger, 1995).

Better social input could have been obtained if a social scientist was employed to converse with all stakeholders. This was investigated but later abandoned.

The investigations were thorough and allowed an easy and justifiable conclusion which was initially, prior to investigations, thought by some to be untenable. This points out the necessity to subject certain alternatives to deeper investigation even though they at first appear unfeasible.

*Ariadne-Eros 400/132kV line EIA*

On the Ariadne-Eros 400/132kV line EIA Eskom internal geological and soil studies were conducted on the substrate's ability, within the study area, to accommodate the powerline. The crane studies conducted on the Ariadne-Venus 400kV line EIA were referred to and satellite photography used to identify land uses.

Mitigatory measures, it was claimed, would be drawn up in conjunction with the relevant authorities where sensitive areas occured within the corridors. However, the line was routed in the proposed corridor in consultation with I&APs and the Eskom environmental officer responsible for the project. The investigation and mitigation of environmental issues although not documented was personally undertaken over a period of 4 months by the environmental officer and surveyor within these corridors (Funston, pers comm., 1998). Environmental issues were noted such as patches of indigenous forest, schools, dams, crane breeding sites and airfields were avoided when designing and routing the line and sensitivities passed on to construction. This is not totally in compliance with IEM as these issues should have been addressed more thoroughly earlier on during planning and documented.

The NPB letter and comment on the Ariadne-Eros 400/132kV line EIA report expressed the following concerns:

2. This draft report does not conform to the requirements of an environmental impact assessment report as given in the Department of Environmental Affairs documents, for the following reasons:
   ii) As no environmental concerns have been identified in the corridors, no assessment of the impacts of the proposed lines have been given.
   iii) In view of the above the report fails to provide site specific mitigatory measures for the proposed corridors.
3. For the above reason, it is suggested that this report be revised in its entirety. In addition we wish to point out the following:
   iii) As inadequate information has been given on the biophysical aspects associated with each alternative corridor, it is recommended that detailed studies on each (excluding geology) be undertaken.

(Osborn, letter, 1996)

Issues such as wetlands were attended to in a generalised manner and investigations noted by the NPB as being inadequate.

A landowner similarly requested that more detailed studies be conducted by a specialist (McKenzie, letter, 1996). These requested studies were not forthcoming.

*Eros 400/132kV substation*

During the Eros substation EIA a substantial test pit for borrow material was dug in the middle of the larger of the two wetlands situated on the site. The use of material from this area was later prohibited but the hole had already broken into the rocky impervious layer. This may have severe consequences later and could result in the dessication of the wetland. Had the EMP been published at the earlier stages in the project, taking into account all activities associated with the substation's construction, this could have been avoided.

The investigations were seen as only partially adequate as the site later revealed the existence of two wetlands utilised by a large flock of +-50 Crowned Crane. This was confirmed by a specialist, after a

site visit, to constitute an issue of significance due the magnitude of the flock (McCann, pers comm., 1998).

The Crowned Crane at particular times of the year will have to be monitored as they are the one species of crane known to perch on Eskom infrastructure such as the busbars in the substation, which could result in their electrocution. This could result in the extermination of a substantial breeding percentage of the KZN flock.

*Kokstad-Mount Frere 132kV line*

Subsequently it was realised that, although the environmental officer possessed some knowledge of soil erosion and its origins, it would have been preferable if a specialist geomorphologist had been contracted to proffer advice on this issue. On the Kokstad-Mount Frere 132kV Line the issue of soil piping was identified but the appointment of a consultant was disallowed as an uneccessary cost.

No other issues identified required specialist input and the local knowledge available from I&APs (including the NPB) was deemed sufficient. The same specialist geomorphologist, however, was later contracted to review damage due to soil erosion which had transpired as a result of contravening the EMP (see EMP monitoring below) and his input and additional knowledge and experience, it was noted, in retrospect, would have provided invaluable input in its compilation and enforcement during construction.

*Mount Frere 132/22kV substation*

For the Mount Frere substation three substation sites were investigated in terms of issues identified by the Eskom environmental officer, technical staff and in liaison with the TLC on the proposed expansion of the town. The environmental officer responsible was also ensconced in investigating Hector 400/275kV substation post construction and was able to mitigate any potential for serious erosion in the Mount Frere substation EMP. The Distribution substation is also substantially smaller minimising the potential for negative impacts such as those experienced at the larger Transmission substations.

### 5.5.1 Trends Associated with the Investigation of Issues

The investigation of significant issues for the projects was generally dismal with four projects having unacceptable levels of investigation of issues.

Some issues require specialised and detailed studies prior to the project commencement and even beyond construction's completion e.g. the study of the black-rumped button quail at Hector substation. This was not encouraged except for the study of cranes due the Ariadne-Venus 400kV line first EIA. No cumulative impacts were investigated.

Those other than environmental management in Eskom were in control and consistently dictated what level of investigation was adequate in accordance with project time constraints.

A distinct lack of investigating social issues is evident. This was further exacerbated in tribal authority areas as the environmental officers were all white and were not trained as social scientists.

All investigations of issues on other EIAs pale into insignificance when compared with the depth of investigations which transpired on the Ariadne-Venus 400kV line (2) EIA. The question must be asked that if studies could be done for this project why were similar studies approaching these levels of investigation not conducted for others? A reason was that detailed investigation was often in response to I&APs' demands and not project or environmental necessity.

Highly emotional issues which easily stir up public sentiment and create bias, such as the powerlines' ability to kill Wattled Crane, are brought into a more correct and objective perspective after investigations have been done. Investigation also helps to prevent Eskom being held legally liable by causing otherwise avoidable or preventable damage.

The appointment of specialists was limited by management to minimise costs. Outside consultants were normally not appointed therefore the level of investigation was often inadequate as it was conducted in-house by Eskom environmental officers who were often working with issues and problems not directly related to their field of expertise.

Correct investigation or sourcing the correct expert could have easily avoided major irreversible impacts which cannot be remedied / or partially ameliorated. Rehabilitation is extremely costly and

ecosystems almost impossible to stabilise and repair, justifying the initial cost of consultants to conduct thorough investigations.

Where an environmental consultant was used on the Hector 400/275kV substation EIS her study was strongly influenced by her background and experience skewing the emphasis toward particular issues. This reflects the importance of appointing appropriate environmental consultants whose studies relate directly to the needs of each project and supports the appointment of a small multi-disciplinary team.

Eskom environmental officers relied on I&APs such as the NPB, to indicate the need for specialist investigation. Thus the probability for adequate investigation was reduced when scoping was inadequately conducted or the comment of I&APs on issues requiring investigation, ignored.

Investigations often described impacts in general terms and were not sufficiently specific or measurable. Thus adequate mitigatory measures could not be prescribed for project design.

The significance of issues was seldom adequately rated by sufficient investigation in terms of factors such as intensity, duration, context or the ability to incur cumulative impacts. Although assigning significance is subjective it remains a fundamental requirement of the IEM guidelines of 1992 and how it is ascertained should have been documented.

Investigation was thwarted by management's inexperience which influenced their decision to allocate sufficient time and funding for investigations.

## 5.6 Review

### 5.6.1 Introduction

Reviewers according to the IEM guidelines "assess the content, comprehensiveness and adequacy of reports, as well as the organisational and presentational qualities of reports. They may wish to identify any issues not covered, inaccuracies in information, problems with logic or any conflicts apparent in the assessment process" (DEA, 1992d, p 5).

*Ariadne 400/132kV substation*

The request by the advisory panel that Eskom select preferred sites and, together with associated transmission lines, present these alternatives to I&AP's for review was never undertaken by Eskom (De Kock, 1991; Klopfer, 1996) in spite of the the IEM Guidelines of 1989's requirement to do so.

*Ariadne-Venus 400kV line*

At the behest of a few landowners (approximately between 10 and 12) and key I&APs Eskom was forced to subject the first attempt at the Ariadne-Venus 400kV line EIA to review. Strong objections, particularly by the Nottingham Road community and the NPB, at a public meeting on 28 July 1993, were raised against the exclusion of the consideration of other alternatives to the east of the N3 highway. At this meeting Eskom agreed to review the alternatives at a greater level of detail, in the light of additional information obtained from the I&APs. The initial problems with inadequate scoping and omissions in available data, pointed out at this meeting by I&AP's, were addressed by the establishment of a Joint Review Committee, the holding of two workshops, the gathering of further information from I&APs, the involvement of specialists and additional field work. (Lombard and Associates, 1993). Eskom tried to resolve the impasse by agreeing to appoint an environmental consultant (selected by the I&AP's) during October 1993 to review the EIA procedure and further agreed to review any additional corridors proferred by landowners.

Already 4 months late, the first Ariadne-Venus 400kV Line Route Selection, Environmental Impact Assessment (November 1993) was published and made available for review. The constraints imposed on the routing of the 124km Ariadne-Venus 400kV line by the siting of the Ariadne substation, however, was never subject to review.

The review was not complete since additional information was not available. The study on Cranes had only commenced on 4 October 1993; further studies on impacts on hoofed game and on veld and farming issues had also been commissioned. These, however, were not available by the time the consultant's review was complete and the final EIS with its recommendation not available (Lombard and Associates, 1993). The review of the impact assessment process therefore did not include a review of the re-evaluation of corridor alternatives nor of the final environmental impact report.

It is noticeable that the necessary studies and information were not forthcoming. Eskom circumvented the full review process and prematurely arrived at a decision similar to the one they had made previously. It was at this point, after the requirements of the review procedure had not been met, that Eskom was found out and forced to repeat the EIA in its entirety. Thus Eskom had undertaken the review only under duress and then still disobeyed its recommendations with the dire consequence of having to repeat the EIA.

It is interesting to note that only when the vested interests of individual landowners was threatened was there any requirement for review. The passage of a portion of the powerline through black tribal areas was not questioned by the residents nor subject to review. A summary letter of the process and findings was circulated to all I&APs and the sizeable report made available at numerous indicated points for review.

The feedback from I&APs synthesised by the independent Environmental Evaluation Unit re-formulated and changed the report format and issues covered. As a result the draft report of March, 1995, which was conducted subsequent to Eskom deciding to repeat the EIA, was revised and re-published for the third time (Willemse, 1995c). The comprehensive final document, excluding three previous lengthy reports was comprised of an EIR - 234 pages; Synthesis of I&APs comments +-100 pages; Eskom's response to I&APs Comments +- 250 pages and a Summary Report – 19 pa ges and a detailed A0 sized gloss map (Willemse, pers comm., 1997) depicting major issues, the study area and alternative corridors.

In response to the request by I&APs, Eskom appointed an independent high-ranking advisory panel to review the revised EIR and to make a recommendation on the most appropriate corridor taking into account the comments of I&APs. The EIA was also reviewed by the KZN environmental portfolio committee and regional and national government environmental ministeries.

I&APs' review was continuous and ongoing (iterative) and, where possible, their concerns were accommodated. The decision was very apparent and obvious once the EIA was complete making the review stage by the panel of experts a matter of course. It enabled Eskom, who complied with the review panel's recommendations, to make an appropriate decision and ensured that there was little opposition to the next phase of negotiations for a suitable line route within the proposed corridor (Tunnicliffe, pers comm., 1997).

*Ariadne-Hector 400kV line*

For the Ariadne-Hector 400kV line EIA a final assessment of all the alternatives was conducted by the independent environmental consultant and a recommendation presented at a public meeting with key I&APs (Funston, letter, 1995). Once consensus was reached the corridor was adopted after a final site visit.

A draft report, detailing the peferred corridor, was compiled and circulated for review. There being no major changes to accommodate, the report was not revised and negotiation within the 'preferred' corridor commenced. The review of the draft EIR also constituted the point of appeal according to the Eskom IEM procedure as enunciated in the EIA report (Funston, 1995a, p 10).

*Hector 400/275kV substation*

The draft document was to be released for public comment between the 10 and 30 September 1994 prior to a decision being reached on 03 October 1994. The draft document, however, was ultimately only hand delivered on 17 October to the majority of I&APs and comment requested by not later than 27 October 1994, (Gouws, et al, letter, 1994a). This ultimately, according to the NPB, resulted in only a week for its review (McClintock, letter, 1994b). The soonest they could deliver comment was by the last week in November. The NPB Planning department played an objective yet highly crucial role in the Ariadne-Venus 400kV line EIA and were regarded by Eskom as a key I&AP. Eskom's response to the NPB was: "Our contractors will be starting the earthworks at Hector site on 11 November 1994..... We look forward to receiving your comments in the last week of November 1994, and will incorporate any major issues into our Management Plan" (Moir, letter, 1994a). The NPB comments which were therefore tabled after construction had commenced, would have little meaningful influence even if retrospectively included in an EMP.

The report, due to its complexity and time allotted for its review, would have required that its content be presented to the layman before such a person was able to understand and comment on its content. ".... one of the comments from the public was that this person found the report "too technical" and "he could not understand it" (Gouws, et al, letter, 1994b). No other comment was received from the public perhaps verifying this fact.

This epitomises a disregard for IEM requirements and a disregard for the need to influence and provide mitigatory measures for activities such as construction prior to their commencement.

NPB comments (McClintock, letter, 1994c) on the EIS report were eventually forthcoming and some of the recommendations adopted (Gouws, et al, 1995a) but were too late to provide meaningful input into the substation's design and construction – the latter was nearing completion.

A letter entitled: "Eskom-NPB Joint Planning" stated: "..... Subsequent arrangements were made .... to address certain questions raised by the consultant, and the Board's botanist .... and the Regional Ecologist .... both visited the site and provided comment on the consultant's report on the basis of their inspection" (Sandwith, letter, 1995). This shows that the document was reviewed. A site visit was included in this process, however, this was three months after construction had commenced making the review process superfluous.

*Pongola-Vergenoeg 132kV line*

For the Pongola-Vergenoeg 132kV line EIA, I&APs merely reviewed a Preliminary EIA report. No review of the procedure or adequacy of the study was conducted. There was no review of a draft report or opportunity for comment internally i.e. by Eskom or externally by I&APs in spite of the request by I&APs to see such a document.

*Ariadne-Bulwer 132kV line*

For the Ariadne-Bulwer 132kV line EIA the findings of the EIA were subject to both external and internal review with the involvement of the NPB as a key I&AP, in the absence of a statutory authority. A public meeting was held to facilitate review where the findings of investigations and the potential alternative corridors were proferred with the intention to elicit a decision by I&APs. After a process of evaluation the I&APs had selected their preference. Eskom management then also reviewed the findings and made a decision. Eskom management and I&APs agreed on the final route selected and the mitigatory measures to be adopted. In addition Eskom Survey (responsible for project design) were part of the review panel on both occasions in order to understand the need to deviate the line and other mitigatory measures.

A protocol to guide subsequent interaction and review between Eskom Distribution Land Development Management and the NPB Planning department, who were responsible for reviewing Eskom EIRs, was entered into.

Due to limited response from tribal authorities the best option was proferred by Eskom for the portion of the study area (Phase 2) which passed through their jurisdiction and representatives of the tribal authority were driven through the route to obtain their approval.

The placement of copies of the report with its recommendation on a preferred route was left for perusal and final review at a convenient locality. Copies were also circulated to key authorities. This was met with no response and only one I&AP was noted as having 'read' the report.

The review stage merely allowed Eskom management and some I&APs to fully appreciate the process followed and the conclusion arrived at. I&APs understood the reasons for the line route's location and therefore approved subsequent phases of the project viz. its negotiation with no opposition as a result. Similarly Eskom management understood the reasons for any additional cost incurred in its routing. The report was praised by the NPB.

*Ariadne-Eros 400/132kV line EIA*

The Ariadne-Eros 400/132kV line EIA's two final corridors were discussed at the various public meetings and appeared to be accepted by I&APs. This not only constituted the consultation process but also informally constituted the review process especially as no choice had to be made between alternative corridors as both were to accommodate powerlines (Funston, pers comm., 1998). A draft report was compiled and placed at strategic points for review. A copy was given to the NPB for comment.

The line negotiations did not proceed with ease as a result of inadequate review and the project was delayed for 18 months as a resullt (Richardson, pers comm., 1996).

*Eros 400/132kV substation*

For Eros substation a decision was made within Eskom in consultation with technical staff comprising a multi-disciplinary team and directly affected landowners. The Ariadne-Eros 400/132kV line EIA report, with its brief expose of the process followed to locate the substation, served as the only means by which the selection of the substation site could be reviewed by the public or specialists.

*Kokstad-Mount Frere 132kV line*

For the Kokstad-Mount Frere 132kV Line EIA the review was conducted prior to the production of the final EIR which was temporarily supplanted by an interrim document summarising the process followed, stating issues and the means of evaluation. Key factors informing the decision were collated into a document which was presented at both external and internal review meetings and this was seen as adequate.

Based on issues the three alternative corridors were compared and a preferred alternative selected at an internal review meeting which was attended by Eskom managers and an environmental auditor from Eskom Corporate Environmental Audit Division who was requested to be present and comment on the procedure followed. This was to prevent further 'bullying' and lack of consideration for the process by Eskom management. The evaluation was repeated at an external review meeting in Kokstad and the selected alternative, that had been separately agreed upon and selected by Eskom, confirmed.

Due to limited response from tribal authorities the best option was proferred by Eskom for the portion of the study area (Phase 2) which passed through their jurisdiction and then representatives of the tribal authority were driven through the route to obtain their approval – in essence the decision was made on their behalf.

The placement of copies of the report with its recommendation on a preferred route was left for perusal and final review at a convenient locality. Copies were also circulated to key authorities. This was met with no response and only one I&AP was noted as having read the report proving how ineffectual this method was for puproses of review.

The review of alternatives and issues gained the full support of I&APs and authorities without suspicion. The white landowners were satisfied with the process followed as it was seen to be transparent and participatory. This allowed subsequent phases of the project such as negotiation, survey and construction to proceed with minimal delay and without adversity from landowners.

*Mount Frere 132/22kV substation*

For the Mount Frere substation, authority review was included as part of the consultation phase with the Mount Frere Transitional Local Council and this was considered adequate given the size of the

substation and its limited potential for impact.

### 5.6.2 Trends Associated with Review

Review was never requested by those without land tenure such as the predominantly Black communities. The reasons for this are numerous and well documented elsewhere.

Review, by means of the report being made available for perusal by I&APs, was considered adequate by Eskom, irrespective of whether I&APs could understand the highly technical and voluminous document or not. The use of this medium for review is considered inappropriate. The need for review of the report might also be considered superfluous if the EIA and involvement of I&APs was sufficiently thorough during the process and consensus reached on the decisions arrived at. Continual review, where I&APs are part of an ongoing process which may even continue through to monitoring, as opposed to once off review is also more preferable.

Internal review by Eskom management as well as external review by I&APs proved to establish an atmosphere of consent, trust and co-operation especially for subsequent stages of the project.

The need for expert / specialist review was appreciated by Eskom to some extent as the NPB was consulted and considered to be the review authority for the time. This was necessary where Eskom had both conducted the EIA and also was responsible for making the final decision. Where there comment was not heeded it coulld result in massive damage such as at Hector substation.

Undertaking a review of the EIR once construction has already commenced, with little chance of any recommendations being implemented, shows a distinct lack of understanding of the importance associated with this process and amounts to little more than 'green-washing' or going through the motions.

Internal review was necessary in order to educate Eskom management so as to develop their understanding and support for the EIA process and its decision. Internal review also balanced the decision in terms of cost and economic criteria which were concerns more understood by Eskom management than I&APs who neglected to give heed to issues which did not directly affect them.

## 5.7 Environmental Management Plan and Monitoring

The EMP and monitoring are two aspects of the IEM guidelines which are required to be integrated into the implementation phase of the project, also referred to as the construction phase. These two aspects are briefly covered and as they are closely related are discussed simultaneously in this section. Mitigatory measures, management of activities and monitoring needs, identified during the EIA, are meant to be implemented during this phase. "The purpose of the Management Plan is to describe how negative environmental impacts will be managed, rehabilitated or monitored and how positive impacts will be maximised (DEA, 1992c, p 17).

An effective management plan is required to be dynamic and subject to revision and updating during the project. A minimum requirement is that it should embody the following: "provide specific goals, detail management actions, detail the party responsible for effecting management reccommendations, the timing and duration of actions, state personnel implications, training implications and financial implications" (DEA, 1992c, p 17).

Monitoring is not to be confused with auditing which differs in that it is rigid and reviews what transpired compared to what was prescribed. Monitoring is more dynamic and attempts also to ensure the implementation of the recommendations of the EMP or revise the requirements of the EMP which transpire seen to be impractical or not sufficiently stringent.

*Ariadne 400/132kV substation*

For Ariadne substation the necessity for an Environmental Impact Management Plan (EIMP) was stipulated by the environmental officer. The appointment of an environmental consultant to compile an EIMP was approved on 19 July 1994 at a cost stipulated not to exceed R15 000 (Vosloo, letter, 1994). The project cost R78 million.

The greatest impacts associated with substation construction transpire during the cutting of the substation platform and associated earthworks. Construction activities had commenced on site during May 1993 and by June 1994 all earthworks were complete ahead of the EIMP's completion. To have addressed issues identified by the EIMP retrospectively, was rendered impossible as this would have caused delays disrupting the project's progress with exceptional cost implications. The potential for the

EIMP, therefore, to influence the substation's design and construction was eliminated by it being completed after the project's construction had commenced.

The monitoring was rendered ineffectual by disallowing the person responsible for the EMP to effect its monitoring. A breakdown in continuity ensued. The EMP was a generalised document not sufficiently focused on specifics e.g. it did not advise on the large colony of herons which were resident on the site nor did it make recommendations concerning the land invaders on site.

*Ariadne-Venus 400kV line*

For the Ariadne-Venus 400kV line (2) the EMP was produced as a two part series covering generic issues and specific issues separately. The second document included air photography of the chosen route once it had been pegged by Survey. Access routes (a major impact associated with powerline construction) to be followed, were clearly drawn on the air photography and issues clearly and graphically depicted (Willemse, 1997).

An oversight was that the required archaeological investigation of the surveyed / acquired route was overlooked and was done only after construction had commenced. This resulted in marginal delay with some towers having to be moved and re-surveyed whilst at other tower sites archaeological sites identified were analaysed using test pits and permission granted to destroy them (Anderson, pers comm., 1997). Overall, the EMP was well implemented with minor mishap and adequately monitored via a designated person who was also responsible for liaison with landowners during construction.

*Hector-Klaarwater 275kV line*

The Hector-Klaarwater 275kV line EMP was only completed in 1996 after the line had been negotiated and surveyed resulting in a highly project specific and relevant document for construction but of little relevance to the design and routing of the powerline.

The EMP was included in the contract agreement for implementation by the construction contractor. It included profiles and accompanying air photographs of sections of the line route to which direct reference was made. This obviously made it more easily understood. The EMP was handed to the Resident Engineer for implementation and the environmental officer released to attend to other

projects. The total lack of monitoring of its implementation by the Eskom environmental officer, however, is unsatisfactory.

*Ariadne-Hector 400kV line*

Only a generic EMP was compiled for the Ariadne-Hector 400kV line. Insufficient time and resources were made available to compile a specific EMP for the powerline's construction. Little emphasis was placed on the EMP and only some monitoring was conducted during construction as and when requested by construction or project management (Funston, pers comm., 1998).

*Hector 400/275kV substation*

The cutting of Hector substation's terraces was already complete by the time both the Hector EIS report and EIMP of February, 1995 were completed. Thus the moving of approximately 250 000$m^3$ of soil and 90 000$m^3$ of rock (Eskom, 1995b) or otherwise stated "a cut of 242 000$m^3$ and fill 210 000$m^3$ " was already complete (Gouws, et al, 1995a, p 14). Compiling the EMP was therefore inconsequential on the implementation phase.

The EIS had little potential to effectively influence project design due to the limited time alloted. The EMP therefore, as recommended, should have been the EIS's sole emphasis (Burger, letter, 1994). In accordance with IEM the consultant should have largely realised that the Decision phase had been reached and at best a thorough investigation of issues associated with the one alternative was all that was possible in the limited time available, rather than attempting to influence or reiterate issues already investigated in the design phase by the Design department. The only means to influence the project process was by recommending mitigatory measures which could have then been included in the EMP as Conditions of Approval and created as the NPB stated: "a successful development" and to: "develop a model substation on this particular site if all possible mitigation, construction and post-construction management measures were documented and implemented" (McClintock, letter, 1994c). However, as the consultant endeavoured to complete the whole EIS the opportunity to influence the project via the EMP was also forfeited and it was only completed during February 1995, post construction commencement.

The expectation for environmental input into the project's construction had been created and two contracts for environmental rehabilitation of R1.354 million and R1.6 million created (Eskom, 1995b).

The funds had been allocated but the anticipated report and expenditure did not materialise (Bothma, pers comm., 1997). Thus specific mitigatory measures elicited during the environmental investigation were not implemented.

Little monitoring of the issues mentioned in the EMP transpired showing its inability to predict potential environmental damage. The initial lack of adequate environmental supervision is noted by the fact that environmental destruction in the sensitive environment was first reported by a conscientious Eskom Distribution surveyor who noticed a bulldozer indiscrimately clearing the indigenous trees in the ravine below and elsewhere around the substation. An attempt was then made to rectify mishaps and the Eskom environmental officer resident in Johannesburg frequently visited the site during construction for purposes of monitoring. The damage proved that impacts not anticipated prior to construction and allowed to initially proliferate are very difficult to contain and rehabilitate later.

During monitoring once construction had commenced, the original EMP was seen as inadequate and was discarded. It was then replaced with a novel pictorial version which was more practical and easily understood by construction personnel. This was far more graphic with photos scanned in and placed on a site plan of the construction site and Eskom's property. It was revised as the project progressed to address issues such as erosion as they arose.

The ecologist made an appeal in a subsequent follow-up report that: "Erosion of the banks, paths, waterways and road verges needs to be addressed, as does also the discharge of sediment bearing stormwater" (Ward, 1996). The ecologist similarly recommended the use of gabions to trap sediments and allow natural vegetation to re-establish in the watercourse. This may also be viewed as a form of monitoring.

Monitoring was specified in the EMP to be undertaken by either an Eskom employee or external consultant (Gouws, et al, 1995b). In the short time period allotted and for the sake of familiarity and continuity, this function should have ideally resulted in the consultant responsible for compiling the EIS and EMP, being retained. Only the ecological consultant was retained and the Eskom environmental officer took over monitoring and the original EMP discarded.

*Pongola-Vergenoeg 132kV line*

A superficial and generic EMP was initially compiled by the environmental officer responsible for the

Pongola-Vergenoeg 132kV line EIA. He was later seconded elsewhere and a second environmental officer handed the project. The initial EMP was discarded as being too superficial as it overlooked numerous critical issues on a project in a highly sensitive area. It was therefore superceded by another generic plan as well as two separate detailed EMPs for two of the three phases into which the project was divided for construction purposes – the one phase being already complete. The landscape which the powerline crossed was sectionalised according to generic aspects such as upper plateau grassland or dense bushveld and mitigation measures specific to these sections were prescribed. The revision of the EMP enabled most of the potentially negative impacts to be avoided. However, in order to avoid certain otherwise inevitable impacts the EMP required that the line be re-routed in its entirety. This led to chaos and project delays as the attempt to re-route the line occurred at an advanced stage of the project approaching construction. Accommodation of a change of the tower design for the line and incumbent problems with access were also addressed.

A separate monitoring document, as required by the IEM Guidelines of 1992, was not compiled but some of the documented monitoring requirements were incorporated into the generic EMP. Continual monitoring due to the nature of the environment and the need for continual input during survey and construction resulted in the environmental officer being continuously on site at great cost to the project and Eskom. This was done in comparison to other projects where one day per month was spent on monitoring and attending monthly project meetings. The ongoing compilation of reports when incidents arose were to be a hallmark of the project's construction.

*Ariadne-Bulwer 132kV line*

The routing of the Ariadne-Bulwer 132kV line in the corridor was done by surveyors in liaison with the environmental officer in sensitive areas. The EMP was initiated and an archaeological survey undertaken of a chosen route but never completed as construction was postponed.

*Ariadne-Eros 400/132kV line EIA*

Only a week was given to compile an EMP for the Ariadne-Eros 400/132kV line EIA - a massive undertaking demanding far more time. This was largely accommodated by a very thorough investigation of the line by the environmental officer for four months during the negotiation and routing stage and as far as possible impacts mitigated by avoidance and cautious routing of the line.

There was therefore only some environmental input during construction and a few site specific reports compiled.

Monitoring during construction was conducted in an ad hoc manner and the environmental officer called when requested from Johannesburg (Funston, pers comm., 1998). The EMP and monitoring conducted in this fashion remain unsatisfactory when compared with the requirements of the IEM guidelines.

*Eros 400/132kV substation*

An EMP was compiled for the selected site of Eros substation predominantly by input from the regional and locally based Distribution environmental officer. However, due to the lateness of its compilation it did not have time to sufficiently influence the geological tests and design of the substation in relation to its immediate environment.

The experience gained and volunteered by the Distribution environmental officer who monitored the Hector substation post construction proved beneficial for Eros substation's construction and prevented a reoccurence of the problems of soil erosion experienced at Hector substation.

Monitoring was conducted by the Distribution environmental officer on a voluntary and monthly basis although this was not specified. An important reason for this cooperation between Distribution and Transmission was that Transmission Environmental Management operates from Eskom head office at Megawatt Park, Johannesburg, too far away and therefore impractical to provide consistent input during the project's construction phase.

If construction had not been regularly monitored on a monthly basis, by the Distribution environmental officer, fortuitously present in the area, then it is doubtful that the EMP would have been implemented as the construction contractors showed little knowledge of how to implement its content and recommendations without personal guidance. Due to the localised nature of the impact, mitigation measures were put in place to preserve the wetlands and the borrow pit left open to attenuate run-off from the substation.

*Kokstad-Mount Frere 132kV line*

The Kokstad-Mount Frere 132kV Line EMP was completed after the record of decision and mitigatory measures for key issues highlighted during the EIA were implemented. It was primarily focused to control the external (non-Eskom) construction contractor's activities. The routing of the line in the corridor was done by surveyors in liaison with the environmental officer in sensitive areas. Liaison, however, was not always entered into due to the limited availability of the Distribution environmental officer at times. The survey of the proposed route by an archaeologist, as requested in the EIA, was undertaken and recommendations included in the EMP.

A presentation of the EMP was made at the tender meeting when all contractors were meant to be present and this was followed by a site visit. The environmental officer pointed out difficulties associated with the powerline's construction. This was viewed disfavorably by certain Eskom employees as the contractors increased their price accordingly. In spite of this a contractor, who had not been present at the tender meeting, was allowed to tender and as his tender was the lowest he was awarded the contract, ignorant of the problems awaiting construction. A presentation of the EMP was made at an initial meeting when the contractor was appointed, however, it is inappropriate to consider this as training.

No separate monitoring document was compiled as required by the IEM Guidelines of 1992 but rather it was included in the EMP. Monitoring was undertaken via monthly site visits for the duration of the project. The monthly project meetings were attended by the environmental officer after a site visit with the construction contractors where issues were raised and recommendations minuted. In spite of this, non-compliance to the EMP transpired especially when the project fell behind schedule.

The EMP proved to be adequate except for the specialist input required for the issue of soil erosion. However, in spite of its thoroughness and the thoroughness of monitoring, Eskom, against the written and verbal instruction of the environmental officer, bulldozed (using a 21 ton mechanical shovel) access through numerous dongas and pristine vegetation. The environmental officer reported the issue to Eskom senior management as well as brought this contravention to the attention of the Department of Environmental Affairs. The latter were powerless to do anything as no law existed to enable prosecution of this contravention in the previous Transkei homeland where homeland law still prevailed. Eskom did not undertake disciplinary action, illustrating once again the lack of importance attributed to environmental management. The result is that the EMP was denegrated to only being

enforced at the project manager's discretion. The soil erosion which has transpired as a result is irreversible. Numerous mitigatory measures to prevent this soil erosion were investigated, with the aid of a specialist, but all were ultimately deemed inadequate or too costly to ensure that this process would not continue.

It was stated in the EMP that construction should transpire on harder surfaces such as on rocky areas and shallow soils during the wet season, however, this was disregarded as it would engender that construction of the powerline would not transpire in a progressive linear fashion. Rain ultimately stopped construction when vehicles got bogged down and were then vandalised in the deep soils. The project was delayed for two months and construction was subsequently forced to resort to construct only on harder surfaces during wet weather. This shows that simple recommendations of the EMP could have saved Eskom a substantial sum of money and minimised losses to the external construction contractor who as a result made no profit, staff were hospitalised with stress disorders and the owners of the company stated it was the most difficult project conducted in the 27 years of the company's existence.

A rehabilitation plan was provided in the EMP predominantly to minimise soil erosion. Costs were also calculated and management educated in its necessity and implications via a site visit.

*Mount Frere 132/22kV substation*

The EMP for Mount Frere substation was adequately compiled. Due to the experience the Eskom environmental officer gained from the Hector substation the drainage of the substation was addressed in the design stage to prevent soil erosion. Site rehabilitation after construction was specified. Monitoring was conducted on an ad hoc basis during construction. The EMP and monitoring proved highly effective with no mishap. The rehabilitation specification which constituted a major part of the EMP was concise and precise.

### 5.7.1 Trends Associated with the Environmental Management Plan

Out of all the stages of the IEM guidelines the EMP suffered greatest neglect if pressures of time and resource constraints materialised.

At times, even if the EIA had been conducted adequately, the implementation of the EMP did not transpire. It may be surmised that the Eskom goal of acquiring a line route had been achieved.

The financial requirements, duration and timing of actions, training, responsible person and personnel implications were never adequately pronounced except for the Ariadne-Venus 400kV line.

The EMP content was often too generalised without sufficient measurables and adequate mitigation measures could not be designed as a result.

Construction contractors struggled to interpret the EMP even though it was often simplified, had accompanying maps or air photography with minimal written instruction and written in tabular form. This was not due to a lack of willingness to implement its specifications. Continual ongoing interpretation of and training in its content was therefore required.

The EMP focused on short term goals during the implementation phase with little focus except for general comment on impacts associated with the operational phase.

### 5.7.2 Trends Associated with Monitoring

The very simplistic trends prevailed where experience from monitoring previous EMPs resulted in their improvement. Conversely as a number of EMPs were compiled but not monitored their was little subsequent improvement.

If the EMP was late it was almost impossible to reverse or even contain adverse impacts by monitoring, once construction had commenced. EMPs were often produced too late to be of significance.

Eighty percent of the time the person responsible for monitoring was not the same environmental officer responsible for or who had undertaken the EIA. This engenders a lack of continuity which is compounded if no training accompanied the issuing of the EMP or when previous experience was lacking. It also shows a diminished regard for environmental management during project implementation.

Adequate monitoring was not enforced and attendant on the individual as opposed to the process. That is monitoring was not encouraged nor enforced resulting in its neglect unless the environmental officer was sufficiently conscientous and realised the merit and importance of this step for the present project as well as future EIAs/EMPs.

An inordinate amount of time had to be spent on monitoring if previous phases of the EIA had not been adequately attended to. Trying to implement project design changes during monitoring once construction had commenced was almost impossible. Issues had to have been pre-empted and mitigation measures prescribed prior to this stage being reached in order for their satisfactory implement. Trying to implement changes to project design once construction had commenced was also highly costly and disruptive. What is evident from monitoring is that the ability and options available to mitigate impacts diminishes drastically as the project progresses. The onus placed on costly and additional rehabilitation measures, often prescribed during the monitoring stage, conversely increases.

The lack of ability of construction contractors to implement the EMP shows the necessity for monitoring, training and interpretation of the EMP which was often lacking.

Although monitoring could continue after construction was complete, if the Eskom environmental officer so desired, recommendations could not be easily implemented as the project was deemed closed and a whole new project would have to be opened to account for any additional costs. This process could take as long as two years. Monitoring at Hector substation alone took four years and then a subsequent two years to implement some recommendations - post construction completion. This shows the necessity and benefits of long term monitoring post construction.

## 5.8 Auditing

According to the IEM guidelines auditing constitutes a "reassessment of the project or policy proposal in the light of developments during implementation". It therefore provides feedback on "planning ..., the accuracy of investigations ..., and the effectiveness of the Conditions of Approval and Monitoring Programme ..." (DE A, 1992a, p 9).

*Ariadne 400/132kV substation*

An Eskom (in-house) audit was conducted of the Ariadne substation site during 1997 but the IEM

process was not followed. It merely stated that there were no apparent environmental impacts due the substation's operation and no serious environmental consequences had transpired due its construction. The audit was limited to the site itself. It in no way referenced the EMP drawn up by the consultant for both construction and operational phases, nor whether its recommendations were adhered nor did it comment on their validity. The auditing therefore has not been holistic as it narrowly considered the substation itself in isolation of its numerous lines exiting and entering the substation and entirely neglected to consider the procedural issues as ensconced in the IEM guidelines and Eskom policy (Eskom, 1997).

*Ariadne-Venus 400kV line*

No audit has been done in accordance to the format prescribed by IEM for Ariadne-Venus 400kV line 2 EIA. The lessons learnt, however, as a result of the EIA, are signifiant and have been presented at conferences both nationally and internationally (Willemse, 1995d).

*Hector 400/275kV substation*

A subsequent audit of the Hector substation site, similar to the audit for the Ariadne substation, only assessed the immediate confines of the substation and did not consider beyond the Eskom premises (Eskom, 1997). Eskom could face legal charges if prosecuted for the erosion below the premises on neighbouring property.

*Ariadne-Bulwer 132kV line*

An audit for the Ariadne-Bulwer 132kV line EIA is not applicable as the project did not proceed to the construction phase.

*Kokstad-Mount Frere 132kV line*

Only the process followed for the Kokstad-Mount Frere 132kV Line EIA was audited by an Eskom person external to the process. General compliance to IEM was adequately achieved. The "process followed and standard of assessment" was commended by the Eskom environmental auditor and "noted of being of a high standard within Eskom" (Lucas, letter, 1997). The major shortfall which influenced the thoroughness of the Kokstad-Mount Frere 132kV line EIA scoping and investigation

phases was the inadequate time of 4 months compared to the 6 month period requested in which to conduct the EIA. This was confirmed by the Eskom environmental auditor (Lucas, letter, 1997).

*Pongola-Vergenoeg 132kV line*

The post construction inspection of the Pongola-Vergenoeg 132kV line EIA does not qualify as a full audit. A form of auditing has been conducted by the Eskom environmental officer who was part of the project from its inception until after its construction. This does not meet the requirements of a formal audit which requires that an independent third party conduct the audit. The audit was concluded after the rehabilitation plan for the line was compiled. Its implementation and the efficacy thereof, however, was not auditted. The lessons learnt on the Kokstad-Mount Frere 132kV Line EIA and EMP prevented similar mishaps on the Pongola-Vergenoeg 132kV line EMP.

*Hector-Klaarwater 275kV line*

For the Hector-Klaarwater 275kV line, Ariadne-Hector 400kV line, Ariadne-Eros 400/132kV line, Mount Frere 132kV substation and for Eros substation EIAs no known audit has been conducted to date.

### 5.8.1 Trends Associated with Auditing

Auditing was largely not done. This phase of an EIA is commonly not adequately addressed in projects in South Africa as it reveals predominantly long term benefits.

Auditing was often narrowly focused on the immediate confines of the substation after construction was completed and not on the project process which had preceeded the substation's construction including the EIA, EMP and monitoring. Thus auditing did not constitute an audit in terms of the IEM guidelines.

Testing of predictions was not conducted and would have revealed the necessity for greater measureability and predictability for auditing purposes as opposed to general dsecriptions of impacts and mitigatory measures.

## 5.9 Performance of the Eskom Implementation of IEM between 1989 and 1997

Tables were used to summarise the findings graphically. Trends apparent in the tables are explained and discussed.

Table 10 provides a synopsis of the implementation of the various steps of the IEM guidelines, between 1989 and 1997, for each of the twelve projects analysed. After careful consideration a percentage depicting each step of the IEM guidelines' implementation per project was estimated. This was further converted to a scale of 0 - 6 from which a mean average for implementation of that particular IEM step for all twelve projects was derived as well as to determine the mean percentage implementation of all the IEM steps analysed per project. From Table 10, Tables 12, 13 and 14 were derived. Table 11 provides a break down of the elements which as a whole constitute scoping. There attainment per project was rated and the average taken as the rating for scoping used in Table 10.

In Table 10 it is evident that for five project EIAs out of the twelve, unnacceptable levels of adequacy were attained of only approximately 20-40% adequacy. Three others were below standard i.e. below 50% adequacy. For four, high to very high standards were achieved. This shows that the potential existed to conduct the implementation of the IEM guidelines but they were not consistently implemented or consistently implementable.

The identification of alternatives and significant issues and the determination of specific guidelines were conducted erratically and exhibited a closer affinity to the other aspects of the specific project EIA with which they were associated (Table 10 and Table 11). This merely shows that certain EIAs were more poorly implemented than others as a whole. The reason for this has been shown to be a desire to achieve company goals and restrict the EIA to a minimum unless the potential for resistance from I&APs exists. This is also supported by the high rating attained for consulting and using appropriate consultative techniques, for landowners (white advantaged I&APs). Thus projects which crossed communities which posed little potential for resistance received less attention during scoping.

A noticeable trend in Table 10 for the period was the correlation between the environmental practitioner and the quality of EIA delivered. The use of skilled environmental officers as those who would lead in the implementation of EIAs in Eskom, albeit from the bottom up, was lacking. This demography in Eskom environmental management not only reflected the dearth in the newly created environmental practitioner profession of the time in South Africa, but Eskom, instead of using

qualified EIA consultants to help guide, relied on the appointment of surveyors, botanists, zoologists, etc. This is a reflection of the prevailing lack of awareness and importance atributed to this aspect of the business initially. This was despite visiting overseas specialists having advised Eskom to the contrary and highlighted the need for well skilled employees. There is also concern that lessons learnt from past EIAs and past environmental practitioners are not being conveyed to the newly appointed (Burger, 2000a).

Table 10: Estimated % Implementation of Selected Steps of IEM

| 81-100% (6)<br>61-80% (5)<br>51-60% (4)<br>41-50% (3)<br>21-40% (2)<br>1-20% (1)<br>Not attempted (0) | Ariadne 400/132kV substation '91 | Ariadne-Venus 400kV line (1) '91 | Hector-Klaarwater 275kV line '92 | Ariadne-Venus 400kV line (2) '94 | Ariadne-Hector 400-kV line '94 | Hector 400/275kV substation '94 | Pongola-Vergenoeg 132kV line '94 | Ariadne-Bulwer 132-kV line '94 | Ariadne-Eros 400/132kV line '95 | Eros 400/132kV substation '95 | Kokstad-Mount Frere 132kV line '96 | Mount Frere 132/22kV substation '96 | AVERAGE IMPLEMENTATION OF IEM STEPS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Policy | 4 | 3 | 3 | 5 | 4 | 4 | 5 | 4 | 4 | 4 | 5 | 5 | 69 |
| Administration | 2 | 1 | 4 | 6 | 3 | 1 | 1 | 5 | 2 | 2 | 3 | 4 | 47 |
| Adequacy of Scoping | 3 | 2 | 5 | 5 | 5 | 2 | 1 | 5 | 3 | 3 | 5 | 5 | 60 |
| Investigation of Issues | 1 | 2 | 3 | 6 | 4 | 1 | 1 | 5 | 3 | 2 | 4 | 4 | 49 |
| Review | 0 | 2 | 3 | 5 | 4 | 1 | 0 | 4 | 2 | 1 | 4 | 4 | 42 |
| Environmental Management Plan | 1 | EIA repeated | 5 | 6 | 2 | 1 | 1 | Project halted | 2 | 3 | 5 | 6 | 53 |
| Monitoring | 1 | | 1 | 5 | 2 | 4 | 5 | | 1 | 3 | 5 | 5 | 53 |
| Auditing | 1 | | 0 | 0 | 0 | 1 | 1 | | 0 | 2 | 2 | 0 | 12 |
| EIA's OVERALL ADEQUACY | 27 | 35 | 50 | 79 | 50 | 31 | 31 | 77 | 35 | 42 | 69 | 69 | |

Unacceptable levels of investigation of only approximately 20% adequacy were attained for five projects (see Table 10). Two others were below standard i.e. below 50% adequacy. For two, high

standards were achieved and for three acceptable levels of investigation achieved approximating more than 50% adequacy. Generalisations were often made during investigations and therefore could not justify and dictate changes to project locality and design.

The implementation of the steps of providing an appropriate EMP and monitoring were inconsistent in their implementation and fluctuated widely as apparent in Table 10. This fluctuation was at times dependent on the environmental officer involved as evident for the implementation of these phases for Hector 400/275kV substation and the Pongola-Vergenoeg 132kV line where monitoring was conducted reasonably well by someone other than the person who had compiled the EMP. Thus the discrepancy between the rating for the EMP and monitoring for these two projects. The implementation of monitoring, on these two projects, at an individual's initiative and discretion, masks the overall lack of attention to monitoring post the project's implementation by Eskom. This is also a common trend globally (Petts, 1999b; Sadler, 1996 in Hill, 2000; Lee and George, 2000). It is also evident that more attention to monitoring had to be paid when previous steps such as the EIA and EMP were deficient in their compilation and implementation.

Obvious in Table 11 was the inadequacy of the techniques employed for and inadequate involvement of the previously disadvantaged communities. There was at times even entire neglect of the communities concerned or an assumption that consultation with the tribal authority and techniques employed were adequate, neither of which was verified.

Certain aspects of scoping, as evident from Table 11, were conducted very well such as the provision of background information and consultation with authorities. The most preeminent authority was the NPB with whom Eskom regularly and frequently engaged and regarded as the key authority in the absence of a statutory body. This may illustrate a trend of focusing outwards and appeasement as opposed to focusing inward and consistently striving to achieve what was prescribed by the IEM guidelines.

Although learning errors were expected, an improvement in the implementation of the IEM guidelines with time, if there was a true commitment to implementating the guidelines, was anticipated. This was especially expected after the controversy, delays experienced and understanding gained from repeating the Ariadne-Venus 400kV line EIA.

Table 12 is derived from Table 10. Table 12 gives a clear indication of steps and projects where an estimated 60% adequacy of implementation of the IEM steps was attained. Sixty percent is considered a reasonable standard if the supposition is to be made, as was widely accepted, that Eskom, not only accepted, but also implemented the IEM guidelines.

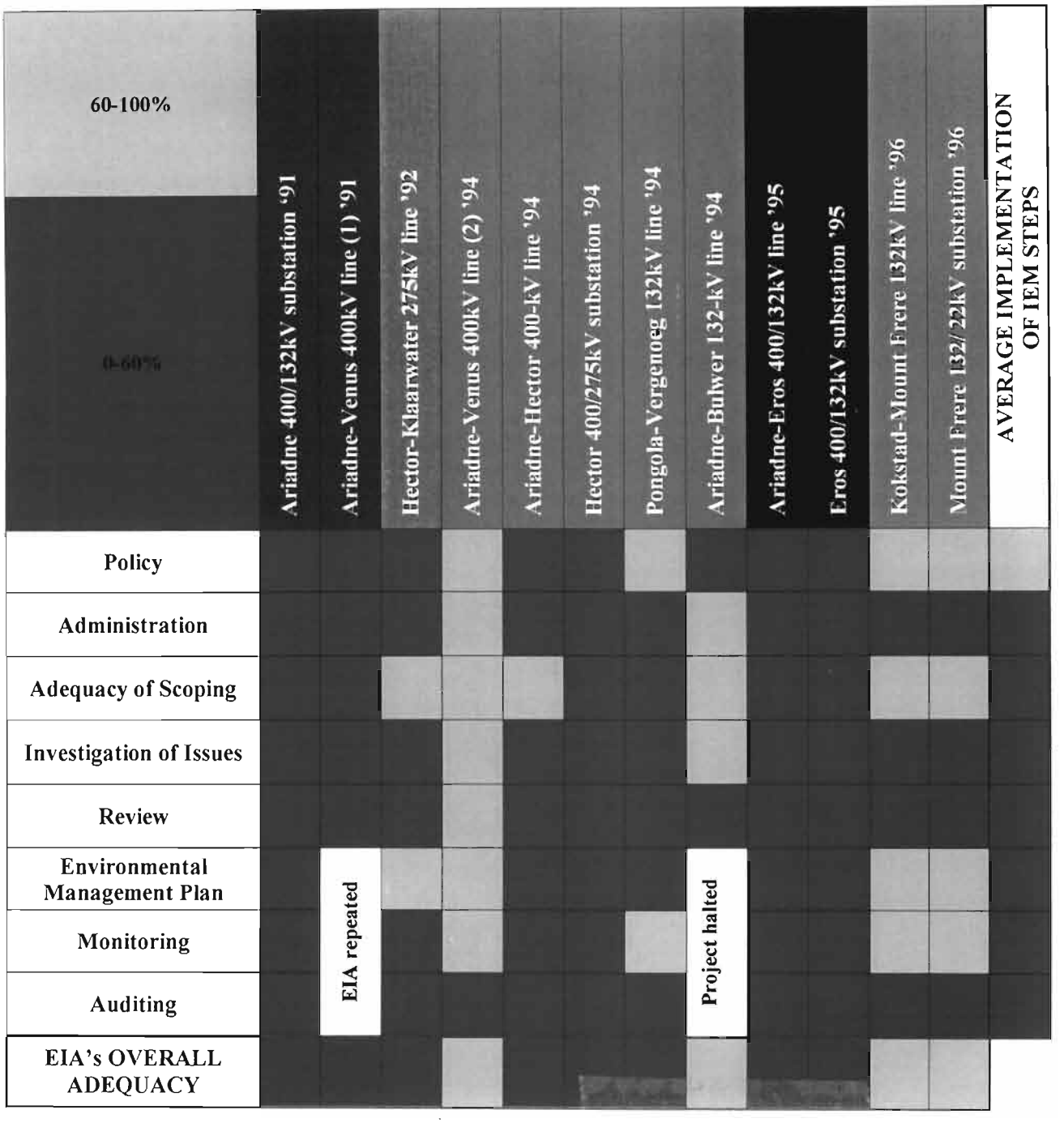
Table 11: Stipulations of the IEM Guidelines to be met during Scoping and the Estimated Extent to which they were Attained

| 81-100% (6)<br>61-80% (5)<br>51-60% (4)<br>41-50% (3)<br>21-40% (2)<br>1-20% (1)<br>Not attempted (0) | Ariadne 400/132kV substation '91 | Ariadne-Venus 400kV line (1) '91 | Hector-Klaarwater 275kV line '92 | Ariadne-Venus 400kV line (2) '94 | Ariadne-Hector 400-kV line '94 | Hector 400/275kV substation '94 | Pongola-Vergenoeg 132kV line '94 | Ariadne-Bulwer 132-kV line '94 | Ariadne-Eros 400/132kV line '95 | Eros 400/132kV substation '95 | Kokstad-Mount Frere 132kV line '96 | Mount Frere 132/22kV substation '96 | AVERAGE IMPLEMENTATION OF IEM STEPS FOR SCOPING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Provision of Background Information | 4 | 1 | 4 | 6 | 6 | 1 | 2 | 5 | 5 | 2 | 5 | 5 | 64 |
| Adequate involvement of Authorities | 4 | 3 | 5 | 6 | 5 | 2 | 1 | 5 | 4 | 3 | 5 | 5 | 66 |
| Adequate involvement of advantaged I&APs | 1 | 2 | 5 | 6 | 5 | 2 | 1 | 5 | 3 | 3 | 5 | 5 | 60 |
| Techniques appropriate to advantaged I&APs | 4 | 1 | 4 | 6 | 4 | 1 | 1 | 4 | 2 | 3 | 5 | 5 | 55 |
| Adequate involvement of disadvantaged I&APs | 2 | 0 | 2 | 1 | NA | NA | 0 | 3 | 3 | NA | 3 | 3 | 32 |
| Techniques appropriate to disadvantaged I&APs | 3 | 0 | 3 | 1 | NA | NA | 0 | 3 | 3 | NA | 3 | 3 | 35 |
| Identification & Selection of Alternatives | 2 | 1 | 4 | 5 | 4 | 1 | 1 | 5 | 1 | 3 | 4 | 4 | 49 |
| Identification of Significant Issues | 2 | 2 | 4 | 6 | 3 | 4 | 1 | 5 | 2 | 1 | 4 | 4 | 49 |
| Determination of & Compliance to Specific Guidelines | 2 | 2 | 4 | 6 | 4 | 0 | 0 | 5 | 3 | 3 | 3 | 4 | 50 |
| % ADEQUACY OF SCOPING | 44 | 22 | 65 | 80 | 74 | 26 | 13 | 74 | 48 | 43 | 68 | 70 | |

It is noticeable that four projects stand out clearly in Table 12. The three Distribution projects of the Ariadne-Bulwer 132kV line, Kokstad-Mount Frere 132kV line and Mount Frere 132/22kV substation EIAs relied on the report format generated for and experience gained from the Ariadne-Venus 400kV

line EIA. This was due to the efforts of the environmental officer to gain this information and not due to immediate company instruction. Thus only the Ariadne-Venus 400kV line repeat EIA can be seen to have had full managerial support and had been conducted adequately in its entirety bar auditing. It is surprising to note that the experience gained from the Ariadne-Venus 400kV line EIA was not

Table 12: Implementation of Selected Steps of IEM Attaining >60% Adequacy




automatically conveyed to the subsequent Transmission EIAs for the Ariadne-Hector 400kV line, Hector 400/275kV substation, Ariadne-Eros 400/132kV line or Eros 400/132kV substation projects. These projects were all conducted concurrently or slightly subsequent to the Ariadne-Venus 400kV line repeat EIA's commencement.

Whereas the Ariadne-Venus 400kV line EIA attained an exceptionally high rating of 79% implementation (estimated) it is not considered preposterous to expect at least an improvement to 60% conformance to the IEM guidelines in subsequent EIAs (Table 12). In contradiction to this expectation Table 10 shows averages of 50, 31, 31, 35 and 42% implementation of the IEM guidelines being attained for projects, post the Ariadne-Venus 400kV line EIA. Even though these averages are subjectively derived, they give an undeniable indication that there was insufficient attention being given to the implementation of the IEM guidelines even post the Ariadne-Venus 400kV line EIA. Thus it is not inappropriate to consider that the implementation of the IEM guidelines took place:

- when other circumstances or reasons dictated their implementation other than the protection of the environment; or
- that the implementation of the guidelines required a major adjustment which Eskom was unable to consistently make in the short term.

Both arguments have credence.

Table 13 shows that the implementation of the IEM guidelines was totally inadequately attempted for some projects. This may be deemed understandable prior to the Ariadne-Venus 400kV line EIA being repeated but less than 40% attainment of successful implementation thereafter once again illustrates that, as has been discussed in Chapter 5, external factors such as political will and the necessary reform to accommodate and implement the guidelines was a prior necessity. It is clear that auditing was badly neglected in contradiction to a statement made that "environmental impact assessment and management plans will be implemented and audited for all major construction projects" (Eskom, 1993a). Scoping, as being the step upon which subsequent phases of the project depended, was relatively well conducted and more specifically for landowners (Tables 13 and 14).

Overall, the citing of policy was the only IEM step to be commendably implemented in the author's opinion (Tables 12 and 14). However, ascertaining compliance to the IEM guidelines by assessing the citing of policy in the EIR does not necessarily give a true indication of compliance either. Ultimately a better assessment is whether or not policy was complied with or cognisance was taken of it when implementing the EIA. Citing Eskom environmental policy or referencing the Eskom EIA procedure, which was similar to the IEM guidelines, should have resulted in greater compliance to the IEM guidelines. This trend is not noticeable and therefore the citing of policy, even though well done, often amounts to 'lip service'.

Table 13: Selected Steps of IEM where < 40% Estimated Implementation was Attained.

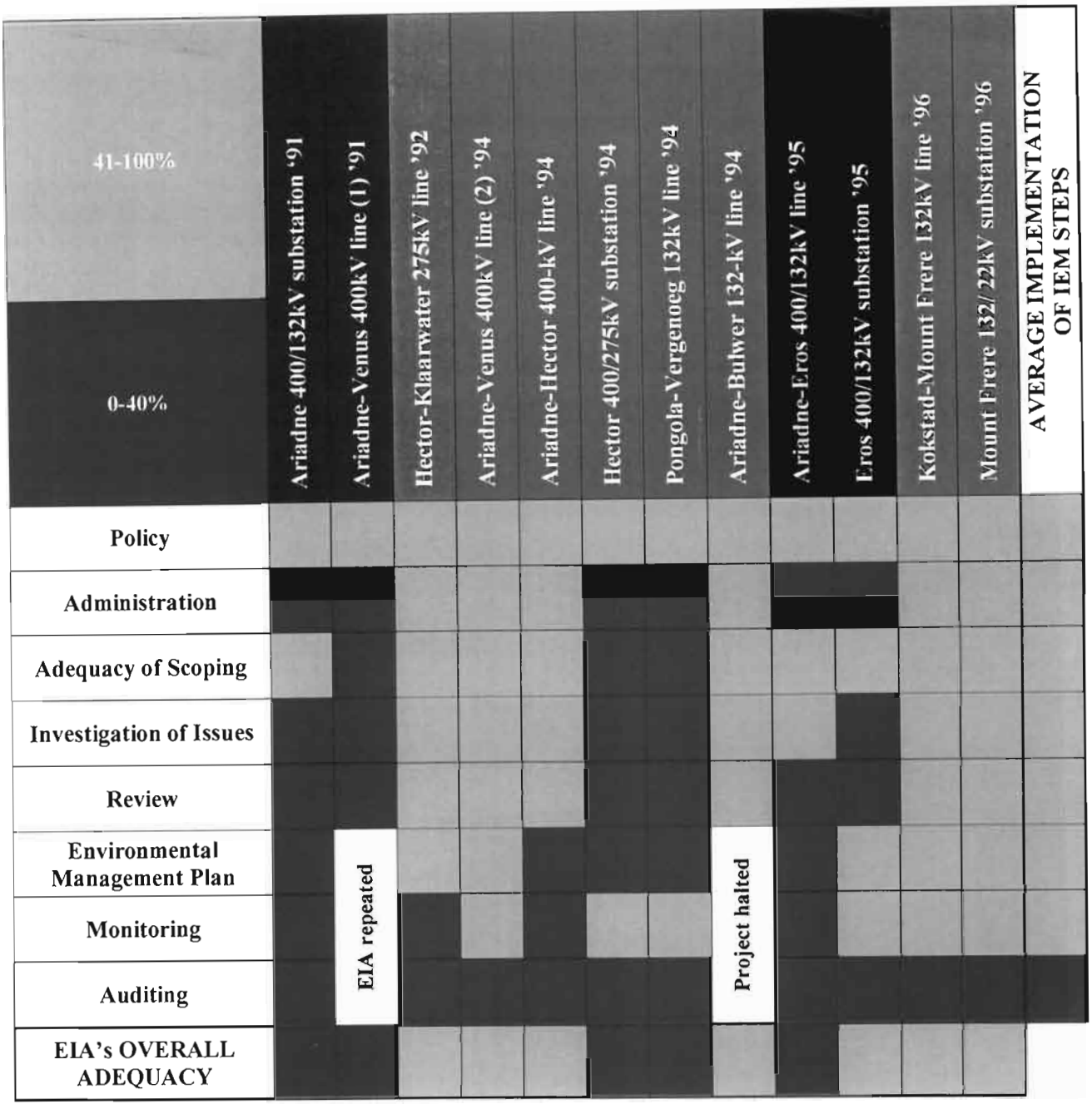
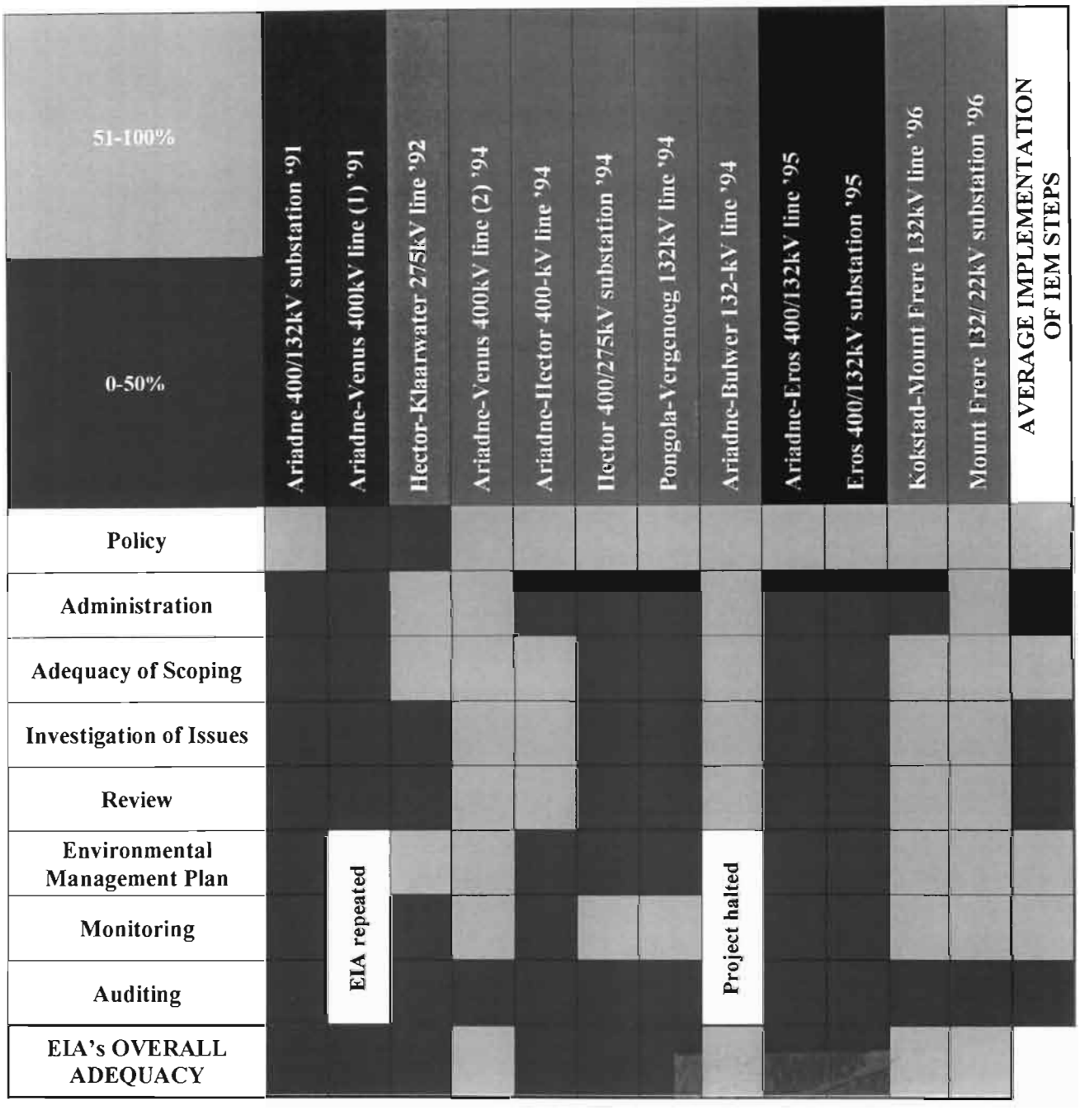



Table 14, depicting 50% compliance, accentuates the trend prevalent in Table 13 where certain EIAs were conducted more in compliance to the IEM guidelines than others due to various external factors as discussed in Chapter 5. Aspects such as project administration, the investigation of issues and review are highlighted in Table 14 as having been shown less than adequate attention as well.

Table 14: Selected Steps of IEM where < 50% Estimated Implementation was Attained.




If an estimated average attainment of approximately 60% may be deemed an attainable point with an indication of improvement with time being indicative of Eskom having adequately attempted implementing the IEM guidelines then it is evident that either Eskom was not comitted to their implementation or they were not implementable in the short term.

In conclusion it was considered irrefutable that the IEM guidelines were accepted and to be implemented by Eskom, however, the implementation thereof was deficient when conducted on a voluntary basis.

## 5.10 Conclusion

All the steps of Policy and Administrative Requirements, Review by Specialists and the Public, compilation of an Environmental Management Plan, Monitoring and Auditing as mentioned in Table 2 have been reviewed across the 12 case studies. The key issues and lessons learnt were identified. The tables provided in Chapter 5 summarise the findings of this study.

The final chapter, Chapter 6, provides a review of what can be gained as a result of charting the development of IEM/EIA in Eskom over the period 1989-1997.

# CHAPTER 6

# CONCLUSIONS AND RECOMMENDATIONS

## 6.1 Introduction

The aim of this thesis was to assess the implementation of the IEM guidelines in projects conducted in KZN for the period 1989 to 1997 by Eskom in order to ascertain whether the IEM guidelines were indeed accepted and voluntarily applied by Eskom, prior to EIA being legislated. From Eskom's voluntary implementation of the IEM guidelines, trends and points of learning were derived which may benefit the future implementation of EIA in South Africa, particularly with regard to self-regulation. Figure 3 provides a summary of key lessons learnt.

## 6.2 Policy

There was a greater focus on external policy and guidelines than internal policy and procedure which shows that the implementation of environmental management was dependent on the expectation that EIA would be legislated and that the IEM guidelines would largely constitute this legislation. This is in antithesis to the spirit of IEM and integration, which attempted to allow the companies of the time to voluntarily imbibe the principles of IEM into company policy with regard to projects, provide the necessary reform and implement them. Thus there was little pressure within the company to apply the guidelines, rather they were applied in accordance with an expectation to meet the requirements of law. There was, and most probably still is, the expectation that law, and not political will and the necessary company reform, will adequately drive the implementation of EIA.

## 6.3 Administration

The major and most pre-eminent flaw of IEM is that it did not prescribe true integration into the project process but allowed the continued existence of a stand-alone process. Departmental restructuring, project procedure restructuring and education of all staff in a new manner of planning and implementing projects was required in order to effectively implement the IEM guidelines.

It might, however, be assumed that Eskom and other agencies in South Africa could have benefited to a greater extent from overseas experience, by pre-empting the failures in administration already experienced elsewhere. The guidelines should have placed a far greater emphasis on the administrative reform necessary to accommodate implementation.

The progress made by Eskom in altering the project process to accommodate environmental input does reflect the fact that past EIAs and the attempted implementation of the IEM guidelines has indeed educated and paved the way for reform.

Acutt (2001) in her present study has realised that administration requires an accountability facilitated by what is now called partnerships. It is evident that legislation alone cannot attain environmental goals approaching sustainable development nor can mere internal 'voluntary' compliance realise these goals. She advocates partnerships between proponents and I&APs which should enable close working relationships which strive for environmentally balanced development (Acutt, 2001).

The lack of `clear and consistent administration of the IEM guidelines is also related to the status afforded to environmental management in the company. Where it has higher standing equivalent to other corporate priorities, it will not be esily sidelined in response to business pressures. Thus a higher standing needs to be afforded EIAs at all levels from strategic planning to individual projects to implement the IEM guidelines. A transformation in practice and political will, will be evident when, in times of pressure, companies still enable EIAs to be conducted and not discarded in preference of short term cost and time exigencies alone. It is acknowledged that change in administration is evident but that this is a slow process continually threatened to be de-railed in the face of corporate or development priorities.

It ca also be deduced therefore that voluntary assessment such as sectoral Strategic Environmental Assessment (SEA), presently not legislated, will only take place in an environment where corporates are striving to achieve the high ground in environmental management and not merely trying to achieve what is legislated.

**Auditing**

- largely not done
- if done focused on effects not process
- testing of predictions not conducted

**Policy**

- policy imbibes IEM guidelines
- higher regard for external policy such as the IEM guidelines than internal Eskom policy
- citing policy did not ensure compliance

**Administration**

- time and costs poorly allocated
- staff constraints
- skilled staff required
- education resulted in some improvement over the period
- IEM procedure poorly applied
- company structure limited IEM application
- IEM applied according to external pressure
- IEM initially not integrated into project procedure
- IEM is beneficial to subsequent project stages when applied
- incorporation into project process subsequently resulted
- IEM not applied strategically

**IEM in Eskom**
**1989 - 1997**

**Monitoring**

- lack of continuity as often relegated to a project manager or new environmental officer
- not seen as important as prior steps of the EIA
- often conducted at the individual's initiative
- an inordinate amount of time spent monitoring if prior phases of the EIA not adequately attended to
- monitoring was problematic in that it should have stretched well beyond construction/project close-off and was often curtailed

**Scoping**

- need and desirability well presented to I&APs but not known issues and impacts
- involvement of authorities portrays outwards focus, not integration
- educating I&APs in their rights marginal
- had to overcome I&APs apathy by appropriate techniques
- no scoping at a strategic planning level
- adequate scoping benefited future stages of the EIA project
- scoping done in response to external necessity and landowner pressure
- poor consultation leads to mistrust and conflict
- disadvantaged I&APs marginalised and techniques inappropriate
- efficacy of technique important not number of people reached
- window-dressing to meet procedural requirements as opposed to reaching I&APs
- professionals should have been used to advise on scoping
- alternatives were constrained to project alternatives and not strategic alternatives which were discarded without environmental input
- strategic planning allows alternatives and issues to be investigated outside the constraints of projects
- alternatives have to be aggressively evoked
- issues were not adequately and consistently rated
- specific guidelines only actively sought at the behest of the company not due to compliance with procedure
- IEM educated those involved with its implementation and resulted in some reform

**Environmental Management Plan**

- the EMP was often neglected if time constraints existed
- the EMP was regarded as having lesser importance
- was often a generalistic and superficial document
- few measurables included made auditing impossible

**Review**

- using the EIR for review was inappropriate
- appropriate review benefits the subsequent phases of the project
- on occasion the comments of the NPB were ignored but not that of landowners
- going through the motions
- internal review helped educate and get the support of Eskom management

**Investigation of Issues**

- cumulative impacts not investigated
- use of specialists minimised
- usually superficial and general
- social impacts not investigated at all
- investigation constrained due to the unknown cost and time implications
- insufficient time in projects
- investigation necessary to dispel emotional bias
- reliance on internal staff inadequate
- poor scoping resulted in poor investigation of issues
- poor investigation led to costly/irreparable environmental damage and exposed Eskom to legal prosecution

**Figure 3: Summary of Key Lessons Learnt**

## 6.4 Scoping - Consultation

Scoping can easily be subverted to meet another agenda to aid the project's advancement. This is not necessarily wrong and not an unfavourable by-product, but this must not detract from the original reason for which it was employed. This must be clearly enunciated to enable scoping and its components such as consultation with I&APs, to be conducted for the correct motive.

There was often a very low response, as illustrated in Table 8, to consultation showing that standard techniques are not always appropriate in a South African context. Professional advice and a specialist survey and determination of a correct and adequate method of consultation in developing countries is necessary.

The issues and trends identified in this study are consistent with international and local literature reviewed. Suspicion, mistrust, bias, inadequate consultation with disadvantaged communities, apathy on the part of I&APs and the proponent, delays due to inadequate consultation, inappropriate consultation methods, division in communities as a result of scoping and the unpredictability of consultation are all apparent. All point to the importance of consultation in the long term. The lack of flexibility in a project driven process to accommodate the unpredictableness of consultation was one of the more repetitive and apparent discrepancies which arose. Consultation prior to the project process is therefore necessary and, as with other aspects of this study, there is a continual indication of the requirement for SEA in addition to EIA.

## 6.5 Scoping of Possible Alternatives

There should be no area that is not exposed to environmental input – strategically or otherwise. Strategic environmental assessment (SEA) prepares the company for the implications associated with specific project EIAs and allows the necessary costs, time allowances and investigations to be considered and even commenced well in advance.

Disallowing alternatives merely in terms of the company's expediences can also marginalise otherwise preferable alternatives in terms of the environment.

Those external to the company are not aware of the whole ambit of alternatives available for consideration. This requires a measure of education of I&APs concerning all tenable alternatives - preferably at a strategic level.

There is no guarantee of fair consideration of all alternatives even if consultants are appointed, as they are only appointed on a project-by-project basis and do not adequately comprehend all the alternatives that are technically and strategically available and feasible. Thus sectoral SEA necessitates internal environmental staff with a knowledge of both the technical constraints and limitations imposed by the environment in order to prevent alternatives being discarded prematurely.

Alternatives to a development rapidly diminish as the project progresses towards implementation and it makes sense to attempt to diminish the risk of potential project failure (often only realised in the long term) by conducting more exhaustive environmental feasibility studies of all alternatives. This must ideally transpire well before large capital investment is committed to individual projects' design and implementation.

IEM attempted to diminish 'end-of-pipe' control by being introduced as early as possible in the project process. The point at which this transpires differs from company to company. The role of skilled individuals working within the company structure, must be supported during strategic points of decision making. The narrow confines of project EIA are too restrictive and environmental management is often seen as the cause of project delay and financial loss to the company as a result. However environmental management has the potential to provide assurance and ensure greater project success if it is implemented timeously and strategically.

Thus a top down approach to prescribing which alternative will be implemented must be replaced by a greater democratic and consultative approach. This must be facilitated by the creation of the necessary forums and education of I&APs. This will engender social responsibility and allow a measure of caution to be exercised before feasible alternatives are discarded. An open and unbiased approach to alternatives will obviously gain the trust and support of I&APs, further providing greater assurance of the project's success. The transparent consideration of all alternatives should not only be conducted when external pressure is brought to bear by the exceptional and few erudite I&APs, but should be actively promoted as standard company practice.

## 6.6 Scoping - the Identification of Significant Issues

The onus rests with the company/proponent to educate and train I&APs in selecting issues associated with projects and their activities. As with identifying alternatives, issues can be glossed over where time constraints exist at the level of individual project EIAs. The seriousness of not identifying issues needs to be emphasised, as trying to repair environmental damage is almost always impossible and extremely costly.

Bias may be introduced as the identification of issues is often influenced by the specific training of the environmentalists conducting the scoping exercise. Issues identification can be enhanced by a multi-disciplinary team of specialists and successful short and long term monitoring and auditing. The use of disciplinary action, applied when issues are overlooked, will enhance the responsibility of the individual conducting the EIA, to conduct a thorough elucidation of all issues.

## 6.7 The Investigation of Issues

It is evident that South Africa as a developing country experiences problems related to investigation common to those of developed countries. The lack of time for adequate studies during project EIAs as well as the need for more specific information as opposed to descriptive and general statements is experienced elsewhere in developed countries as well. Investigations have to be accommodated within a rigorous project schedule where costs and deadlines traditionally hold precedence. Project performance should be seen as commensurate with environmental performance i.e. the level of environmental performance must be raised to be on a par with the project's technical standards.

Adequate investigation entails that long term investigations be conducted well before the individual projects are commenced preferably at a regional or ecosystem level. Cumulative effects must also be investigated over a period of time by reviewing impacts due to existing infrastructure in the region. This departs from the piecemeal repetitious and costly investigation assoiated with project EIA to which the application of the IEM guidelines was restricted by Eskom. The decision for such long term investigation is often made by those other than the environmental officer but the investigation of certain issues such as social and biophysical impacts necessitates long term studies.

The lack of substantive EIAs, which give measurable results that could positively aid and influence project design and enhance project sustainability, is having a negative effect on the credibility and value of EIA.

The investigation of issues, especially those requiring long term studies, beyond the limitations of individual projects on a regional basis once again points to the need for Strategic Environmental Assessment (SEA). SEA similarly reduces the repetition of studies on a project-by-project basis. The information can then be referred to for the individual projects and has the additional benefit of contributing to the pool of scientific knowledge for the region. This assists other EIAs, as well as the scientific community. Funding should be provided upfront for SEAs rather than being used for damage control once projects have failed.

The lack of social studies, in line with trends cited in the literature, is most evident. Social impact assessments should have been conducted on the construction of powerlines. This could have been very beneficial and identified the most appropriate consultation methods to be employed.

Where the company focuses on the speed at which the project is completed and at the lowest cost, this constrains the investigation of significant issues to a minimum. Often a project's success is appraised in terms of short term time and cost savings and this is a significant area of concern as the environmental officer seeks to ensure that long term costs to the environment are curtailed and project sustainability enhanced. Issues investigation can also be justified by successful long term monitoring and auditing.

## 6.8 Review

Review has to be taken seriously and conducted so that the decision is transparent and accessible to all I&APs.

The need for review is often thwarted by the perception or attitude that 'the company is doing or has done enough'. This also portrays a lack of commitment to democratic decision-making processes.

## 6.9 Environmental Management Plan

Once issues on the critical path, such as satisfying landowners via scoping, have been attained issues such as the EMP post project 'approval', often not seen to be as critical, suffer neglect. Where self-regulation is practiced the implementation of the EMP gives a strong reflection of the environmental commitment of a company. Project implementation is therefore also an appropriate phase in which to measure actual environmental commitment.

Where the situation exists that no EIA has been conducted, often due to an emergency and the project being expedited, then the EMP takes on a greater significance and time and money has to correspondingly be committed at this stage to accommodate investigation and measures to mitigate environmental problems. Thus, in extreme events of emergency, an EIA may be overlooked but then there must be greater attention to and studies associated with the EMP.

## 6.10 Monitoring

Monitoring must be empowered to discipline any non-compliance to the EMP or prescribed rehabilitation measures. This avoids the environmental problem being passed on to another department or individual who is ultimately not responsible for its commencement but, by default, becomes accountable for its rehabilitation. Hence they are partly justified in not taking responsibility for environmental repair which is extremely costly in the long term. Penalties should ensure ownership of the issue of environmental damage and discipline be binding on the environmental officer / consultant if issues were overlooked in the EIA.

Monitoring has the overall benefit of developing knowledge about environmental management and this is beneficial for the future identification and rating of issues. It also enables future mitigation measures to be more realistic and practical.

As there are no penalties if issues are overlooked in the EIA, it is not surprising that there is often little improvement in terms of issues identification for subsequent EIAs. There is, as a consequence, far less motivation to improve upon previous EIAs by conducting monitoring and ensure that all issues were identified and in terms of being knowledgeable about which issues to expect in subsequent EIAs.

Implementation is also the intense phase when serious impacts can unpredictably and instantly materialise. They need to be dealt with promptly if they have not been anticipated. Thus monitoring cannot be relegated during this phase to monthly site visits with the environmental officer being located at great distance from the project. The need to interpret the EMP, in an ongoing manner, during monitoring to construction staff will also suffer as a result.

The EIA, EMP and monitoring conducted by the same individual strengthens continuity and builds experience which is beneficial for subsequent EIAs. It is also far more cost effective reducing the need to educate subsequent personnel who take over the environmental function as to what has preceeded them.

Monitoring is also a key aspect which should encompass the period post implementation and should not be restricted to just the implementation phase. It is in the phase post implementation that cumulative impacts begin to emerge and it is an invaluable learning period for future reference.

## 6.11 Auditing

Auditing has to be practical and must extend into an audit of the whole process followed and not merely the consequences of project implementation. Audits should also provide feedback to enable standards to be set for subsequent EIAs. Predictions of the EIA and EMP have to, for the purpose of auditing, be measurable. EIAs and EMPs therefore have to be geared to being audited to some extent. The necessity of auditing is seldom attributed the importance it deserves, but,. as Dwight D. Eisenhower warned: "the uninspected inevitably deteriorates" (cited in Soutter and Mohr, 1993, p 22).

## 6.12 Recommendations

This study has shown that Eskom possessed the policy and procedure to have implemented the IEM guidelines but, for a number of reasons, did not achieve all the goals of Integrated Environmental Management. The company must be commended on attempting self-regulation in EIA and can benefit from the experience gained over the past decade. Change to enable integration has gradually begun to take effect. It also needs to address its shortcomings in the application of IEM principles. A previous study by Lawson (1996) provides an alternative view of the EIA process in Eskom.

The IEM guidelines themselves do not adequately address integration and what the administration of integration entails. Procedure is seldom adequately legislated. IEM, it is held, cannot be legislated but

may be regulated. In addition government and their law enforcement agencies do not have sufficient capacity, time and knowledge to adequately authorise and understand in all their diversity, new developments and exercise the necessary and concomitant policing requirements for industry. A measure of self-regulation therefore remains critical to foster integration and the advancement of the goals of IEM.

Integration, in addition to legislation, therefore requires both self-regulation and internalised guidance mechanisms within a corporation. It is recommended that this can only be achieved by outside government agencies monitoring the processes within corporates such as Eskom. Government must, in addition, be provided with the authority and knowledge to effect, and as a last resort, enforce change within company procedure and structure in order to consistently raise the level of environmental management. This affects the core of business and moves away from 'end-of-pipe' control and is focused on attaining the envisaged goal of integration. It shifts the emphasis away from the project itself and to the core of the business, although attention to individual projects is not to be discarded.

Having individuals at all tiers in the corporation accountable to and in partnership with government agencies provides access to information, review of and feedback on company procedure. This is different to the current system of merely providing the snap-shot of reporting consequences when they occur or providing an EIR at times for external review. This will also provide the information on key areas which cannot be regulated such as political will, training needs and company procedure and structure which are otherwise unlikely to change. This will utimately ensure that the environmental agenda cannot be overridden by other corporate expediencies. The environmental officer's accountability as a professionals should also ensure higher standards. In this manner a more balanced level of sustainability relevant to both the business and the political environment may be achieved. The catalyst for change still remains the individual and cannot rely solely on guidelines or a code of practice.

As applied to Eskom this would practically result in the Eskom environmentalist having both a manager within Eskom as well as one in a statutory body to whom they are accountable. This would encourage transparency and partnerships. Such an individual would be employed by a company with the foreknowledge that their function is to identify problems in administration and effectively transform corporates in order to implement guidelines such as IEM.

"The world has already been through three economic revolutions – agricultural, industrial and informatics. It is now on the threshold of a fourth: environmental" (Business Council for Sustainable Development, 1992, cited in Soutter and Mohr, 1993, p 1). The problem remains that after four decades since NEPA and the nineteenth century being acclaimed for the environmental trends it has ushered in, we in industry, have not achieved this revolution and are even repeating past mistakes. Revolution is radical and radical measures have to be employed where company reformation transpires and not the current status quo fostered by legislation. The law shows what is desired but is powerless in itself to achieve the goals of IEM – individuals and a correct procedure in companies will ensure the necessary enculcation and the fulfillment of integration and attainment of integrated development.

Perhaps a parallel must be drawn analogous to immigrants (environmental management) leaving their culture to establish overseas (industry). The first generation immigrant remains little different, isolated and independent. The second generation has less stronger ties as does the third. The fourth generation is no longer an outsider but integrated both adding to and part of a new culture. In South Africa policy and the IEM guidelines were the first generation. Legislation was the second. Both have been accused of being written by environmentalists for environmentalists (Kruger and Lucas, 1997). The third generation is an Environmental Management System and the fourth I postulate is a mixture of both self-regulation and being regulated – or will it be too little too late.

# CHAPTER 7
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## PERSONAL COMMUNICATIONS

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|---|---|
| Botha, G | Manager, Council for Geoscience |
| Graupbner, O | Chief Environmental Consultant |
| Grove, F | Eskom Geological Engineer |
| Leibbrandt, P | Transmission Environmental Representative |
| Purdon, N | Land Development Manager |
| Reck, N | Civil Engineer, African Gabions |
| Richardson, R | Transmission Negotiator |
| Rienks, S | Soil Scientist, University of Natal |
| Roberts, V | Soil Scientist, Department of Agriculture, Cedara |
| Stewart, M | Pitermaritzburg Depot Supervior |
| Timm, N | Senior Survey Technician |
| Van Rooyen, D | Customer Executive Officer Richmond |
| Van Rooyen, L | Principal Surveyor |
| Van Tonder, H | Chief Environmental Auditor |

These are personal communications used in addition to those mentioned in Chapter 3. The individuals were not interviewed for purposes of this study, however, their comments have relevance.

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