

**EVALUATION OF ENVIRONMENTAL IMPACT MANAGEMENT CONTROL FOR
LINEAR DEVELOPMENT WITH REFERENCE TO ISO 14001**

by

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OPSOMMING

Die studie is aangepak na aanleiding van probleme, om geïdentifiseerde omgewingsimpakte, tydens konstruksie van kraglyne te voorkom en beheer in die Eskom Transmissie Groep. Geïdentifiseerde moontlike impakte vind plaas nieteenstaande die beskrywing daarvan in die Omgewingsinvloedbeheerplan. 'n Moontlike rede hiervoor word gesoek in bestaande literatuur asook deur te kyk na die praktiese toepassing van omgewingsbestuur tydens konstruksie.

Die oordrag van inligting vanaf die Omgewingsimpakstudie na die Omgewingsbestuursplan vind plaas, maar die implimentering van voorstelle en bestuurspraktyke vind nie plaas nie. Moontlike redes hiervoor is die volgende :

- Gebrek aan 'n standaard vir omgewingsbestuursplanne
- Gebrekkige identifisering van omgewingsaspekte en moontlike verwante impakte
- Gebrek aan duidelike doelwitte
- Gebrek aan kennis en opleiding in omgewingsbestuur
- Gebrek aan deurlopende verbetering van standaarde
- Gebrek aan toegewydheid tot omgewingsbestuur deur die kontrakteurs
- Gebrek aan 'n doeltreffend geïmplimenteerde Omgewingsbestuurstelsel in die Transmissie Groep.

Die slotsom van die studie is dat die samestelling, opstel en implimentering van Omgewingsinvloedbestuursplanne nie sal slaag sonder die implimentering van 'n doeltreffende Omgewingsbestuurstelsel in die Transmissie Groep nie. Die bestuursplanne moet opgestel word na aanleiding van die ISO 14001 Standaard en moet 'n ekstenisie van die Standaard wees.

EXECUTIVE SUMMARY

This study resulted from difficulties in containing environmental impacts during the construction phase, as well as subsequent operation and maintenance of Transmission Lines. Impacts identified during the Environmental Impact Assessment (EIA) occurred, notwithstanding the compilation of an Environmental Impact Management Plan (EIMP), to control these impacts and proposed mitigation measures to alleviate the foreseen impacts. A possible reason for this failure is sought by investigating current literature and practise pertaining to environmental management during construction/maintenance projects in South Africa, with particular reference to Eskom.

The term Environmental Management Plan (EMP) has only been in existence since 1990 in the draft Guidelines for Integrated Environmental Management (IEM) of the Department of Environmental Affairs and Tourism (DEAT). A survey of literature in South Africa highlighted the fact that very little specific literature pertaining to linear EMP's exist. A search on the Internet also highlighted a total lack of specific literature for linear EMP's. The lack of specific standards or guidelines for the compilation of such EMP's, especially on linear developments, and only scant reference to site specific EMP's such as Environmental Management Programme Reports (EMPR's) for mining operations, is one of the major constraints identified during this study.

EIMP's within the Eskom Transmission Group are usually compiled based on the practical experience from previous developments, and regularly the same problems would arise. The continuation and forward feed of information collected during the EIA would take place, but the implementation would somehow fail. This is seen to be caused by a few major factors:

- Lack of standards for compilation of EIMP's
- Lack of identifying all environmental aspects and associated impacts
- Lack of clear objectives and targets
- Lack of environmental awareness and training

- Lack of commitment to continual improvement through review of past and existing practises
- Lack of commitment to Environmental Management on the part of the Contractor
- Lack of an EMS on the part of Eskom Transmission

The ISO 14001 Standard for Environmental Management Systems was used as the measurement tool for the compilation and implementation of an Environmental Impact Management Plan. Although only scant reference to such a plan or programme is found in the ISO 14001 documentation, the management plan or programme should be seen as an extension of the Environmental Management System (EMS). It is thus necessary to incorporate the elements of an EMS in an EMP, for such a plan or programme to succeed. These elements will then ensure that the EMP falls within the scope of the EMS of the company.

The conclusion of this study is that without a proper EMS in place, to form the framework within which to work, the compilation, aims and implementation of a Transmission EIMP would short of its intended effect. This is particularly the case within the Eskom Transmission Group, as the Eskom EMS was never really implemented in this group. The EIMP should in itself be a management system with checks and balances as well as clear objectives and measurable targets. For the purpose of construction, the objective clearly is to prevent and minimise possible negative impacts, rather than managing the environmental damage once it occurred.

The EIMP should be adequate enough to impose prevention measures pertaining to environmental damage during construction and subsequent maintenance. An inadequate EIMP inevitably leads to contractual problems and effectively negates the benefits of sound environmental planning that can be derived from the IEM process and good EIA practise. It should form part of the contractual agreement to ensure legal liability, therefore the contract should not be placed before the EIMP is completed.

Based upon this study it is recommended that the EIMP be compiled within the framework of an EMS such as ISO 14001. All the elements of the EMS should be

included in the EIMP to ensure a document which can withstand the pressures of purely development orientated thinking. The principles of integrated environmental planning should at all costs be included in the EIMP and enforced during the construction and maintenance phases of linear developments in Transmission.

The final recommendation is that for Transmission purposes, this document should be called the Environmental Management Programme (EMP), as stipulated in ISO 14001, rather than an EIMP. It should be an extension of the EMS. This would ensure environmental management throughout the life-cycle of the project. Once construction of a project is completed and maintenance starts, the EMP should still be the basis for environmental management, within the framework of the Eskom EMS. This would ensure a separate EMP for each asset, and would inevitably lead to better overall environmental management in the Transmission Group.

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Glossary of terms

Environment : The aggregate of surrounding objects, conditions and influences that influence the life and habits of man or any other organism or collection of organisms (South Africa, 1989:1481).

Ecosystem : Any self-sustaining and self-regulating community of organisms and the interaction between such organisms with one another and with their environment (South Africa, 1989:1481).

Environmental Assessment : The process of collecting, organising, analysing, interpreting and communicating data that is relevant to some decision (Department of Environmental Affairs, 1992f:4).

Integrated Environmental Management : A philosophy which prescribes a code of practise for ensuring that environmental considerations are fully integrated into all stages of the development process in order to achieve a desirable balance between conservation and development (Department of Environmental Affairs, 1992f:4).

Interested and Affected Parties : Individuals or groups concerned with an activity and its consequences (Department of Environmental Affairs, 1992f:4).

Environmental Impact : An environmental change caused by some human act (Department of Environmental Affairs, 1992f:4).

Environmental Management Programme : A programme for achieving its objectives and targets which shall include :

- designation of responsibility at all levels
- the means and timeframe by which they are to be achieved (ISO 14001, 1996:9)

Management Plan : A plan which organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of the proposed development (Department of Environmental Affairs, 1992f:4).

Mitigate : The implementation of practical measures to reduce adverse impacts or enhance beneficial impacts of an action (Department of Environmental Affairs, 1992f:5).

Monitoring : An activity that ensures that the requirements of the management plan are met (Department of Environmental Affairs, 1992f:5).

Table 1 Abbreviations and their meanings

DEAT	Department of Environmental Affairs and Tourism
EIA	Environmental Impact Assessment
EIMP	Environmental Impact Management Plan
EMP	Environmental Management Plan(pre-ISO 14001)
EMP	Environmental Management Programme (post-ISO 14001)
EMPR	Environmental Management Programme Report
EMS	Environmental Management System
FLO	Farmer Liaison Officer
HD3	Hydra-Droërivier No 3 Transmission line
IAPs	Interested and Affected Parties
IEM	Integrated Environmental Management
SA	South Africa

Chapter 1

1.1. Introduction

Increased realisation that the global environment is under enormous pressure, is creating great pressure on governments, industry and the general population to improve control over their actions. The drive for global sustainability, coupled with much needed development to ensure creation of a better life for all, is a force that exerts pressure on all countries and industrialists to take environmental concerns into consideration during development.

In most Developed countries the legislative control over development actions is strict and are vigorously implemented through permit systems. Currently this is not the case in Developing countries where the drive for development is high. As South Africa (SA) is a Developing country, the need for food and shelter overshadowed the concern for the future. For integration of environmental concerns into development, an open system of government and an informed citizenry are required, both historically lacking in SA (Fuggle and Rabie, 1992:748). Although SA had quite comprehensive legislation for the protection of the environment, the lack of specific regulations in the past and a lack of capacity to enforce legislation, caused quite a problem. This allowed developers the chance to circumvent the law and use environmentally detrimental practises. A lack of understanding of the complexities of our environment added to the problem.

The Environment Conservation Act, No. 73 of 1989 defines the environment as : "the aggregate of surrounding objects, conditions and influences that influence the life and habits of man or any other organism or collection of organisms" (South Africa, 1989:1481). This definition is the first legislative attempt in SA to define the environment (Fuggle and Rabie, 1992:99). It is also clear that this definition is open ended and provides for both the effective protection and controlled utilisation of the environment. It is however true that in SA there are many other acts which endeavour to protect certain aspects of the environment. The Environment

Conservation Act is thus not an all encompassing legislative control mechanism for the South African environment (Glazewski,1991:13).

The use of self regulation by some companies, where government intervention is lacking, has advanced to quite an extent, but the lack of environmental reporting is still hiding the detrimental effects caused by many companies. It was therefore of great importance that regulations be promulgated to ensure the application of all the good intentions captured within legislation. This is particularly true in the South African context, as the requirements of the Act were not enforced. This lack of regulations in the past has proved detrimental to the environment.

Decision-making surrounding development in the past clearly shows the lack of environmental consideration. This lack has lead to major developmental mistakes that resulted in a degraded environment in large parts of our country. One only has to compare the findings of Acocks in the first half of this century with the current status of our natural environment. The lives of millions of people were affected due to this 'not so sound' decision-making processes. Forced removals caused people to be concentrated in areas not suitable for certain agricultural practises, which then led to problems such as overgrazing which caused serious erosion. The lack of understanding of the natural environment also effected environmental damage where the wrong type of agriculture was, and is still practised.

Environmental Impact Assessment (EIA) in the planning of new major developments is currently used extensively throughout SA, mainly due to public pressure. EIA has recently become legally enforceable with the promulgation of regulations under sections 21, 26 and 28 of the Environment Conservation Act, 73 of 1989 (GN 1182 ,1183 and1184, GG 18261, 5 September 1997). Public pressure is also mounting to include the recommendations of the EIA in an Environmental Management Plan/Programme (EMP) that should form part of the contract once implementation starts. **The main problem with the EMP is the lack of a proper standard for compilation and the implementation then falls short of the intent.**

When the first EMP was prepared by Gibb Africa (Pty) Limited for roads in 1990, the term EMP had just been published in the draft Integrated Environmental Management (IEM) Procedure Guideline Documents. There was thus little information about EMP's, particularly for construction projects. The EMP were compiled according to the objectives of the guideline documents as understood at the time (Carter, 1997:9).

This early EMP was divided into three sections :

- a description of the environment and controls required (general)
- specifications containing procedures for implementing each of the controls (included in contract and legally binding)
- an education programme (compiled during course of the contract).

In SA the Department of Water Affairs and Forestry and the Department of Mineral and Energy Affairs issue permits. Some mines operate under the Environmental Management Programme Report (EMPR). This can be classified as an EMP in SA. The Department of Water Affairs also has a document with guidelines for construction of major dams. Both these documents are however concentrating on site specific projects and can not be utilised as such for purposes of linear development. Both these documents were compiled pre-ISO14001, without conformance to a specific environmental management system, and can therefore not be used as a format.

The lack of standards or regulations pertaining to EMP's is also compounding the problem. A further constraint is the lack of trained personnel for implementation of the EMP, as most contracting companies are more inclined towards the engineering side of development and lack Environmental Management Systems (EMS). The incorporation of environmental factors is still lacking, as it is perceived as a cost constraint in a country where industrial development and economic empowerment is of the utmost importance due to huge unemployment problems.

The purpose of IEM in SA is to ensure the understanding of environmental consequences of development. This necessitates the compilation of an EIA to identify and assess all the possible environmental impacts of the proposed development. This includes the monitoring and modifications that must take place during the implementation phase of a development (Fuggle and Rabie, 1992:749).

A study of the Cowichan Estuary Environmental Management Plan (CEEMP) was done by Alexander in 1992 to determine the shortcomings of the CEEMP and the reasons for failure. This CEEMP intended to provide guidance and a focal point for pursuing opportunities offered by the Estuary, and for sustaining its environmental quality for generations to come (Alexander, 1992:1). It acknowledges the presence of industry, but it aims to limit the environmental impacts of industry, to avoid losses of habitat and to rehabilitate the present degraded areas. It therefore represents a total management system rather than a short term problem solving scenario. **One of the main shortcomings pointed out by the author is the need for public participation in setting the goals and implementing the plan.**

Eskom has a group dealing with high voltage power lines, ranging from 132 000 volts to 765 000 volts, called Transmission. Within the Transmission Environmental Section, EMP's are compiled specifically to address the impacts identified during the EIA, to ensure that mitigatory measures are adhered to. They are project specific and concentrate mainly on the construction phase. It is also referred to as an Environmental Impact Management Plan (EIMP). One of the main problem areas is that an EMS has never been implemented within the Transmission Group, although Eskom has an overall EMS. It is also foreseen that Eskom will adopt the ISO 14001 Standard for EMS in the near future.

It may well be that the perception of what constitutes the environment is not seen by Transmission in the same light as described by the Environment Conservation Act, which represents the broadest sense of the word environment. There is however not a specified standard currently in use for the purpose of compiling the EIMP. The EIMP is perceived as standing on its own and does not form part of the overall EMS

of Eskom. This is particularly true of the document used in this case study as certain important omissions occurred concerning implementation, accountability, responsibility, monitoring and auditing, which are all key elements of an EMS.

1.2. Problem statement

This specific study was prompted by a concern about the applicability of EIMP's for linear developments within the Eskom Transmission Group. EIMP's are compiled and included in the contracts for construction of new Transmission lines. The EIMP's appear to have little effect in limiting, or preventing the foreseen and identified impacts.

1.3. The aims of this study

Broad aim :

The broad aim of the study is to evaluate a Transmission EIMP with reference to the ISO 14001 standard for Environmental Management Systems. The recently compiled EIMP for the Hydra-Droërivier No 3 400kV (HD3) Transmission line between De Aar and Beaufort West, currently under construction, was selected for this purpose. This document clearly lacked the key elements of an EMS as described in 2.2.

Specific aims of the study are as follows :

- 1.3.1. To determine the requirements of ISO 14001 for an EIMP or EMS.
- 1.3.2. To determine if the Transmission EIMP meets the requirements of ISO 14001.
- 1.3.3. To determine if the Transmission EIMP will meet the goals set.
- 1.3.4. To predict defaults that can occur.
- 1.3.5. To measure predictions against actual defaults through monitoring and site visits.
- 1.3.6. To give recommendations for the improvement of future Transmission EIMP's.

1.4. The structure of this study

This study is structured as follows :

- Overview of literature on EMP's.
- Determining requirements of ISO 14001 for EMP's, comparison of the Transmission document with these requirements and prediction of defaults.
- Management and monitoring of implementation of the Transmission EIMP to measure the accuracy of predictions.
- Recommendations to improve future Transmission EIMP's and to obtain better environmental management results on construction projects commissioned by Transmission.

1.5. Background to the problem

The use of environmental management plans, or programmes are advocated throughout the developed world. Environmentally aware individuals put massive pressure on developers and industrialists to ensure that management, or control of activities take place to ensure preservation of the environment. Plans and programmes which are compiled should be executed. In many instances these plans are not taken seriously and the end result does not compare at all with the intent.

Within Transmission the same problem exists. Management plans which do not fulfil the expectations of site staff, project managers and contractors are major causes of dissatisfaction on site. These plans are perceived to be a millstone by the site staff and project engineer, whilst the contractor normally complains about the extra costs it will incur in implementing the plan. From the Transmission engineering perspective, the plan is also seen as a financial constraint which will eventually increase the contract price. The long-term benefits of a well structured and implemented plan is not appreciated, which then ultimately leads to a watering down of the management plan, sometimes with far-reaching effects. The cost of maintenance is usually increased substantially, which could have been prevented had a proper plan with clear guidelines, objectives and targets been implemented.

The central theme of this study is thus to determine why perceived environmental damage can occur during construction of linear developments, even though EIMP's were compiled and are included in the contract during the planning stages. No previous study in this field has been undertaken. The feeling is that these problems occur due to a lack of continuity in the application of sound environmental management principles once the environmental assessment is concluded. There is sufficient information, but the problem lies with the application.

The word "impact" is used within Transmission for the purpose of EIMP's, because EIMP's are used to control construction activities that may have a detrimental effect on the environment. The EIMP is therefore applicable to the construction period only and has no continuation into the operation and maintenance phases of the Transmission line. It does not include all aspects of an EMS. The EIMP is drawn up based on practical experience. It includes the recommendations from the EIA and the specific requests from affected landowners. No specific standard is used to ensure that the document will incorporate all the necessary elements to make it adequate enough to ensure compliance and implementation.

Previous experience on construction projects have shown that certain activities have a detrimental effect on the environment. These activities are included in the EIMP document, which forms part of the tender documentation. The contract is awarded inclusive of the recommendations, mitigatory measures and landowner special requests. Notwithstanding all of this, most of the identified and foreseen impacts become reality during the construction phase due to an application failure. A major complaint against EIMP's is that they are not user friendly, as many of the contracting staff have scant environmental training.

1.6. The purpose of an EMP

The purpose of an EMP is to describe how a development proposal will be implemented and the subsequent control over the implementation (Fuggle and Rabie, 1992:752). It should detail the management and monitoring of all significant

negative impacts, as well as the maximising of positive impacts and rehabilitation of affected areas. An important factor to be stressed is that the EIMP is a dynamic document which can change as the development progresses. The control over construction activities can also be executed in the form of an environmental contract. The contract should list mitigatory measures as well as associated penalties and could act towards improving relations between conflicting parties (Fuggle and Rabie, 1992:752).

Other purposes of an EMP are described by Ross (1993:1) as :

- planning to be consistent with environmental policy and legislation
- day-to-day management to ensure consistency in environmental operations
- reporting plans and actions to maintain a lasting record of environmental activity
- review so that current and past practices can be assessed in the light of their effectiveness
- communication of environmental knowledge, practices and technology.

In Canada, the Ontario Hydro Electricity Utility, compiles a document with construction guidelines before construction starts. This document is then updated throughout the construction phase and all actions taken are included into the document. It culminates in an "As Constructed " document which details the management, rehabilitation and future management necessary during the operational phase of the transmission line (Brian McCormick, 1997, personal communication). Forward feed of information into the operational and maintenance phases of the development therefore takes place.

The Guideline document on IEM describes the purpose of an EMP as "how negative environmental impacts will be managed, rehabilitated or monitored and how positive impacts will be enhanced" (Department of Environmental Affairs, 1992c:17). The various mitigation measures should be organised and co-ordinated into a structured and well-formulated plan which will guide the construction, operation and decommissioning of the development. The management plan may simply deal with one mitigation aspect or may provide a comprehensive overview of the management

and monitoring requirements for the duration of the project. It should also be viewed as a dynamic document which may require updating and review during the life of the development.

Fuggle (1990:32) state that it is inevitable and desirable that infrastructural and industrial development take place in the developing countries. Procedures for inclusion of environmental management should therefore focus on management options to minimise environmental problems, rather than gathering information with the purpose of preventing development. Emphasis should be on finding solutions rather than on attempting to achieve environmentally favourable decisions. This could be achieved by implementing **impact control plans** during construction, environmental restoration after construction, operational guidelines that recognise the need for feedback from an environmental monitoring programme and ultimately plans for project decommissioning that incorporates post-project environmental rehabilitation.

Fuggle and Rabie (1992:752) state that various mitigation measures should be co-ordinated in a structured and well-formulated EMP which guides the construction, operation and eventually the decommissioning of the development. The EMP should be dynamic and may require revision or updating during the life of the development.

An effective EMP will be a document which precisely sets out both the goals and actions required in mitigation or optimisation (Department of Environmental Affairs, 1992c:18). It should include at least the following information :

- Specific goals of the management plan
- Details of management actions
- Party responsible for implementation
- Timing and duration of management actions
- Personnel, training and financial implications.

The environmental policy, aims and targets need to be cascaded into operational environmental management plans, strategies, procedures or guidelines in order to

ensure they are implemented throughout the life cycle of the development (Nel, 1995:190).

Fuggle and Rabie (1992:752) also refer to an environmental contract which may be required as a condition for approval. It is a contractual control over development where penalties for not complying with the stated conditions are stipulated. The Transmission EIMP is given to the contractor as part of the tendering documentation. The contractor is therefore well informed of the conditions under which the tender must be compiled. The main shortcoming is however the lack of penalties as well as the stipulation for environmental compliance on the part of the contractor. There is no requirement on the contractor to have an EMS in place to ensure acceptability to Transmission. **This is currently not a prerequisite in the overall Eskom Environmental Policy.**

Ontario Hydro has a standard document outlining environmental guidelines for the construction and maintenance of Transmission facilities. This is a generic document that forms part of all contracts. This document is based on the EMS of Ontario Hydro. It outlines the policy, commitment, responsibilities, decision making, general mitigation measures, project execution, monitoring and abandonment of the development. It also gives specific requirements for specific tasks related to all developments or facilities (Ontario Hydro, 1993, Rev. 3:4). This ensures implementation of the EMP under the EMS requirements.

Ontario Hydro also produces a development specific management plan which is updated as the development progresses and which is transferred to the maintenance personnel. This document is then referred to as an "As constructed Management Plan" (McCormick, 1997, personal communication). The document then acts as a "Life Cycle Management Plan".

There are four key EMS requirements that need to be fulfilled to ensure sound environmental management during construction (Hill *et al*, 1993:_) :

- **Environmental Policy** :- to judge all the activities that are to be managed so as to set a desired level of environmental performance.
- **Organisational Structure** :- to determine the responsibilities, authority, lines of communication and resources needed.
- **Environmental Management Programme (EMP)** :- to stipulate environmental objectives and targets to be met and work instructions and controls to be applied in order to achieve compliance with the environmental policy.
- **Environmental Audit** :- to measure environmental performance and the effectiveness of the EMS.

It is thus clear that the environmental management of construction projects should be treated on the level of an EMS rather than a simple plan standing alone.

Procedures for the measurement of environmental performance indicators require the setting of standards (Hill *et al*, 1993:_). The compilation of records of monitoring are necessary to ascertain any significant environmental changes. The environmental state before construction should act as the parameter against which performance is measured at all times. The need for environmental awareness training of all site staff is also highlighted by the authors. Training should be site specific to have the necessary effect. A further observation made was that in most cases the Environmental Officer charged with implementation of the EMP had no executive powers. This is also the case in Transmission with the Environmental Officer / Farmer Liaison Officer, whom has to implement the EIMP, liaise with the landowners and act as a link between the Eskom, contractor and Landowners. The person unfortunately reports to the Eskom site staff and likewise, have no executive powers.

ISO 14001 (1996:9) requires that all personnel whose work may create a significant impact on the environment, receive appropriate training. All roles and responsibilities

should be clearly defined, documented and communicated in order to facilitate effective environmental management. At the time of this study, Eskom has not yet adopted ISO 14001 as the standard for EMS in the Company.

Soutter and Möhr (1993:12) state that one of the first things that needs to be done in environmental management is to identify the key people who are responsible for the implementation of the EMP. The second most important feature is to audit the implementation to ensure compliance with policy and legal requirements and to reach the objective of safeguarding the environment.

It is thus clear that environmental management will only succeed if it takes place within the framework of a well-formulated, structured programme or plan. Management rests on pillars of planning, setting objectives and targets, defining responsibilities, communication and training. To ensure that all systems operate well, it is necessary to have regular monitoring and auditing of the management programme / plan to ensure compliance and with the view of continual improvement. In SA the IEM guidelines recommends environmental input into all stages of project development (DEAT, 1992, a-f). It is perceived that these documents are a legacy of the previous Government and the major part of the population therefore ignores it. The trend in SA is also for input to end after the EIA has been submitted. This is, however in line with the IEM guideline series in which an EMP is included as a possible step and not necessarily as a must (DEAT, 1992a:10). Very few projects have any level of input beyond the EIA, if an EIA is done at all.

The Du Toitskloof road contract can thus be seen as a pioneering effort on linear developments and a major step in the right direction (Hill Kaplan Scott Inc., 1993). The information forward feed from the EIA to the EMP took place and special training and responsibilities were given to all site staff. A system of penalties and incentives was initiated which led to commitment from all staff to fully accept responsibility for environmental management on site. The Environmental Control Officer was given certain authority to expedite the implementation of the EMP.

The Palmiet Pumped Storage Scheme, a joint Department of Water Affairs and Forestry (DWAF) and Eskom effort, had a very comprehensive EMP drawn up in 1982 by Ekokonsult Inc. This plan was seen as a very good example of an integrated construction / environmental project that could serve as an example and model for future projects. Two highly regarded environmental awards were bestowed on this effort, the merit award from the Institute of Landscape Architects (SA) in 1986 and the first Environmental Planning Professions Interdisciplinary Committee (EPPIC) National Premium Award in 1988. This however did not ensure a continuation of the good practice in the following years within Eskom.

Transmission has compiled EIMP's for Transmission lines since the 1990's as part of fulfilment of the Eskom Environmental Policy (ESKBAAD6), but these were done in house and did not have any public involvement, other than the affected landowners. These plans had many shortcomings and a concerted effort has been made to improve them over the years. A major shortcoming, however, has been the lack of input from external parties and guidelines for compilation.

The purpose of the EIMP in Transmission is to ensure that the construction activities which may have a detrimental effect on the environment are controlled and minimised. The EIMP is drawn up based on the recommendations of the EIA and the special conditions as set by the landowners affected by the transmission line. The EIMP is included as part of the tender documents for a new project so that the prospective contractors are informed of the environmental requirements, over and above the normal legislative requirements, that they have to adhere to. The aim is to ensure minimal disruption and damage to the environment during the construction phase, therefore the contractor will know if they have to allow for special construction methods. No forward feed to the operation and maintenance phases of the development is allowed for currently, as the EIMP is applicable to the construction period only.

Personal experience with such projects has shown that although the EIA's for all Transmission line projects included a fair amount of public participation (HD3 EIMP

included), this public input ended before the EIMP was compiled. The appointment of an officer to implement the EIMP also did not have priority in all instances. Until the present moment it is still a problem to get properly qualified people to attend to the implementation of the EIMP's.

To be really effective, measurable, achievable and cost-effective operational targets must be set. It is also important to ensure that operational levels have full ownership of these targets, although the process can be driven from higher levels. It is very important to realise that no programme / plan is hard and fast, it is always subject to change. The implementation would only succeed if proper training and properly trained personnel are provided. It is also very clear that an EIMP lacks these elements, and should be far more comprehensive and adaptable to include the operational and maintenance phases of a project.

Chapter 2

2.1. ISO 14001 Standard review

ISO 14001 : Environmental Management Systems – Specification with guidance for use, is an international standard accepted and approved by the President of the South African Bureau of Standards on 14 October 1996. It has been compiled over the preceding three years with inputs from major role players across the Globe. This standard will probably be endorsed by most Countries in their Environmental Policy making. It is envisaged that most companies that would want to compete on overseas markets, would eventually adhere to and incorporate the elements of this EMS standard in their day to day operations.

The contents of the ISO 14001 Standard covers all aspects of an EMS that would ensure compliance to Environmental Legislation and Policy, no matter which country or company it is implemented in. **It is based on the principle of continual improvement and therefore culminates in a review process to ensure that identified problems are corrected.** The whole idea is to always try and improve on previous shortcomings, with the view to continually improve performance in the environmental field. Sustainability principles, as adopted at the Rio Summit, plays a major role in the implementation of this EMS.

Some of the main parts of ISO 14001 deals with planning, implementation and operation, checking and corrective action and review. The pillars of the EMS are goal setting, documentation and control, training and awareness as well as monitoring and measurement. All these actions are driven by the Environmental Policy, which in turn is driven by Environmental Legislation and Regulations. Although only scant reference to an environmental management plan is made, it is clear that some form of management programme needs to be compiled as part of the EMS, against which to measure performance. No specific mention is made to project phases, as this standard is more focused on implementation of an EMS on the total operation of a company and life cycle of projects.

The simple review of environmental performance may not be sufficient to ensure that legal and policy requirements are continually met. It is therefore very necessary to review all aspects and possible impacts of a company or project against a structured management system or management plan to ensure continual meeting and exceeding of policy and legislative requirements (ISO 14001 , 1996:4). The aim is to integrate environmental management with the day-to-day management of actions, so that environmental and economic goals are achieved.

2.2. Elements of the ISO 14001 Standard

The following elements are clearly defined in the ISO 14001 standard as the basic elements needed for implementation of an EMS. These elements are only listed here and not discussed in detail. Some detail will be included in the section describing the predicted defaults that may occur when implementing the Transmission EIMP.

Elements

⇒ Environmental policy which guides the whole process

⇒ Planning which includes :

- *Identification of environmental aspects*
- *Identification of legal requirements*
- *Objectives and targets*
- *Environmental management programme*

⇒ Implementation and operation which includes :

- *Structure and responsibility*
- *Training, awareness and competence*
- *Communication*
- *Documentation about the system*
- *Document control*
- *Operational control*
- *Emergency preparedness and response*

⇒ **Checking and corrective action which includes :**

- *Monitoring and measurement*
- *Non-conformance and corrective and preventative action*
- *Records*
- *Environmental management system / plan audit*

⇒ **Review with the aim of continual improvement.**

The above elements encompass all possible actions necessary to ensure that environmental requirements are achieved at all levels of operation. It can therefore be assumed that if all these elements are included in an EIMP, and the EIMP is seen as an all inclusive management system rather than a simple plan for construction purposes, the plan should achieve its objective of optimising environmental management. The environmental management programme mentioned above is the only reference to an “EMP”. **What can be clearly seen, is that it forms part of the overall EMS!**

2.3. Contents of the EIMP document used in the case study

The HD3 EIMP document is a typical example of EIMP's as currently drawn up by the Land Survey and Environmental sections of Transmission for major new projects, specifically Transmission lines.

The EIMP for the HD 3 400 kV (400 000 volts) Transmission line consists of three major parts:

- The first part is a generic document containing general information and guidelines for the contractor (See appendix A).
- The second part contains the spanning sheets (profiles) showing the different tower positions with reference to specific aspects and impacts identified at and between tower sites. Only an extract of profiles is included for information purposes, as the full document comprises 18 profiles. An index of environmental

issues covered by the EIMP, and as portrayed on the profiles is included here (See appendix B).

- The third part is the landowner special requests (See appendix C).

The generic part of the document, included in appendix A, is based on experience from previously constructed Transmission lines. No public participation is used to determine the contents of the document and therefore only experience is included. The document concentrates mostly on the generally expected impacts, plus those identified during the EIA, and do not give any details towards prevention or mitigation of the possible aspects and impacts of the contractor's construction activities. Most of the contents are also found in the Transmission specification for construction (TRMSCAAC1, rev2, 1995), and is therefore a duplication of contractual agreements with the contractor.

The document seriously lacks specific recommendations for mitigation of possible environmental impacts that have been identified. This is due to the document being drawn up at the tender stage of the project and it therefore only gives broad and general guidelines towards environmental management. There is no indication that the document will be updated and improved upon at a later stage, when impacts become apparent. It is therefore far short of a living document that will change over time. The essence of environmental management, namely the adaptability to situations (because there are no clear answers beforehand), is therefore lost completely.

The implementation of the EIMP is likely to fail due to the lack of many elements of an EMS. The document is standing alone and is not really coupled to the overall environmental management system, which is also not implemented within the Transmission Group. Its validity is contained to the length of the construction project and does not extend beyond that in any way. It is therefore anticipated that many defaults with regard to implementation will occur and that the document will fail in its goal, namely Environmental Impact Management.

The next section will depict the shortfalls of the HD3 EIMP when compared to ISO 14001, a standard for EMS.

2.4. Evaluation of the HD3 EIMP compared to ISO 14001

One of the first observations, that can be made studying the contents of the HD3 EIMP, is that it is not structured to enhance understanding and implementation of environmental issues and management. It lacks most of the components of a management system as defined by ISO 14001, in the sense that some of the elements are included, but the importance of these elements is watered down due to a lack of vision during compilation.

Some of the main problems identified are the following :

- No reference is made to the contractors Environmental Policy. As a matter of fact there is no requirement from Transmission on the contractor to produce an Environmental Policy or Statement.
- All environmental aspects and associated impacts of the contractor activities are not clearly identified and therefore are not addressed. This may be due to a narrow perception of the term “environment” and the lack of an EMS in Transmission.
- All legal requirements are not fully identified and are therefore not represented in the EIMP.
- There are no environmental performance criteria set out for the project.
- There are no clear environmental objectives and targets set out for the project.
- There are no criteria to ensure environmental capability and competence of the personnel that must implement the EIMP.
- There is scant reference to accountability and responsibility for the implementation of the EIMP.
- There is no reference to, or process of ensuring environmental awareness and training for the appropriate personnel on site.
- There is scant reference to documentation control and record keeping.

- There is no reference to communication and reporting, as well as the channels for communication.
- There is no reference to emergency preparedness and response.
- There is no reference to monitoring and auditing other than stating the monitoring functions of the Farmer Liaison Officer, and these are very broad at best.
- There is no reference to review with the intent of continual improvement - mitigatory actions will therefore stay the same whether they achieve their objectives or not.

The HD3 EIMP therefore falls far short of compliance to any form of environmental management system, especially the ISO 14001 Standard against which it is measured. This may not effect total destruction or degradation of the environment traversed by the Transmission line, but it will surely cause certain defaults (as discussed in Chapter 3) to arise. Due to the lack of standards during compilation and the many shortcomings as pointed out, it can thus be predicted that defaults will occur that could have been prevented, had all aspects of an environmental management system been incorporated in the compilation of the EIMP.

Defaults have economic and environmental implications which could affect the life cycle of the project. Defaults may lead to delays in operations and legal and policy contravention's during construction. It may also result in unnecessary claims for damages against Transmission and the contractor. The goodwill of the landowners is at stake as they are the people who suffer most during the construction phase. By causing damage to private property, the chances of future co-operation is limited, and the customer relations that Transmission relies on is damaged and in some cases irreversibly.

Certain defaults may only become apparent in the operational and maintenance phases of the project. The environmental and economic implications of these defaults can unfortunately only be determined in the long-term, once the Transmission line is in operation for a few years. This normally happens when the maintenance of the servitude makes it a liability, rather than an asset.

Chapter 3

Defaults predicted due to limitations of the HD3 EIMP

3.1. General requirements

As discussed in paragraph 2.4, certain problems and defaults can be predicted due to the shortcomings identified in the HD3 EIMP. These defaults will be discussed under headings based on the elements of the ISO 14001 Standard. There is no requirement on the contractor to implement an EMS. The lack of implementing the Eskom EMS in Transmission may also lead to defaults.

3.2. Environmental policy which guides the whole process

Reference is made to the Eskom Environmental Policy, but the implications of the policy is not discussed at all. The policy is also not implemented fully within the Transmission Group. There is also no requirement on the contractor to produce an EMS or Environmental Policy Statement for that matter. The contractor is therefore not bound by any written statement outlining its stance towards environmental management and performance. The contractor is just required to accept and sign the EIMP as prepared by Transmission, and to provide for implementation of the recommendations and mitigatory measures in the EIMP during tendering.

To keep their tenders competitive, the requirements of the EIMP are not always included by all contractors and the implementation therefore fails dismally. This situation is unacceptable, as Eskom is publicly stating its commitment to sound environmental practises, but allows its contractors and Suppliers to operate without the same type of commitment.

No commitment from the contractor is sought in writing other than signing the contract documents. The commitment to sound environmental practise is therefore

lacking on the part of the contractor, due to a lack of an implemented EMS or written Environmental Policy statement.

It is therefore predicted that unnecessary environmental problems, which could have been avoided through stated commitment to environmental management, may arise on the project. Typically this may result in bad relations with some landowners and damage to the company image of sound environmental management practises, which are publicly stated in the Eskom Annual Environmental Report.

3.3. Planning

3.3.1. Identification of environmental aspects and impacts

No procedure to identify possible environmental aspects of activities or services which may significantly impact on the environment is required from the contractor. Those aspects and impacts identified during the EIA are discussed in general terms and not enough detail is given. The mitigatory measures are given only in general terms, which places the onus on the Transmission site staff and the contractor to implement measures, who do not have the ability.

One of the major setbacks in this regard is that the contractor does the minimum to comply with the general terms given to him, and therefore gets off the hook because he fulfilled his contractual agreements. Common problems that arise from this lack of procedure and environmental aspect identification, are the subsequent degradation of the environment within two to three years after completion of the contract.

Defaults predicted under this category are the degradation of the servitude area, invasion of the servitude by alien vegetation, soil erosion through wind and water action due to channelling of water and loss of topsoil on areas bared by construction activities. Damage to private roads may occur with subsequent bad relations with the affected landowners.

3.3.2. Identification of legal requirements

All legal requirements are not clearly identified and stipulated in the EIMP. The contractor may therefore not be aware of possible legal transgressions and Eskom has to accept responsibility for the actions of the contractor.

Defaults predicted are the damage to natural resources such as veld and topsoil, fences and district roads during construction, pollution of water and land and the possibility of health transgressions by the contractor where proper sanitation is not provided for on construction sites.

3.3.3. Objectives and targets

Clear objectives and measurable targets for all levels of operation during construction are not stated in the EIMP. The objectives and targets are given in general terms as stated in the Eskom Environmental Management Policy. The contractor is requested to minimise environmental damage, but no specific recommendations and guidelines are provided. The recommendations are also not enforced and the contractor normally does business as usual. Legal transgressions may easily occur due to a lack of knowledge and commitment on the part of the contractor.

Recommendations for improved or different construction methods are ignored. Contractors usually state that their methods of construction are tried and tested, and to deviate from existing methods is time consuming and unnecessarily expensive. Only in severe cases is the use of alternative methods of construction allowed. The main problem here is that the person compiling the EIMP does not necessarily communicate with the people responsible to implement the EIMP. There may also be a lack of understanding of the complexities of the construction process.

The construction of unnecessary access roads, wrongly constructed access roads, lack of erosion prevention measures and subsequent damage to fragile topsoil,

siltation of streams and the destruction of habitat of species such as the riverine rabbit, a red data species, may occur. In the area where the present study is conducted damage of such a nature is in many cases irreversible and result in long-term implications on bio-diversity.

3.3.4. *Environmental management programme*

No clear programme for achieving objectives and targets is set out in the EIMP. The EIMP does not designate responsibility for achieving objectives and targets at all levels of operation during the construction phase. There is also no reference to means and time-frame for achieving objectives and targets.

The EIMP is a guideline document which lacks the elements of an EMS, therefore a true management programme is lacking. The implementation is low-key and no special measures are taken to ensure compliance to environmental management legislation and principles. Construction damage is not seen as having long-term consequences and therefore no special effort is made to limit damage. It is perceived that damage will rectify itself over time and the environmental conditions of the area, where construction takes place, is not really taken into consideration. There is a total lack of long-term vision with regard to what will happen in future once construction is completed. Rehabilitation and mitigation measures are restricted due to this lack of vision.

Predicted impacts include the long-term degradation of the servitude, with subsequent erosion and denuding of the servitude, loss of topsoil and plant cover. The bio-diversity of the area is compromised with subsequent loss of species and habitat. No measurement of performance will take place, therefore there is no scope for improvement on future projects.

3.4. Implementation and operation which includes :

3.4.1. Structure and responsibility

No operational structure nor responsibility matrix is set out for the project. Roles, accountability, responsibility and authority are not clearly defined. The EIMP relies on good faith for implementation and no specific resources are provided to ensure implementation of the EIMP. The contractor is not required or forced to employ a skilled resource or to supply other necessary measures to implement the EIMP.

Defaults predicted are the following :

- No person takes real responsibility for implementation of the EIMP because no authority is given to any person.
- No person will take accountability for not implementing the EIMP.
- Problems will not be reported and thus mitigation or rectifying acts may take much longer to accomplish.
- The total effect of having an EIMP will be watered down to just another document on site that people must know about.
- The enforcement of measures included in the EIMP do not take place due to a lack of authority and accountability of the site staff.

3.4.2. Training, awareness and competence

No reference is made to training needed to ensure that implementation of the EIMP takes place. No procedures are prescribed to make all employees aware of the importance of conforming to environmental standards, procedures or recommendations. The contractor's awareness of significant environmental impacts relating to his operations and actions, is not tested nor enhanced in any way through training. The contractor has no obligation to produce a statement of intent or competence with regard to environmental performance or competence or liability to employ a qualified person to implement the recommendations of the EIMP. No reference is made towards the contractor's liability, role and responsibilities under

legislation to implement an EMS or ensure environmental compliance in their day to day activities.

Defaults that may arise due to the lack of training, awareness and competency are a lack of a co-ordinated effort to preserve the environment, construction actions and methods that will cause environmental degradation, non-compliance to legislation and the Eskom Environmental Policy, mitigation actions ignored and rehabilitation not done to specifications. Long-term environmental problems can arise due to this oversight and the operation and especially the maintenance of the servitude can become very costly in the long term.

3.4.3. Communication

No specific channels of communication are referred to in the EIMP. The procedures for communication between the different levels of the site organisation are not clearly outlined. The documenting and responding to communications from external parties is also not clearly defined and prescribed. Communication takes place on an ad hoc basis and formal site meetings are normally held only once a month. The communication is usually also restricted to the site staff internally and only when real problems surface will other channels be used. There is also no formal communication with the contractor, on a regular basis, pertaining to the implementation of the EIMP. The contractor has to read the EIMP and implement the recommendations on his own, rather than be informed regularly of his contractual obligations with regard to the EIMP. Communication with landowners is kept to a minimum and only deemed necessary when the landowner approaches one of the site staff with a complaint. The sharing of information is not formally prescribed.

Defaults that may arise include the delay in rectifying problems, environmental damage that occurs due to a lack of awareness, rehabilitation that is not done to specification and the subsequent breakdown of good relations with the landowner. Unnecessary claims for damage, that could have been prevented, can occur and it may even lead to delays in the project.

3.4.4. Environmental management system documentation

There is scant reference to documentation that must be completed and records to be kept on site describing the core elements of the management system. There is also no reference to availability of the necessary documentation should such documentation be required. The lack of an EMS on the part of the contractor will mean that no Environmental Management Manual is available to guide the process of management. This is also the case with Eskom where the document is available, but not on site, as it is not deemed standard site equipment. The direct referencing to such document is thus not possible and defaults can arise. The lack of an implemented EMS in Transmission directly contributes to this problem.

Defaults that can be predicted are the following :

- Decision-making at the wrong levels.
- Lack of knowledge about procedures, e.g. the cleaning of oil spills.
- Lack of knowledge about specialists available should certain problems arise.
- The use of the wrong methods to rectify problems.
- Legislative, policy and procedural transgressions without knowledge about transgressions.
- Non-compliance to the contractual agreements which include the EIMP.

3.4.5. Document control

No formal system of document control pertaining to environmental documents is prescribed. The location of documents is not ensured. There is no reference to the availability of all current and relevant documentation at all locations where operations are carried out. The issuing of documents is not controlled and therefore the documents may be with the wrong people and implementation of environmental measures can be hampered. Since the EIMP forms part of the contract documents, it should be available at all times.

Defaults predicted are that the implementation of the EIMP will not be forthcoming if the document is not available to the person responsible for implementation. The document will not be kept safe and parts or all of it may be lost. Implementation of all recommendations may be hampered and any changes to the document may not be passed on to the responsible person.

3.4.6. Operational control

There is no reference in the EIMP to operational control measures needed by the contractor to ensure that activities with significant environmental aspects and related impacts are planned according to specified conditions.

Defaults that may occur include the lack of procedures for covering situations that can arise in the absence of staff, no standard operating criteria and a lack of procedures related to significant environmental aspects and impacts. This may lead to the wrong decisions as well as no commitment to try and prevent or overcome significant impacts.

3.4.7. Emergency preparedness and response

There are no references within the EIMP to emergency response procedures and the measures needed to prevent or mitigate environmental impacts should they occur.

Defaults that can arise include veld fires and oil spills, with a resultant lack in ability to contain or prevent damage and measures to restore the damage that occurred.

3.5. Checking and corrective action which includes :

3.5.1. Monitoring and measurement

Although the site staff are expected to monitor the implementation of the EIMP and are doing so, there is a lack of formal procedures in the EIMP for monitoring and

measurement with regard to the implementation of the EIMP. The measurement is also curtailed by the fact that little or no clear and measurable objectives and targets are given in the EIMP. The lack of specific mitigatory measures and rehabilitation plans, as well as the lack of reference to future plans once construction is underway, seriously compounds this problem.

Due to the above elements a clear way of monitoring and measurement of the success of implementation of the EIMP and mitigatory measures as well as rehabilitation is not possible. The amount of environmental damage can not be measured and no standards can be set for future projects.

3.5.2. Non-conformance and corrective and preventative action

Although some measures for corrective and preventative action are given in the EIMP, the lack of measurable objectives and targets, makes this a futile exercise. No reference is made to any non-conformance pertaining to environmental objectives and targets. This is only found with regard to the contractual responsibilities of the contractor. Non-conformance is usually associated with the physical foundations and structures that are installed. Due to the lack of a standard for performance in environmental matters, there is little chance that a non-conformance will be issued against the contractor.

This may lead to unnecessary damage to the natural environment and can cause many long-term problems, both physically as well as socially. The overall environmental performance can thus be diminished and the company image severely compromised. It may also lead to legislative and policy contravention's.

3.5.3. Records

There is only scant reference to the keeping of records on environmental matters. No specific procedure for record keeping is prescribed and no reference is made to the availability of records for inspection and review. There is also no reference to what

should happen to these records once the contract is completed as well as the time for which they have to be stored or kept available. Because the EIMP is concerned with the construction period only, no forward feed to the operational and maintenance people is foreseen.

Defaults predicted are a lack of record keeping, keeping of records in an uncontrolled fashion, lost records and no forward feed of information. The maintenance personnel would not know what mitigation or rehabilitation was done and would therefore not be able to measure the effectiveness of these measures taken. Auditing of the project upon completion, to see if the EIMP was implemented, would be very difficult. The process of continual improvement would therefore be hampered severely.

3.5.4. Environmental management system / plan audit

Auditing can only be done if there are set procedures, standards and records. The lack of these in the EIMP, would thus make auditing difficult. Only the physical appearance of the project can be audited. The EIMP also lacks provision for audits during and after completion of the project.

There would therefore be no chance to measure conformance with the EIMP with regard to the implementation of the EIMP as well as the success of implementation.

3.6. Review with the aim of continual improvement.

Due to all the above predicted defaults, it may be very difficult to review the EIMP and its implementation to determine shortcomings and eventual possibilities for improvements. The process of continual improvement in the compilation and implementing of EIMP's is thus inadequate. The implementation of environmental management would therefore be severely impeded and the company environmental management policy and objectives may not be met.

Chapter 4

Measurement and discussion of predicted defaults

4.1. General

The monitoring of site activities and implementation of the HD3 EIMP was entrusted to the Farmer Liaison Officer (FLO). The FLO was not given any executive authority and powers and had to report to the Eskom site manager. The FLO had two main tasks, (1) to oversee the installation of a 22kV rural line to supply the affected landowners with electricity and (2) to monitor environmental management and liaise between Eskom, the contractor and the landowner (Implementing the EIMP). Task one is perceived to be the main task with task two seen as secondary. The FLO had no training in environmental management as well as on the implementation of the EIMP. It is thus concluded that his appointment only had face value with regard to environmental management, with a much bigger emphasis on liaison with the landowners.

The FLO reported to the Eskom site officer, attended site meetings where he could give inputs in the construction process and gave two-weekly reports to the Eskom negotiator responsible for the project. A copy of the latter reports was used as reference for this study.

4.2. Actual defaults as measured on this project

The site works were relatively streamlined and no major environmental transgressions occurred. Upon completion of the project the servitude seemed to be in excellent condition, possibly due to good rains experienced in the area. Rehabilitation of barren areas were happening as natural veld returned and covered the areas left barren by construction activities. No special rehabilitation was done on site, except to roads. The landowners were reasonably satisfied with the outcome of the project, although some has experienced problems during the construction phase.

Defaults that were measured and encountered whilst monitoring and auditing the implementation of the EIMP will be discussed under the following headings :

4.2.1. Policy issues

4.2.2. Planning issues

4.2.3. Implementation and operational issues

4.2.3. Checking and corrective action issues

4.2.5. Continual improvement issues

4.2.1. Policy issues

The contractor has no EMS, that is relevant to its activities, in place. There is no measure of the values and guiding principles that drives the organisation environmentally.

Defaults found on this project :

- Lack of an implemented EMS for Transmission.
- Lack of an EMS for the contractor.
- There is no person on site with the authority to implement environmental management on behalf of Transmission or the contractor.
- The lack of an EMS leads to a lack of clear environmental objectives and targets being set for the project.
- A lack of commitment to environmental management on behalf of the Transmission and the contractor.

The implementation of the EIMP is thus not policy driven. The problem is compounded by the fact that Transmission has also not implemented an EMS. The main focus of the project lies in engineering and completion of the contract within time and budgetary constraints. A serious lack with regard to continual improvement therefore exists on the part of the Transmission and the contractor.

4.2.2. Planning issues

There is **no clear identification of all environmental aspects** of the contractor's activities. Those identified are discussed in general in the EIMP, but the contractor has no idea about the impacts of his activities on the environment. The contractor is also not party to drawing up the EIMP, and thus feels that unfair constraints are imposed. Due to a lack of planning for unknown factors, the frequency of defaults arising are high and the same defaults re-occur often.

Some defaults that occurred on this project are the following :

- Timing of operations not planned with the landowners and taking seasonal changes into consideration.
- Claims for grazing when animals have to be moved from areas where construction activities take place.
- Interference with normal farming activities of the landowners, due to them not being involved in compiling or reviewing the management plan before implementation.
- Harassment of construction workers by wild animals, such as ostriches, encountered while construction takes place, with subsequent death of the ostrich and a claim being instituted against Eskom.

Legal and policy requirements are not identified in detail in the EIMP. There is no system to ensure that changes in legal and policy requirements are forwarded to the contractor and other site staff, including Transmission staff. The contractor is therefore not informed of all legal and policy requirements and Transmission will have to accept the responsibility of transgressions.

Defaults found on this project :

- The relevant environmental legislation, policy and procedure documents are not available on site.
- No Environmental Management Manual on site with all relevant documentation.

The site staff are therefore not aware of the requirements that are applicable to the environmental aspects of their activities on site.

No clear objectives and targets, with regard to environmental management and performance, are stipulated in the EIMP. A total lack of commitment to attain objectives and targets therefore exists on site. No measurement of performance can take place due to the lack of clear objectives, targets and specific measurable indicators of environmental performance. There is no scope for improvement of performance in the environmental field.

Defaults identified on this project :

- No clear objectives and targets for environmental management.
- No understanding of importance of conformance to environmental management principles.

There is **no clear programme** for implementation of the EIMP and achieving of environmental objectives and targets, mainly due to the lack of the latter two. No designation of responsibility for all levels of the organisation on site to achieve environmental objectives and targets, as well as a lack of a time frame for achievement, exists. There is no scope to change the programme to incorporate changes in activities. Existing practises are also implemented although they may have failed in the past.

Defaults identified on this project :

- No formal structure for implementation of the EIMP.
- All levels of staff on the project not included in the implementation of the EIMP.
- No formal programme of informing all levels of staff of the contents of the EIMP.
- No formal programme to discuss implementation of measures on site specific areas. All actions take place on an ad hoc basis.

4.2.3. Implementation and operational issues

There is a **lack of clear definition of roles, responsibilities and authority** on site for the implementation of environmental management. Because these are not documented and communicated, situations arise where people do what they think is necessary, and not necessarily the right things. All the necessary resources are not available for implementation of the project.

Defaults identified on this project :

- Lack of the right equipment for construction of access roads.
- Lack of a documented procedure for implementation of environmental management.
- There is no person on site, with the clear responsibility and authority to implement the EIMP on behalf of the contractor, that has the necessary competence.

The **training needs** for site staff were not identified. There is no procedure for making all staff aware of their possible significant impact on the environment. The environmental policy requirements are not communicated to all staff. The potential consequences of actions deviating from standard procedures are not known to all staff at all levels. There is no indication that all staff are competent to perform the tasks they have to perform.

Defaults identified on this project :

- Due to a lack of training, staff with the necessary competency to implement the EIMP is lacking on site.
- Certain activities that require a high level of skill and knowledge, e. g. the construction of proper access roads, are left to unskilled people.
- The total workforce received no training concerning environmental matters and the implementation of the EIMP, therefore all levels of staff are not informed about the importance of conforming to environmental requirements.
- All levels of staff are not aware of the actual or potential significant environmental impacts of their activities.

- All levels of staff are not aware of their responsibilities in achieving conformance to environmental requirements, thus it is left to one or two people to implement the EIMP.
- Only some people are aware of the consequences of departing from specified procedures.

There is thus a significant lack of competence with regard to implementation of environmental management on site.

Defaults that occurred on this project due to failure to proper planning are the following :

- Construction equipment got bogged down during heavy rains.
- Damage to topsoil and natural veld after rains when the contractor returns to site too soon.
- Rutting of the servitude road with subsequent channelling of water.
- Blading of access roads where not necessary with resultant claims for damages from the landowner.
- Excess access created where the contractor takes shortcuts.
- Lack of sufficient erosion control measures resulting in access roads being washed away.
- Spillage of concrete on the servitude when trucks got washed on site.
- Littering with domestic waste due to a lack of refuse bins and subsequent removal of domestic waste from site on a daily basis.
- Poor sanitation due to a lack of sufficient toilet facilities on site, especially along the servitude route. Sanitation facilities were supplied at the construction camp only.
- Animals getting lost or mixed up due to gates being left open.
- Rehabilitation and mitigation measures are not implemented immediately, therefore the time delay compound the damage and problems.
- contractor doing the absolute minimum to comply with specifications, with poor results.

Clear lines of **communication** on environmental matters were not identified for this project. All levels of the organisation are not involved through communication and a clear procedure for communication is not known to all levels of the organisation on site.

Default identified :

- Lack of awareness concerning the implementation of environmental management in general and the EIMP in particular.

Documentation, document control and operational control procedure documents are seriously lacking on site. There is no EMS in place for the contractor therefore no related documentation is available on site. No Eskom documentation nor Transmission documentation, other than the EIMP, are available on site. The implementation of environmental management is therefore seriously impeded. There is also no system for document control to ensure that relevant environmental documents are available on site at all times. Documented procedures for control over activities other than the EIMP are not available on site. Situations not covered in the EIMP will therefore be treated on an ad hoc basis. The only documentation on site are a few Eskom documents regarding site activities that should be completed. The documents concerning environmental matters are not completed nor kept up to date.

Defaults identified on this project :

- Scant formal documentation of environmental problems, the way in which they were solved, and actions taken are found on site.
- No records of rehabilitation measures available for future reference.

There is **no formal system for emergency preparedness and response** with regard to environmental impacts on site. Problems are treated on an ad hoc basis and reaction is not always immediate.

4.2.4. Checking and corrective action issues

There is **no formal, documented procedure for monitoring and measurement** of the implementation of the EIMP on site. Monitoring of site operations takes place on an ad hoc basis and problems are addressed as they arise. This task is entrusted to the Farmer Liaison Officer, and other site staff are not actively involved. Because of the lack of clear objectives and targets, measurement of environmental performance is difficult. This is compounded by the lack of record keeping.

The contractor is held responsible for implementation of mitigation and rehabilitation measures. This process is delayed as the contractor does not show commitment to conditions stipulated. This normally results in unnecessary strained relations on site. This problem has its origin in the lack of an EMS on the part of the contractor.

No **non-conformances** were identified and issued on this project. The general environmental performance on site were of such a nature that it was not necessary to prohibit any site operations. The overall impression, after completion of the project, is that excessive damage was prevented in most cases. A few exceptions are found in areas where the contractor moved back on site after heavy rains and caused excessive damage to the servitude road. The servitude is in a reasonable state of repair and rehabilitation should take place through natural processes. Landowners are prepared, in many cases, to repair the damage on their own farms. This practise is quite acceptable because they know the specific conditions of their land.

One main problem experienced on the project is the time delay in implementing rehabilitation measures. This may cause damage to reach a stage where rehabilitation is very difficult or even impossible to implement. The costs of rehabilitation then soars quite dramatically during the operational phase of the project, when maintenance may be necessary to ensure the servitude is kept in a good state of repair. Some problems such as erosion on the servitude access road may only occur in the long-term, due to natural weathering of the site works and

implemented rehabilitation and mitigation measures. The effectiveness of these measures is however not measurable due to a lack of record keeping.

No formal **procedure for record keeping** was in place for this project. There was no **formal system for audits** against the implementation of the EIMP and general environmental performance of the contractor, other than the studies for the purpose of this document.

4.2.5. Continual improvement issues

No formal procedure was set up for the **review** of the effectiveness of the EIMP and its implementation, therefore the problems experienced with this EIMP may re-occur on the next project.

Chapter 5

Conclusion and recommendations

5.1. Conclusion

The objectives and aims set at the beginning of this study were fulfilled. The Transmission EIMP was reviewed with reference to the ISO 14001 Standard for environmental management systems. Defaults in the document and its implementation were clearly identified and discussed. The conclusion is that current practises, with regard to the compilation and implementation of the EIMP, are unacceptable - although the actual construction work was acceptable.

The implementation of the EIMP fell short of the original intent. The lack of an EMS on the part of the contractor and the lack of an implemented EMS on the part of Transmission, are probably the main reasons for failure. The commitment to sound environmental practises is written on paper only. The EIMP has no standard for compilation that links it to the overall EMS of Eskom. Major shortcomings in this regard has been identified in this study.

The major defaults identified with regard to the EIMP document structure and implementation can be ascribed to the lack of structure and conformance to any standard. The document is not an extension of the EMS and therefore stands on its own. The responsibility, authority and competence needed to implement the EIMP, were not clearly stated, therefore the implementation failed. There was a total lack of environmental awareness and training on site. The EIMP does not prescribe any clear objectives and targets with regard to environmental management, therefore monitoring and measurement of performance can not be done. The document and its implementation can not be reviewed for the purpose of improvement.

The conclusion is that the EIMP, as currently compiled and used during construction, is not acceptable. As long as the EIMP focuses on the construction period only and

not feed forward into the operational and maintenance phases of the project, it will keep on failing to produce the required results. The EIMP does not in any sense give the impression of an EMS that is operational and functioning well.

5.2. Recommendations

5.2.1. General recommendations

The EIMP should form part of the overall environmental management system of the organisation. It should be an extension of the EMS and have input from all interested and affected parties during its compilation. The necessary responsibility and authority for the implementation of and EIMP should be formally given to the people involved in the project. General environmental awareness training should form part of the implementation of all EIMP's, to ensure that all understand the importance of conforming to environmental requirements. Commitment to this process must come from all levels involved in the implementation of the EIMP. The term EIMP should be replaced by the term Environmental Management Programme (EMP) as stipulated in ISO 14001. The EMP should fall within the framework of the total EMS.

5.2.2. Specific recommendations

- Transmission should implement an Environmental Management System as soon as possible to form the framework for implementation of environmental management on new projects and existing assets.
- ISO 14001 Standard for environmental management systems should be implemented within Transmission due to its simplicity, but at the same time completeness, in covering all aspects of the business.
- Transmission should put pressure on their prospective contractors to implement their own Environmental Management Systems, so as to comply with the Eskom Environmental Policy.

- Environmental Management Programmes should be compiled within the framework of ISO 14001 to ensure their link to a formal system of environmental management.
- The Environmental Management Programme should be seen as a living document that changes over time, even within a specific project.
- The implementation of the EMP should be audited and reviewed formally on all projects to ensure that forward feed, into the operational and maintenance phases, takes place.
- The implementation of environmental management on projects should be reviewed constantly to ensure continual improvement in practises and processes.

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APPENDIX A

GENERIC EIMP DOCUMENT

TRANSMISSION LAND SURVEY DEPARTMENT



ENVIRONMENTAL IMPACT MANAGEMENT PLAN

HYDRA DROËRIVIER 400kV TRANSMISSION LINE

INITIATED BY: PETER MOIR

COMPILED BY: P S A STEENKAMP AND J P ENGELKE
LAND SURVEY SECTION
MEGAWATT PARK

The following persons are thanked for the time and effort they put into this project making it possible.

Graeme Paterson	Civil Engineering specifications
Bozena Sadlocha	Drawing office - profiles

This document is dedicated in memory of our colleague and friend, *GERT FOURIE*. We hope that this document will reflect his dedication on environmental issues and that he would have been proud of it had he been able to read it.

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1. SCOPE

The scope of this document is to set out guidelines to the Contractor building the line, pertaining to the environment. This document should be seen as part of the contract, and supplementary to Eskom's TRMSCAAC 1. The management plan, including the itemised management plan requirements, must thus be part of the enquiry document, to make recommendations and constraints as set out in this document, which will be enforceable under the general conditions of the contract. The management plan has a long-term objective to ensure that:

1. Mistakes made in the past do not re-occur.
2. Precautions against damage, and claims arising from damage are taken care of timeously.
3. The completion date of the contract is not delayed due to problems with landowners which may arise during the course of construction.

2. INTRODUCTION

Erosion is a serious problem in the Karoo area through which the line will traverse. It is thus imperative that precautions be taken to minimise damage to the topsoil. Proper planning of all activities is thus of the utmost importance. The Eskom Farmer Liaison Agent will liaise with the local extension officer from the Dept. of Agriculture, as well as officials from the Dept. of Nature Conservation and all other interested and effected parties in an effort to establish a good working relationship. The area is environmentally sensitive and appropriate consideration there of especially in the prevention of erosion is essential.

The Hydra Droërvier 400kV transmission line is approximately 246.5 km long, traversing the area between Hydra substation near De Aar, and Droërvier substation situated just outside Beaufort West. The route coming out of Hydra substation runs in a southerly direction towards Droërvier substation. For most part the line will run parallel east of the existing easterly line, but it will bend away from this line at certain points because of terrain constraints.

At present landowners in the area work closely with Department of Agriculture (Soil Conservation). Extensive soil erosion works has been erected along the line amounting to thousands of rands. Attention is drawn to the fact that damage to these works is against the law. It must also be stated that the veld is the lifeline of all these farmers. Although these plants survive in very harsh conditions, rehabilitation of these plants take years once damaged or disturbed. There is concern from all interested parties in respect of physical damage to the environment. Firm action and fines against transgressors will be speedily implemented, to ensure environmental friendliness by one and all during the construction phase. This document will point out specific problem areas, if any, that should be monitored closely by the site staff of Eskom, including the Eskom Farmer Liaison Agent, and the site staff of the Contractors

Good relations with landowners need to be established and maintained, which will help in the solving and prevention of problems. Lines of communication should always be open to ensure proper and timeous reaction to complaints, as the reputation

of both the Contractor and Eskom is at stake, and should be the incentive driving everyone involved to perform to the best of their ability.

Eskom requires a commitment from the Contractor on the following issues:

1. Particularly to take into consideration the requirements of landowners, as the line traverses private property.
2. Always behave professionally on and off site.
3. Ensure quality in all work done, both technical and environmental.
4. Attempt to resolve problems and claims arising from damage immediately, to ensure a smooth flow of operations.
5. To underwrite Eskom's Environmental Policy at all times.
6. To underwrite Eskom's TRMSCAAC 1 at all times.

3. TECHNICAL SPECIFICATIONS OF THE LINE

- 3.1 **LENGTH:**
The length of the line will be approximately 246.5 km.
- 3.2 **SERVITUDE WIDTH:**
The building restriction is 65 m.
- 3.3 **TOWER PARAMETERS:**
 - 3.3.1. Average tower spacing: 400 metres. plus.
 - 3.3.2. Tower height: between 23m to 39m.
 - 3.3.3. Minimum ground clearance: 8.5m.
- 3.4 **TOWER DESIGN:**
Three types of towers may be used on this project:
 - Compact cross rope suspension tower.
 - Self supporting suspension tower.
 - Self supporting strain tower.

4. PHYSICAL ISSUES AND THEIR CONTROL

4.1 TERRAIN

The landscape is varying from flat to rugged with very hilly and rocky areas in-between. Some of these hills could even be described as mountainous. It is in these hilly areas that access will be a problem. The existing track will be used throughout the line and in most of the hilly areas the track has eroded badly and a lot of repairs and maintenance is required. The line also crosses numerous streams and dongas that for the most part of the year is dry. In a couple of areas access is not continuous along the line and alternative access will have to be negotiated with the landowner and the Eskom representative. There is also stretches of the line that will be difficult to access in the rainy season and it is suggested that these areas be avoided in the wet times.

4.2 WET AREAS

A fair number of wet areas will be traversed and in all cases special care must be taken to minimise environmental damage. Going from Hydra to Droërivier substations the wet areas traversed will be in the following order. See profiles for specific action plan.

1. Farm Ezels Fountain 65
2. Lakenrivier
3. Farm Excelsior 52
4. Burgerspruit
5. Gabrielspruit
6. Taaibosspuit
7. Tierhochspruit
8. Farm Waaifontein 65
9. Platdoringrivier

4.3 RIVER CROSSINGS

Travelling along the line from Hydra substation to Droërivier substation the following river crossings will be encountered. These river crossings will be dealt with in the specific schedule attached to the profiles and will also be explained on the profiles themselves. Bear in mind that river crossings is always in environmental sensitive areas and the utmost care must be taken to keep the damage to a minimum, also bear in mind that these areas can in the same time be the habitat of the riverine rabbit. See profiles for specific action plan.

1. Elandsfonteinriver
2. Ongersriver
3. Brakriver
4. Soutriver
5. Gamkariver

4.4 EROSION AND DONGA CROSSINGS

Crossing of dongas and eroded areas shall be thoroughly planned. No soil may be pushed into dongas to allow for access, as this will impede the natural flow of water. When cutting through the embankments of a donga, the cuttings shall be protected in such a way as to ensure that erosion does not spread in the direction of the servitude road. Crossings shall be level with the stream bottom, and where necessary the donga crossings shall be stone pitched. In areas where sheet erosion has occurred, the Contractor must refrain from blading the access road, as this will only encourage erosion. Water diversion berms shall be installed at donga crossings, to ensure that runoff water from the servitude does not flow into dongas causing an erosion hazard.

4.5 ACCESS ROADS

Planning of access routes must be done in conjunction with the Contractor, Eskom and the landowner. Normal site documentation will be sufficient for any agreements reached, thus no verbal agreements should be made under any circumstances. All access roads shall be properly signposted by the Contractor, which must show the direction of travel, as well as tower numbers to which the road leads, also roads not to be used shall be marked with a " NO ENTRY " sign. The Contractor should make maximum use of existing roads, but when these roads are used they must be maintained at all times. Any damage to private roads shall be repaired immediately, and to the satisfaction of the landowner and Eskom. The Contractor shall keep a photographic record of all existing roads used, to ensure that they are maintained in their original state, up to the completion of the contract (TRMSCAAC 1).

Where new access roads are constructed, the Contractor shall install erosion prevention measures during road construction. Where the roads have slopes of more than 2%, water diversion berms shall be installed from the start of the contract, to ensure that erosion is curbed. These berms shall be maintained at all times and be repaired at the end of the contract. Where berms are installed on severe slopes, the outflow shall be suitably stone pitched to prevent erosion from starting at the berms. Preferably no roads shall be constructed on slopes of more than 20%; use being made of existing roads if any. If none exist, roads should be constructed with permission obtained from the landowner in conjunction with the Eskom Farmer Liaison Agent. The Contractor shall take such areas into consideration during the tender stage. The installation of concrete pipes and drifts to facilitate access, shall be at the discretion of the Eskom Farmer Liaison Agent on site. All the necessary precautions against damage shall be taken by the Contractor (TRMSCAAC 1). Any dangerous crossings shall be marked as such, and where necessary speed limits shall be enforced.

Upon completion of the contract all access roads shall be rehabilitated. Where necessary, extra erosion prevention measures shall be installed, and access roads that will not be used in future shall be closed at the discretion of the Eskom Farmer Liaison Agent (See TRMSCAAC 1 for details). Badly damaged areas shall be fenced in to enhance rehabilitation. Where necessary a suitable mixture of grass seed shall be used to re-seed damaged areas, which again will be at the discretion of the Eskom Farmer Liaison Agent. The seed mixture shall comply with the parameters as set out in section 4.10 of this document.

4.6 RUBBLE AND REFUSE DISPOSAL

The Contractor shall dispose of all excess material on site including that derived from packaging, in an appropriate manner and at a designated place. A landfill may be used, but when it is closed up the rubble shall be compacted, and there shall be at least 1m of soil covering the waste material. No landfill may be used without consent from the landowner, and under no circumstances shall hazardous material be disposed of in this manner.

No material shall be left on site which may harm man or animals. Surplus concrete may not be dumped indiscriminately on site, but shall be disposed of in designated areas. Concrete trucks shall not be washed on site after depositing concrete into foundations. Any broken insulators shall be removed and all shards picked up. Broken, damaged and unused nuts, bolts, washers, etc. shall be picked up and removed from site.

4.7 GATE INSTALLATION AND GATE CONTROL

The contractor is referred to the fencing act, Act no 31 of 1963, indicating that no fences may be dropped, even temporarily to allow for access, and the tension in all fences shall be maintained. Gates shall be closed and locked at all times. Any claims arising from gates left open shall be borne in full by the Contractor. If any fencing interferes with the construction process, such fencing shall be deviated until construction is completed. Damaged wire strands next to gates shall be replaced for at least one span on either side. Gates will be installed in all fences for construction purposes and if so required by land owners be removed after construction.

4.8 FIRE PREVENTION

No open fires shall be allowed on site (The Forest Act, No 122 of 1984). The Contractor shall have fire fighting equipment available on all vehicles working on site. At no time shall the Contractors workforce be allowed to collect firewood from the veld.

4.9 SERVICING OF VEHICLES

Servicing of vehicles in the veld is strictly prohibited. Only emergency repairs shall be allowed on site. All vehicles shall be serviced in the designated area inside the Contractors camp. In the event of a breakdown in the veld, any oil spills shall be cleaned up immediately. All contaminated soil shall be cleaned up and removed, and the area rehabilitated immediately. All used parts, packaging, old oil, etc. shall be disposed of in the correct manner and in a proper area designated for such waste materials. Under no circumstances shall such waste be buried haphazardly on site.

4.10 TOWER POSITIONS

Refer to TRIMSCAAC 1 for specifications concerning tower sites on slopes. Disturbance of topsoil on tower sites with severe slopes shall be minimised at all costs. At any tower-sites where conventional foundations are installed, the Contractor shall remove the topsoil separately and store it for later use during rehabilitation of such tower sites. During backfilling operations the Contractor shall take care not to dump the topsoil in the bottom of the foundation. Where a cranepad is constructed, all topsoil shall be removed and stored separately. Once the tower is erected, the slope shall be restored immediately and the topsoil spread over the entire area to ensure proper rehabilitation. Extra seed shall be sown on such tower-sites, unless otherwise directed by the Eskom Farmer Liaison Officer. In accordance with the Conservation of Agricultural Resources Act, No 43 of 1983, slopes in excess of 2% must be contoured, and

slopes in excess of 12% must be terraced. Other methods of rehabilitation of towersites may also be used at the discretion of the Eskom Farmer Liaison Agent, e.g. stone pitching, logging, etc. Contour banks shall be spaced according to the slope on towersites. The type of soil shall also be taken into consideration.

In areas where sparse growth is evident, re-seeding of the area is proposed. A mixture of grass seed can be used provided the mixture is carefully selected to ensure the following:

- a) annual and perennial grasses are chosen.
- b) pioneer species are included.
- c) species chosen are adaptable to the area.
- d) root systems must have a binding effect on the soil.
- e) the final product should not cause an imbalance in the area.

To get the best results in a specific area, it is a good idea to consult with the local extension officer of the Dept of Agriculture. Seed distributors can also give valuable advice as to the mixtures and amount of seed necessary to plant a certain area. Re-seeding, as well as fencing in of badly damaged areas, will always be at the discretion of the Eskom Farmer Liaison Agent, unless specifically requested by a landowner.

It is suggested that when doing the excavations for the towers, 1,8m high barricading be used. When putting up barricading the first two strands of wire shall start at 10cm from ground level and the second strand be 10cm above that.

4.11 WINCH- AND TENSIONER STATIONS

Specifications require the protection of Eskom supplied material on site, especially conductor drums, resulting in a fire break bladed around a drum station in the veld. These areas are normally left to rehabilitate on their own, which could be a disastrous policy. Once the stringing of conductors has been completed in a certain area, the winch and tensioner stations shall immediately be rehabilitated where necessary. If the area was badly damaged, re-seeding shall be undertaken and the area fenced in. For seeding the same provisions as in 4.10 shall apply. (See also 4.10 about slopes).

The fence should only be high enough to keep out livestock and game for 1 to 2 seasons, depending on the rainfall and vegetation in the area. Fencing in of the storage areas for drums on site is also proposed, as this will keep out animals and prevent injury. Should the Contractor want to leave guards on site, this should be discussed and negotiated with the landowner. Proper facilities must be provided to ensure sanitation standards are met. Mobile toilets shall be installed at such sites where a large number of the workforce is concentrated.

4.12 BATCHING PLANTS

Although the Contractor is responsible to secure his own batching plants, Eskom shall ensure that all agreements reached with the landowner are

fulfilled, and that such areas be rehabilitated once construction is completed. Should any claim be instituted against Eskom, due to the actions of the Contractor at a batching plant site, Eskom shall hold the Contractor fully responsible for the claim until such time that the Contractor can prove otherwise with the necessary documentation. Unless otherwise agreed, the batching plant area shall be ripped, revegetated and fenced-in, to ensure proper rehabilitation. All excess material shall be removed from site and properly disposed of.

5. SOCIAL ISSUES AND THEIR CONTROL

5.1 SANITATION

The Contractor shall install mobile toilets on site (TRMSCAAC 1) and the staff shall be instructed to use these toilets when necessary.

5.2 PREVENTION OF DISEASE

All employees of the Contractor shall be treated for tapeworm to prevent the occurrence of measles in livestock. A record shall be kept of drugs administered and the dates when this was done. This can then be used as evidence in court should any claims be instituted against Eskom or the Contractor (TRMSCAAC 1). It is in the interest of the Contractor to ensure that his workforce stay disease free, and the workforce shall be made aware of the effects of sexually transmitted diseases.

5.3 INTERACTION WITH LANDOWNERS

All negotiations for access shall be between Eskom, the landowner and the Contractor. NO verbal agreements shall be entered into. All agreements shall be recorded properly, and all parties shall co-sign the documentation. It is proposed that a photographic record of access roads be kept by the Contractor which will then be available, should claims be instituted by any landowners. The photos taken of access routes shall have the date and time when taken printed on. Any claims instituted by the landowners shall be investigated and treated promptly, avoiding unnecessary delays at all costs.

As the success of a project of this size depends largely on good relations with the landowners, it is proposed that the Contractor will make available one person to act as the liaison officer for the entire contract. This person shall be available to investigate all problems arising at the worksites, involving the landowners. The landowners must also be kept informed about any changes to the construction programme which directly concern them. If the Eskom Farmer Liaison Agent is not on site, the Contractor's liaison officer should keep the landowners informed of developments. The contact telephone numbers of the Contractor and Eskom shall be made available to the landowners, which will ensure open channels of communication, and prompt responses to queries and claims. At all times contact with the landowners shall be courteous. The rights of the landowners must always be respected and all staff shall be sensitive to the fact that we are working on private property.

Littering by the employees of the Contractor shall be carefully monitored, and proper waste disposal facilities shall be provided at all work areas. The Eskom Farmer Liaison Agent shall check the neatness of the worksites as well as the camp-site, and all staff shall be made aware of this. (Environment Conservation Act, No 73 of 1989).

6. BIOLOGICAL ISSUES AND THEIR CONTROL

6.1 FAUNA

The only fauna in the area that is on the endangered list is the Riverine Rabbit, which is only found in the central Karoo and nowhere else in the world. See attached leaflet on the Riverine Rabbit. There is one private nature reserve, namely Steenbokkie Nature Reserve,. This belongs to a Mr. J S Herselman at tel. no. 0201 - 3572. See attached special conditions from owner when working there. The line also traverse areas where game like Springbok, Kudu, Ostrich, etc. are found. No unnecessary disturbance or poaching of game will be allowed. Keep in mind that Ostrich is very prone to injuring themselves when frightened and could also attack when threatened. Damages suffered due to negligence from the contractor will be claimed in full from the contractor.

6.2 BIRDS

During the gathering of information for the environmental impact assessment it became clear that a lot of different bird species is abundant in the area that the line traverse. The fact that the new line will be parallel to the existing easterly line will also have the minimum impact on birds, providing that bird markers are installed at specific places along the new line route. The areas where birdmarkers are to be installed will be clearly marked on the profiles.

There are 89 species judged as sensitive in the study area. All of these species are vulnerable to collision with powerlines and 42 species are also vulnerable to electrocutions, due to their habit of perching on powerline structures. All of these birds are characterised by there medium to large body size. Species with high wing loading (short, broad wings relative to their weight), e.g. grebes, cormorants, flamingos, ducks and geese, gamebirds, moorhens, coots, bustards, small to medium sized waders, and sandgrouse, are more vulnerable to collisions, owing to their fast flight speed and relative restricted manoeuvring ability with low wing loading, e.g. most raptors and crows. Forty-eight of these species are waterbirds. The overall relatively low reporting rates shown by waterbirds in the study area, however, suggests that wetland habitats are limited in this semi-arid zone. Thirty-six species inhabit terrestrial habitats and an additional five species use both wetland and terrestrial habitats. Six species are endemic to South Africa, all are terrestrial species, except for the Blue Crane, which use both terrestrial and wetland habitats. An additional six species are endemic to Southern Africa, two being wetland species and the rest inhabiting dryland. Fifteen species are of conservation concern and nine of these appear in the S A Red Data Book. All of these threatened species found in the study area are sensitive to powerlines. Five of the threatened species are waterbirds, eight are terrestrial species, and two inhabit both habitats. Eight of the threatened species are vulnerable to

electrocutions by powerline structures, in addition to collisions with powerlines. An examination of the reporting-rate information shows that six threatened species (Black Stork, Secretary Bird, Martial Eagle, Lesser Kestrel, Blue Crane, and Ludwig's Bustard) have higher reporting rates in the study area than in their overall South African ranges. One of these species (Black Stork) is a waterbird, four are dryland species, and one (Blue Crane) uses both wetland and terrestrial habitats. Two of these six species are the only threatened species of the fifteen in the study area that are endemic to South Africa and Ludwig's Bustard to Southern Africa. Four of the six species are vulnerable to both collisions and electrocutions (Black Stork, Secretary Bird, Martial Eagle and Lesser Kestrel). The construction of powerlines in the study area, where these sensitive and threatened species have a stronghold, is of serious concern. The situation regarding the Blue Crane and Ludwig's Bustard is of particular concern, as both cranes and bustards have been shown to be highly vulnerable to powerline collisions. The remarkably high reporting rate of both species in the study area, especially Ludwig's Bustard, suggests that the powerlines could reap a high mortality of these species. Of the remaining four species, the Black Stork and Secretary Bird are the next most vulnerable, while the Martial Eagle and , especially, the Lesser Kestrel should not be at any significant risk from powerline collisions. These last two species, however, are the birds, along with several others in the list of sensitive species, which could be most at risk from electrocutions. See attached list of 89 species judged vulnerable to powerlines in the study area.

BIRD DIVERTERS REQUIRED FOR NEW HYDRA-DROERIVIER 3 400KV.

The bird flight diverters are to be of the wire formed type, fifty percent being white and fifty percent black in colour.

In area's where there is no piggy-back system, the bird diverters to be installed on both earth wires, The easterly earth wire to be fitted with the white pigtail and the westerly with the black pigtail. Due to the piggy-back system being introduced, bird diverters can only be installed on the eastern earthwire at 20 metre intervals in such instances. The colours must be alternated. The bird diverters are to be placed at 20 metre intervals.

This table has been extracted from the management plan requirements. The existing Hydra-Droerivier 1 400kv line tower numbers have been listed as the new tower numbers might change. The bird diverters to be strung on the new line on the eastern side can therefore be referenced to the existing tower numbers.

MANAGEMENT PLAN	EXISTING TOWERS	NEW TOWERS	APPROXIMATE LENGTH (metres)
MP4	34-38	31-34	1540
MP6	43-54	39-46	4982
MP7	63-69	54-59	2164
MP10	72-87	61-74	4850
MP13	128-133	106-109	1575
MP14	139-144	116-119	854
MP16	144-152	119-126	3030
MP17A	184-195	153-161	3660

MP14	139-144	116-119	854
MP16	144-152	119-126	3030
MP17A	184-195	153-161	3660
MP19	203-224	168-185	7670
MP20A	228-235	188-193	2296
MP20B	242-249	199-204	2250
MP21A	261-268	214-219	2330
MP33	355-365	291-299	3630
MP41	409-421	336-347	4880
MP44	434-444	358-366	3570
MP46	450-455	372-375	1415
MP49	461-472	381-391	4329
MP58	485-491	403-408	2293
MP62	511-520	427-435	3480
MP68	600-615	501-514	5560
TOTAL			66358

6.3 FLORA

During a survey the following endangered plants were found in the area where the line will be erected. Reference is given in respect to the existing easterly transmission line tower numbers.

Tower 355 - 357: *Aloinopsis rubrolineata*, *Euphorbia hypogaea*, *Glottiphyllum difforme*.

Tower 214: *Chasmatophyllum maninum*, *Euphorbia hypogaea*, *Tridentia virescens*

It is therefore of the utmost importance that any construction activities in the above mentioned two areas be carefully monitored and any new access road in the area to be pegged by the Eskom Farmer Liaison Agent. The impact in these areas are also to be kept to a minimum.

All endangered plants to be marked by steel poles knocked into the ground next to them, painted in an orange colour. See the specific management plan requirements for pictures and details.

7. CULTURAL ISSUES AND THEIR CONTROL

7.1 ARCHAEOLOGY

The Karoo region is extremely rich in stone age sites even though it supported large numbers of non-farming people who were also prolific makers of stone tools until very recent times. Eskom therefore, acknowledging the importance of the possible destruction of archaeological sites along which the new line traverses approached the McGregor museum of Kimberly to carry out a field survey of the proposed route. The object was three-fold.

- The museum would carry out a preliminary study of the proposed route.
- To identify any archaeological sites that could be affected by the development and indicate which of those sites might need further assessment or particular care.

- c) A report should be given highlighting the findings and provide recommendations regarding mitigation measures and any other issues of importance.

Although a large number of artefacts and possible sites were identified ranging from Acheulean to 19th/20th century colonial, by and large the route misses areas of more pronounced archaeological sitings.. However certain definite sites of importance were deemed to require further investigation once the relevant tower positions were known. These sites have since been re-examined and only four sites have needed to be included in the management plan due to tower positions being located at these sites. This does not however mean that no other sites exist and the following items need taking note of.

- a) A lot of sites fall in-between tower positions. Therefore all vehicle movement must be kept along the existing servitude track to prevent damaging of other sites.
- b) Staff members must not be allowed to interfere with rock etchings round along the line especially in the southern section i.e. Nelspoort.

The four sites mentioned requiring specific care are as follows

- A1 profile sheet 5 farm 145 ptn 1.
Acheulean site of importance adjacent to existing tower 177.
- A2 profile sheet 9 farm wynandsfontein 91 ptn 2
possible old trekboer stone walls.
- A3 profile sheet 11 farm mordant klaassenkraal 14 ptn 10
A small late Holocene LSA site adjacent to existing tower 388
- A4 profile sheet 12 farm waayfontein 65 rem
Although this is not a tower position, the area adjacent to the line peg is out of bounds.

The relevant preventative measures to be taken at these sites are listed in the specific management plan.

7.2 MONUMENTS

There are no known monuments on the line.

7.3 FARMHOUSES/BUILDINGS

If and where the lines cross any inhabited area, the necessary precautions shall be taken by the Contractor to safeguard the lives and property of the inhabitants. Speed limits shall be enforced in such areas, and all drivers shall be made aware of the fact, whilst courteous behaviour is expected from everybody in this regard.

8. PROBLEMS FORESEEN IN THE AREA

8.1 PRE-CONSTRUCTION

All agreements made with landowners shall be recorded and strictly adhered to. Proper negotiations shall be entered into between Eskom, the Contractor and the landowner, concerning access onto all properties. A physical access plan along the servitude shall be compiled, and the Contractor shall adhere to this plan at all times. The landowners shall be informed of the starting date of construction, as well as the phases in which the construction shall take place.

8.2 DURING CONSTRUCTION

Access to the line will be very difficult in some areas, and proper planning is of the utmost importance. The following crossings are found along the route:

MAJOR ROADS :	5
SAND ROAD CROSSINGS	14
FARM ROAD CROSSINGS	12
FARMER PIPE LINES :	4
MAJOR POWER LINES	1
POWER LINES :	9
TELEPHONE LINES :	21

The Contractor is reminded of TRMSCAAC 1, stating that access shall not necessarily be continuous along the servitude, and allowance shall be made for the translocation of equipment around obstacles. Proper planning when the physical access plan is drawn up by the Eskom Farmer Liaison Agent, in conjunction with the Contractor, shall be necessary to ensure access to all tower sites. No camping shall be allowed on any private property. If the Contractor wants to leave guards on site, it shall only be done with the written consent of the landowners involved. Strict control shall be maintained on all construction activities and personnel, when working on private property.

No telephone lines shall be dropped during the stringing operations. All crossings shall be with at least rugby posts to protect the lines. Where pipe lines are found along the route, the depth of the pipes under the surface shall be determined to ensure that proper protection is afforded to such structures. Where the existing roads are in a bad state of repair, such roads shall be re-opened, re-used, and then properly rehabilitated after construction is completed. All manmade structures shall be protected against damage at all times, and any damage shall be rectified immediately.

8.3 AFTER CONSTRUCTION

Rehabilitation of the servitude roads will have to be done properly to ensure past mistakes are not repeated. The Contractor shall ensure that all damaged areas are rehabilitated to the satisfaction of Eskom and each and every property owner. The closure of roads according to specifications shall be carried out. The Contractor shall not be released from site until all landowners have signed off the release documentation to the satisfaction of Eskom's Farmer Liaison Agent.

9. POSSIBLE SOLUTIONS TO THE PROBLEMS

- 9.1 Proper liaison between Eskom, the Contractor and landowners.
- 9.2 Proper site management and regular monitoring of site works.
- 9.3 Proper documentation and record keeping.
- 9.4 Regular QA inspections and good quality control throughout the construction period.
- 9.5 A change in attitude towards the environment by all site personnel.
- 9.6 Sensitising and training of all personnel to ensure the above mentioned prerequisites are met.

10. PHYSICAL ACCESS PLAN

A physical access plan shall be drafted by the Contractor in conjunction with Eskom's Farmer Liaison Agent. The landowner will also be part of this plan, and no decisions should be made without his consent. The standard Eskom site documentation shall be used. All agreements should be in writing and well documented. No access roads shall be made without the consent of both the landowner and Eskom. The physical access plan shall allow for the installation of concrete pipes and drifts where such structures may be needed to facilitate access. The Eskom Farmer Liaison Agent shall use his own discretion as to what special measures will be necessary to ensure access. The Contractor is reminded that access shall not necessarily be continuous along the whole line route. All tower positions shall be checked, and the necessary changes to positions shall be requested immediately, once a problem is identified.

11. SITE DOCUMENTATION/MONITORING

The standard Eskom site documentation shall be used to keep records on site. All documents shall be kept on site, and be available for monitoring purposes. Site inspections by an Environmental Audit Team may require to have access to this documentation for auditing purposes. The documentation shall be signed by all parties, to ensure that such documents are legal. Regular monitoring of site works by the Eskom Farmer Liaison Agent is imperative to ensure that all problems encountered are solved punctually and amicably. When the Eskom Farmer Liaison Agent, is not available, the Site Supervisor shall keep abreast of all works, to ensure no problems arise. The commitment of all site staff to be sensitive to environmental issues will go a long way to making this project a big success. The Eskom Farmer Liaison Agent shall attend all site meetings to ensure that he is always informed as to the stage of construction. This will help him to anticipate problems even before they arise, and timeous action can be taken.

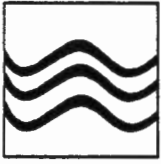
12. APPENDICES

- 12.1 LANDOWNER SPECIAL CONDITIONS.
- 12.2 RIVERINE RABBIT
- 12.3 CIVIL ENGINEERING CONSIDERATIONS PAGES 1 TO 4
- 12.4 TRMSCAAC 1 PAGES 9 TO 15

APPENDIX B

EXTRACT FROM PROFILES

MANAGEMENT PLAN REQUIREMENTS



WETLANDS/RIVER CROSSING



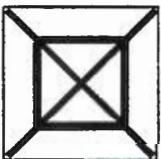
CONCRETE



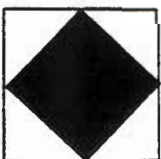
FAUNA OR FLORA
(INCLUDES BIRD DIVERTERS)



ARCHAEOLOGICAL



NO ACCESS OR
ALTERNATIVE CONSTRUCTION



SPECIFIC MAINTENANCE
REQUIRMENTS

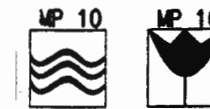
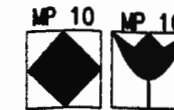
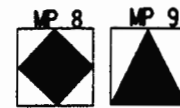


FARMERS
SPECIAL CONDITIONS

HYDRA-DROERIVIER

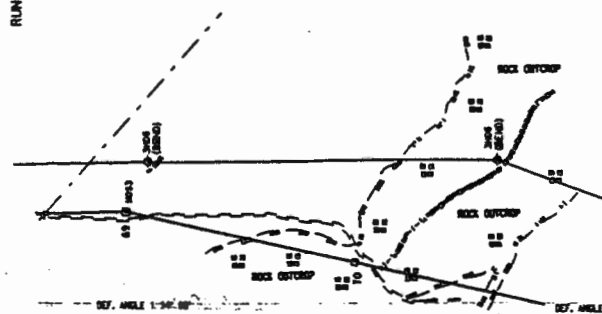
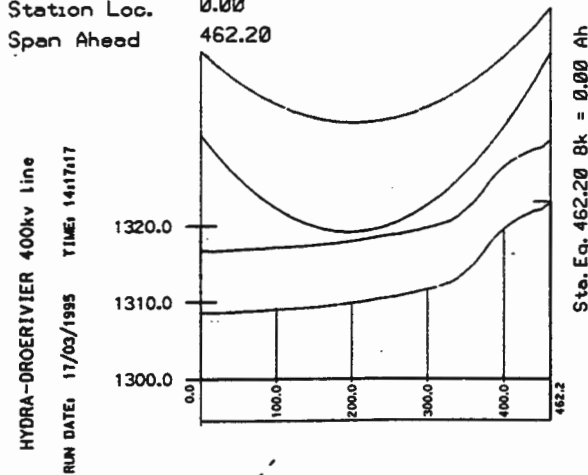
400kV

SHEET (3)



CONDUCTOR USED QUAD, 'ZEBRA' 980"
SCALE : HORIZONTAL 1/5 000
VERTICAL 1/500

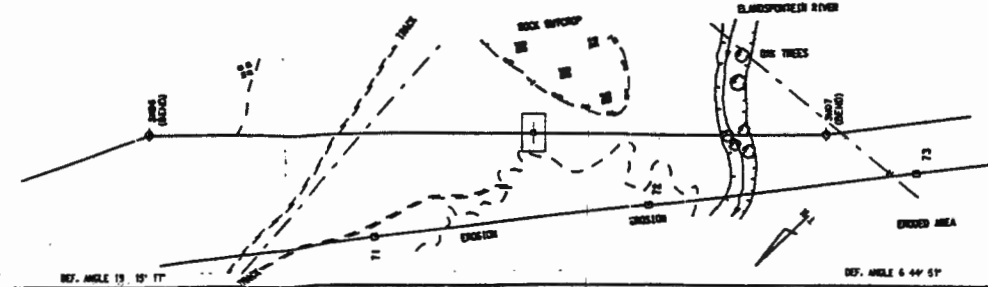
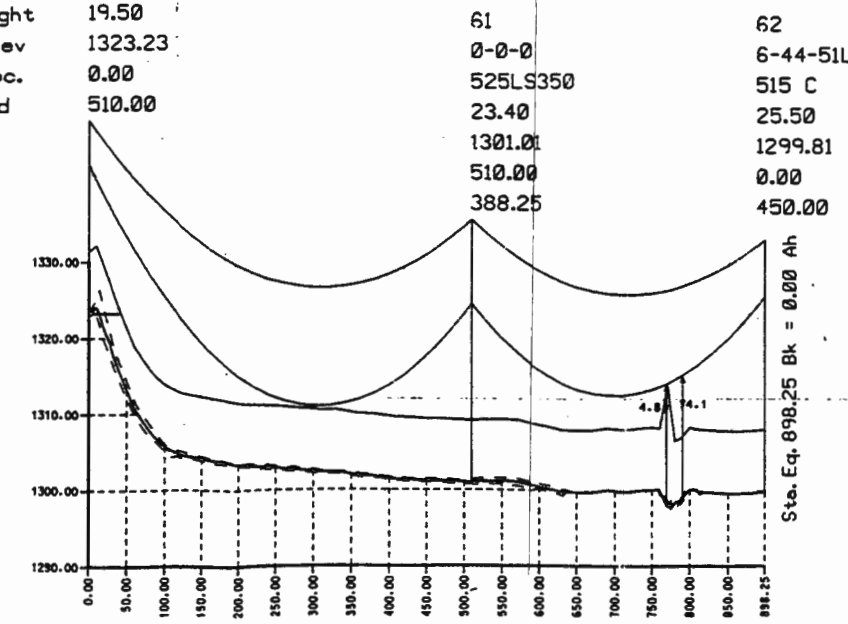
Const. No.	59	60
Line Angle	1-14-9R	19-15-17R
Structure Name	525LS350	515 D
1st PS Height	23.40	19.50
C.L. HUB Elev	1308.57	1323.23
Station Loc.	0.00	0.00
Span Ahead	462.20	510.00



Const. No.	60
Line Angle	19-15-17R
Structure Name	515 D
1st PS Height	19.50
C.L. HUB Elev	1323.23
Station Loc.	0.00
Span Ahead	510.00

HYDRA-DROERIVIER 400kv line

RUN DATE: 17/03/1995 TIME: 14:17:17



APPENDIX C

LANDOWNER SPECIAL REQUESTS

LANDOWNER SPECIAL CONDITIONS APPENDICE 12.1

ITEM	LANDOWNER	FARM NAME	SPECIAL CONDITIONS
1	Mr. M SLABBERT	REM. PTN 10	EROSIONCONTROL
	P O BOX 1220	WELTEVREDEN 170	ROAD MAINTENANCE
	BEAUFORT WEST		LIAISON OFFICER TO BE AVAILABLE
	6970		
	TEL: 0201 - 3353;3295		
2	Mr. J NEL	REM. PTN. 1	VEHICLE TRAFFIC TO BE LIMITED TO SERVITUDE
	P O BOX 388	STEENROTSFONTEIN 168	
	BEAUFORT WEST		
	6970		
	TEL: 0201 - 3340		
3+4	Mr. F J NEL	REM. HANSRIVIER 169	ROAD MAINTENANCE
	P O BOX 320	REM PTN. 1 HANSRIVIER 169	EROSION CONTROL
	BEAUFORT WEST		LIAISON OFFICER TO BE AVAILABLE
	6970		
	TEL: 0201 - 3346		
5	Mr. J S HERSELMAN	FARM 413	STAY ON SERVITUDE ONLY
	P O BOX 39		OWNER TO BE CONTACTED BEFORE CONSTRUCTION AND WHEN WORKING WITH HELICOPTER.
	BEAUFORT WEST		GAME GATES TO BE INSTALLED BEFORE CONSTRUCTION IN ALL GAME FENCES
	6970		NO POACHING OR SNARING
	TEL: 0201 - 2827;2702		LOCK GATES, DO NOT DROP FENCES, PICK UP RUBBISH
6	Mr. A G L MURRAY	PTN. 3	LOCK GATES, DO NOT DROP FENCES, PICK UP RUBBISH
	P O BOX 262	UPPER PLAAT DOORNS 153	
	BEAUFORT WEST		
	6970		
	TEL: 0201 - 3332		
7+8	Mr. P LUND	FARM 410	ANY NEW ROADS TO BE DISCUSSED WITH OWNER. KEEP OWNER INFORMED. OWNER TO BE CONTACTED WITH REGARD TO BORROW PITS. EROSION CONTROL TO BE IMPLEMENTED.
	P O BOX 1026	PTN. 7 ELANDSFONTEIN 150	ACCESS ROADS TO BE REPAIRED.
	BEAUFORT WEST		ONLY ROADS MARKED TO BE USED. GATE INSTALLATION TO BE UP TO SPEC RE. PROBLEM ANIMALS.
	6970		
	TEL: 02024 - 685		
9;10+	Mr. J DE JAGER	REM. PTN 2 ELANDSFONTEIN150	LIAISON PERSON TO BE INTRODUCED BEFORE CONSTRUCTION.
11	TRUSTEE	PTN. 2 KLIPKO-JESKRAAL 132	
	SABRE TRUST	PTN. 1 RIETFONTEIN 122	
	P O BOX 1025		
	BEAUFORT WEST		
	6970		
	TEL: 02024 - 648		

LANDOWNER SPECIAL CONDITIONS APPENDICE 12.1

ITEM	LANDOWNER	FARM NAME	SPECIAL CONDITIONS
12	Mr. C F B HERHOLDT	PTN. 4 MONTANA 123	
13	P O BOX 142	REM. PTN. 3 MONTANA 123	
	BEAUFORT WEST		
	6950		
	TEL: 02024 - 667		
14	Mr. G VIVIER	PTN. 1 MONTANA 123	
15	P O BOX 75	PTN. 1 BELVEDERE 73	
	BEAUFORT WEST		
	6970		
	TEL: 02024 - 682		
16	Mr. J C S MARR	BRUINRUG 64	EROSION CONTROL TO BE ESTABLISHED.
	TRUSTEE		
	GAIRLOCH TRUST		
	P O NELSPOORT		
	BRUINRUG		
	6973		
	TEL: 02024 - 637;600		
17	Mr AWMB SHEARING	REM. FARM 68	ACCESS TO BE PLANNED WITH
18	P O BOX 1277	REM. PTN. 1 WAAYFONTEIN 65	OWNER. MAINTENANCE OF
	BEAUFORT WEST		ROADS.
	6970		
	TEL: 02024 - 639		
19	WAAIFONTEIN	REM. WAAYFONTEIN 65	EROSION CONTROL TO BE ESTABLISHED.
	ESTATES CC		
	Mr. F J PRETORIUS		
	P O BOX 374		
	BEAUFORT WEST		
	6970		
	TEL: 02024 - 630		
20	Mrs. E J SMITH	PTN. 3 WAAYFONTEIN 65	MR. PJ VAN DER MERWE, FARM
	EXECUTOR		SKIETKUIL TO BE CONTACTED FOR
	73 CURVY ROAD		CONSTRUCTION ACTIVITIES.
	BLAIRGOWRIE		
	RANDBURG		
	TEL: 011 - 7895077		
21	Mr. F J RETIEF	PTN. 2 TAAYBOSCHFONTEIN 15	ROADS TO BE MAINTAINED.
	P O BOX 407		LIAISON OFFICER TO KEEP
	MURRAYSBURG		CONTACT WITH OWNER.
	6995		
	TEL: 049222 - 1431		
22	Mr. H S MARAIS	REM. TAAYBOSCHFONTEIN 15	ROADS TO BE MAINTAINED. PICK
23	P O BOX 42	REM. PTN. 4 MORDANT	UP RUBBISH.
	VICTORIA WEST	KLAASSENSKRAAL 14	
	7070		
	TEL: 02042 - 305		
24	Mr. OG DE KLERK	PTN. 11 MORDANT KLAASSENS-	LOCK GATES. EROSION CONTROL
	P O BOX 149	KRAAL 14	TO BE UP TO SPEC. KEEP
	VICTORIA WEST		OWNER INFORMED.
	7070		
	TEL: 02042 - 2230		

LANDOWNER SPECIAL CONDITIONS APPENDICE 12.1

ITEM	LANDOWNER	FARM NAME	SPECIAL CONDITIONS
25	Mr. FJ V D MERWE P O BOX 315 MURRAYSBURG 6995 TEL: 049222 - 2213	PTN. 10 MORDANT KLAASSENS- KRAAL 14	VELD DAMAGE MINIMISED. LOCK GATES. PICK UP RUBBISH. REPAIR ROADS. LEAVE ANIMALS AND LABOURERS.
26	Mr. PJ RETIEF P O BOX 412 MURRAYSBURG 6995 TEL: 02042 - 23	GABRIELSBAKEN 2	MAINTAIN ROADS AND BERMS.
27	ESKOM	REM UITVLUGTFONTEIN 265	
28	Mr. PJ V D MERWE P O BOX 239 VICTORIA WEST 7070 TEL: 02042 - 4104	REM. SKIETKUIL 3	MAINTAIN ROADS AND BERMS. KEEP OWNER INFORMED.
29	Mr. LA DE JAGER P O BOX 83 ABERDEEN 6270 TEL: 049212 - 2911	KLEINFONTEIN 93	MINIMUM VELD DAMAGE. PICK UP RUBBISH. USE EXISTING ROADS. KEEP OWNER INFORMED. ANCHORS TO BE MARKED.
30	Mr. DP HUGO BURGERSFONTEIN P O BOX 16 VICTORIA WEST 7070 TEL: 02042 - 4121	BURGERSFONTEIN 92	INSTALL GATES IN NEW FENCES. PICK UP RUBBISH. USE EXISTING ROADS. KEEP OWNER INFORMED. LEAVE ANIMALS, LABOURERS.
31	Mr. JA ESTERHUIZEN POORTJIE P O BOX 166 VICTORIA WEST 7070 TEL: 02042 - 4812	PTN. 1 WYNANDSFONTEIN 91 PTN. 3 VLEKFONTIEIN 90	MINIMUM VELD DAMAGE. PICK UP RUBBISH. KEEP OWNER INFOR- MED. LEAVE ANIMALS, LABOURERS.
32	Mr. M ESTERHUIZEN P O BOX 28 VICTORIA WEST 7070 TEL: 02042 - 4804	REM. WYNANDSFONTEIN 91	MINIMUM VELD DAMAGE. USE EXISTING GATES,ROADS. PICK UP RUBBISH. KEEP OWNER INFOR- MED. LEAVE ANIMALS, WORKERS.
33			
34	Mr. FJ DE VRIES P O BOX 36 RICHMOND 7010 TEL: 053691 - 21702	PTN 1 BULT EN RIETFONTIEIN 96	MINIMUM VELD DAMAGE. LEAVE ANIMALS, WORKERS. PICK UP RUBBISH. KEEP OWNER INFOR MED.
35	NR2 SCHOEMAN FAMILY TRUST VAN TROMP STREET STRAND 7140 TEL: 024 - 532201	PTN. 1 NIEUWEFONTEIN 89	MINIMUM VELD DAMAGE. PICK UP RUBBISH. REPAIR ROADS,BERMS. KEEP OWNER INFORMED. LEAVE ANIMALS,WORKERS.

LANDOWNER SPECIAL CONDITIONS APPENDICE 12.1

ITEM	LANDOWNER	FARM NAME	SPECIAL CONDITIONS
36	GROOTAAR PTY LTD	REM. PTN. 1 RONDAVEL 85	USE EXISTING ROADS. INSTALL
39	P O BOX 39	PTN. 4 EXCELSIOR 52	GATES BEFORE CONSTRUCTION.
	RICHMOND		EROSION CONTROL MEASURES.
	7010		
	TEL: 053691 - 21303		
	JW VAN HEERDEN		
37	Mr. JH SIEBERHAGEN	REM. RONDAVEL 85	REPAIR ROADS. TAKE PRECAU-
38	P O BOX 19	REM. ANNEX RONDAVEL 86	TIONS IN RAIN NOT TO DAMAGE
	STEYNSBURG		VELD, ROADS. KEEP OWNER IN-
	5920		FORMED.
	TEL: 04842 - 3302		
40	Mr. JAF V D HEEVER	PTN. 2 RONDAVEL 85	EROSION CONTROL, MAINTAIN.
42	P O BOX 97	REM. EXCELSIOR 52	KEEP GATES CLOSED. KEEP
	MARBLEHALL		OWNER INFORMED.
	450		
	TEL: 012020 - 3258		
43	FRED VAN ZYL	REM. PATRYSFONTEIN 42	USE EXISTING ROADS. MINIMUM
44	TRUST	PTN 10 PATRYSFONTEIN 41	DAMAGE TO VELD.
	P O BOX 7297		
	SLELLENBOSCH		
	7599		
	TEL: 021 - 8813727		
45	Mr. SA V D HEEVER	PTN. 6 PATRYZENFONTEIN 41	INSTALL/MAINTAIN BERMS/ROADS.
46	P O BOX 55	PTN. 1 WODEHOUSE 25	KEEP GATES LOCKED, FENCES
	RICHMOND		NEAT. PICK UP RUBBISH.
	7010		
	TEL: 053691 - 22304		
47	Mr. JL KOCK	PTN. 5 WODEHOUSE 25	NO POACHING. KEEP OWNER
48	P O BOX 134	PTN. 1 FARM 145	INFORMED.
	RICHMOND		
	7010		
	TEL: 053691 - 22221		
49	Mr. P v Z KOCK	REM. FARM 145	
	P O BOX 134		
	RICHMOND		
	7010		
	TEL: 05363 - 60144		
50	Mr. FW KOCK	REM. ORANGE VALLEY 10	NO RUBBISH ON SITE. KEEP
	P O BOX 653		GATES CLOSED. KEEP OWNER IN-
	DE AAR		FORMED. INSTALL BERMS.
	7000		
	TEL+ 05363 - 60932		
51	Mr. HP BEKKER	REM. PTN. 1 ORANGE VALLEY 10	AREAS COMPACTED TO BE
52	P O BOX 18	REM. PTN. 5 ELANDSKUILEN 9	RIPPED. NO FIRES. EXCAVATIONS
53	DE AAR	REM. PTN. 1 JAAGPOORT 8	TO BE FENCED. KEEP OWNER IN-
54	7000	PTN. 2 ESELSFONTEIN 65	FORMED. USE EXISTING ROADS.
	TEL: 05363 - 60145		KEEP GATES LOCKED.

LANDOWNER SPECIAL CONDITIONS APPENDICE 12.1

ITEM	LANDOWNER	FARM NAME	SPECIAL CONDITIONS
55	Mr. JA VAN ZYL	REM. PTN. 1 ESELSFONTEIN 65	PREVENT EROSION. MINIMUM
	P O BOX 226		VELD DAMAGE. PICK UP RUBBISH.
	DE AAR		BUILD BERMS. KEEP OWNER IN-
	7000		FORMED. LEAVE ANIMALS, WOR-
	TEL: 05363 - 60158		KERS ALONE.
56	Mr. CJ GROBBELAAR	REM. ESELSFONTEIN 65	ROADS TO BE REPAIRED,
	P O BOX 303		GRASSED WITH RIGHT SPECIES
	DE AAR		GRASS. NO WORK WHEN EXCES-
	7000		SIVE WET. PICK UP RUBBISH.
	TEL: 05363 - 60731/2		KEEP OWNER INFORMED ON ALL
			ASPECTS. LEAVE ANIMALS, WOR-
			KERS ALONE.
57	Mr. PG MARAIS	REM. NIEWEJAARSFONTEIN 137	ANCHORS TO BE MARKED. ALL
58	P O BOX 606	PTN. 1 STUURMANSHUILEN 35	ACCESS ROUTES TO BE CLEARLY
59	DE AAR	PTN. 1 HARTEBEESTHOEK 31	MARKED BEFORE CONSTRUCTION.
	7000		REMEDIAL WORK TO PREVENT
	TEL: 05363 - 60387		FUTURE EROSION. NO CAMPS ON
			SERVITUDE ALLOWED. ALL WOR-
			KERS TO BE OFF PREMISES
			AFTER HOURS AND GATES TO BE
			LOCKED AT ALL TIMES. NO FIRES.
			NO POLLUTION ALLOWED. NO ANI-
			MALS OR BIRDS TO BE BOTHERED
			MOBILE TOILETS TO BE ON SITE.
			ESKOM REP. TO BE ON SITE
			WHEN WORKING. ALL PEOPLE
			WORKING ON SITE TO HAVE A
			COPY OF THIS SPECIAL CONDI-
			TIONS. IN ANY EVENT OF THIS
			NOT BEING ADHERED TO ALL
			WORK WILL BE STOPPED UNTIL A
			RESOLUTION IS FOUND.
60	Mr. A H HORN	REM. HARTEBEESTHOEK 31	LIASION OFFICER TO BE INTRODUCED BEFORE CONSTRUCTION.
	P O BOX 3		KEEP GATES LOCKED.
	DE AAR		
	7000		
	TEL: 05363-2516/3945		
61	Mr. IJ VAN ZYL	REM. FARM 150	REPAIR ROADS, BERMS. KEEP
	P O BOX 321		GATES, FENCES IN GOOD CONDI-
	DE AAR		TION.
	7000		
	TEL: 05363 - 3944		
62	ESKOM	PTN. 3 WAGT EN BITTJE 5	