

**ACACIA SUBSTATION UPGRADE
ENVIRONMENTAL MANAGEMENT PLAN (EMP)
FOR CONSTRUCTION**



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ABBREVIATIONS

CELO	Contractor Environmental Liaison Officer (Can be the Contractor Site Supervisor on small projects)
CM	Contract Manager (Eskom)
DEAT	Department of Environmental Affairs and Tourism
EAP	Environmental Assistant Practitioner
ECO	Environmental Control Officer (Can be the Eskom Site Supervisor on small projects)
EIA	Environmental Impact Assessment
EO	Environmental Officer
ESO	Environmental Site Officer
I&AP	Interested and Affected Parties
PM	Project Manager (Eskom)

DEFINITIONS

Auditing – A systematic, documented, periodic and objective evaluation of how well the environmental management plan is being implemented and is performing the aim of helping to protect the environment.

Biodiversity – the rich variety of plants animals that live in their environment. The fynbos ecosystem is an example of biodiversity in the Western Cape Province

Built environment – man-made physical surrounding composed of things like buildings, houses, roads, etc.

Conservation – this involves protecting resources, especially the biodiversity found in the area.

Contamination – making something impure or polluting.

Corrective action – response for addressing and environmental problem that is in conflict with the EMP determined through audits, monitoring or management review.

Environment – Our surroundings, including living and non-living elements, *e.g.* land, air, animals, plants, soil and humans.

Fynbos – low-growing and evergreen vegetation found only in the Western Cape.

Hazardous waste – Waste that can cause damage to plants, animals, their habitat and well-being of human beings, *e.g.* waste from detergents, pesticides, *etc.*

Recycling – Collecting, cleaning and re-using materials.

Stakeholders – A subgroup of the public whose interests may be positively or negatively affected by a proposal or activity.

Waste Management – Classifying, recycling, treatment and disposal of waste generated during reconstruction and decommissioning activities.

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1. SCOPE

The upgrading or refurbishment of a substation can have a major impact on the receiving environment. An application to DEAT for the proposed upgrade of Acacia substation was submitted in October 2008. The response indicated that the activities proposed as upgrade of Acacia substation are not regarded as listed activities in terms of GN No R.385 of 21 April 2006 of the National Environmental Management Act (NEMA) of 1998 (Act No. 107 of 1998).

Although the upgrade is not a listed activity in terms of the regulations Eskom still required the development of an Environmental Management Plan (EMP) to guide the process of upgrading the substation. This is based on the notion that the upgrade has numerous risks that require consideration and management interventions. This EMP is aimed at highlighting and pre-empting risks and identifying guidelines for construction personnel to help them protect, sustain and conserve the environment during construction.

The principles and conditions prescribed in this document are in line with the Integrated Environmental (IEM) philosophy which is aimed at achieving a desirable balance between development and conservation (DEAT, 1992). IEM is a key instrument of NEMA which prescribes the methodology for ensuring that environmental management principles are fully integrated into all stages of the development process. IEM advocates for the use of a variety of environmental management tools, of which the EMP is a case in point.

This EMP constitutes an enquiry document aimed at making recommendations and identifying constraints, which are enforceable under the general conditions of a contract between the developer and the contractor (See Appendix A for Declaration of understanding of the EMP by the Contractor).

The EMP for Acacia Substation aims to meet the following principles:

- 1) Continuous improvement: the proponent or implementing agency must commit to review and continually improve environmental management;
- 2) Integration across operations: This EMP must integrate across existing

- operational units such as safety, health and environment (SHE);
- 3) Legislation: The developer, engineer, contractor and sub-contractor must take cognisance of the fact that certain activities conducted during construction may require further licensing or environmental approval, e.g. bulk fuel storage, waste disposal, *etc.* The Contractor must continuously consult the ER, EO and ECO in this regard; and
 - 4) Broad level of commitment: the effective implementation of this EMP hinges on broad commitment from management and the entire workforce;
 - 5) Flexible and response: The construction team and all relevant personnel must be prepared to make rapid short-term responses to problems or incidents. This EMP is not “cast in stone”, and this implies that it must be continuously reviewed in consideration of the emerging dynamics of the proposed upgrade of the substation.

Eskom requires the Contractor to comply with the following conditions:

1. Take into consideration the legal rights of affected communities and Eskom Regional staff.
2. Always behave professionally on and off site.
3. Ensure quality in all work done, technical and environmental.
4. Resolve problems and claims arising from damage immediately to ensure a smooth flow of operations.
5. To underwrite Transmission’s Environmental Policy (Refer to Appendix I) at all times.
6. To preserve the natural environment by limiting any destructive actions on site, avoiding sensitive areas and actively implement the conditions of the EMP.

2. PROJECT BACKGROUND & GENERAL PRINCIPLES

The Environmental Control Officer (ECO) on site shall, in conjunction with the Contractor, ensure that all site staff are informed of the details of this document as well as the conditions thereof. The ECO shall convey the contents of this document to the Contractor site staff and discuss the contents in detail with the Project Manager and Contractor. The ECO will also determine compliance with the EMP.

No work shall commence until permission is granted from the Environmental Advisor from Transmission.

2.1. PROJECT EXECUTION AREA

The proposed upgrade will take place in an already existing substation called Acacia substation located in Edgemean in the City of Cape Town (See Figure 1 for an aerial view of the substation). Edgemean is an already developed residential area. The proposed development area is neighbouring residential units, major roads, a prison and a National Heritage site.

Figure 1: An aerial view of Acacia substation



The upgrade of Acacia substation will take place within an existing Eskom land bordering the Goodwood Correctional Services in the south-east, Platteklouf National Heritage Site in the east (See Figure 2), a community centre in the north-east, Edgemean business Park in the north, the N1 freeway in the south and a residential area in the north (less than 500 meters away) and east (less than a

kilometer away) of the substation. The construction, refurbishment or upgrading activities of Acacia substation is limited to the area as demarcated by Eskom and shown on the site plans within the existing fenced yard. During construction, the Project Manager or Contractor must obtain written agreements for any activities that need to be undertaken in an area outside of the Eskom owned property. These can be done for facilitating access, building construction camps or material storage areas.

Figure 2: Picture of the Plattekloof Natural Heritage Site



2.2. PROJECT SCOPE OF WORK

The load at Acacia substation already exceeds firm capacity of 500MVA under N-1 conditions. The measured 2006 maximum load (667MW or 694MVA) at Acacia substation exceeds the transformer firm capacity of 500MVA by 194MVA. The 500MVA firm capacity of Acacia was calculated from the existing 2x500MVA 400/132kV transformers. The upgrade of the substation will involve the following:

- Extension of the 132kV on the right side of the 33kV transformers to accommodate the two feeder bays and one transformer bay;
- Installation of a third transformer, 500MVA 400/132kV on the far left of the substation;

- Building a 132kV cable from existing transformer T2 (far right) to the extended busbar;
- Installation of the fault current limiting reactor in series with the 3 transformers; and
- Moving of the feed F5 to a section between F7 and 66kV transformer, and in the place of F5 install two bus sections (busbar 1 and 2).
- Carry out additional work in the control room which includes the following:
 - Changing the Electronic circuits and relay in the panel; and
 - Replacing the cables with bigger sized cables (this still needs to be confirmed).

The activities mentioned in the project scope will take place in an already existing Eskom substation as shown in the picture above and all impacts will be confined to the existing Eskom yard.

Should water be required from sources other than Eskom supply, a written agreement shall be reached between the Contractor and the Landowner in the presence of Eskom's officials. The substation must remain locked during the construction period to prevent animals or local community members from wandering onto site and getting injured. All works shall be limited to the fenced area and the Contractor workforce shall refrain from venturing outside this area onto private property.

2.3. ROLE PLAYERS AND RESPONSIBILITIES

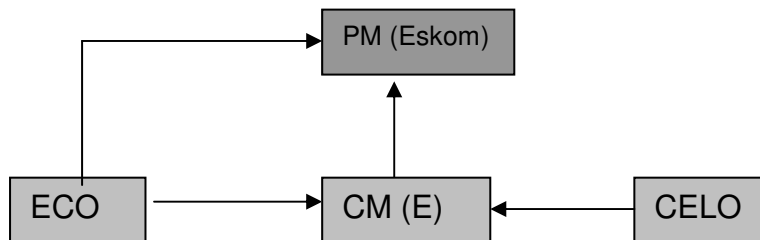
The successful execution of this EMP will require active involvement of all stakeholders taking part in the substation upgrade. It is important that all the stakeholders understand their roles and responsibilities clearly. There must be clear communication lines to receive and convey information on the project. The following potential role-players and their responsibilities are going to be involved in this project (The matrix below provides a list of all role-players. A section on their contact details must be completed and given to all relevant stakeholders at the beginning of the project/awarding of the contract):

Responsibility Matrix.

FUNCTION	NAME & TEL	RESPONSIBILITY
Project Manager (PM)		<ul style="list-style-type: none"> • Tasked with the overall management of project, contractors, consultants and EMP implementation. • The PM also ensures that all environmental procedures are met. • Report all incidents identified during construction to Transmission Environmental Manager
Site Supervisor/ Contract Manager (CM)		<ul style="list-style-type: none"> • Oversees site works, liaison with Contractor, PM and ECO
Environmental Control Officer (ECO)		<ul style="list-style-type: none"> • Act as a liaison between Eskom, Contractor and the Landowner. • Monitor the Implementation of EMP, condition of authorisations, & relevant legislation • Provide regular reports to Eskom Project manager in relation to implementation of the above. • Report legal contravention to Eskom and relevant authorities within required timeframes • Handle information from whistle blower as confidential and inform the relevant authorities as soon as possible.
Contractor (C)		<ul style="list-style-type: none"> • Implement and comply with recommendations and conditions of the EMP, appoints / delegates a dedicated person to work with ECO
Contractor Environmental Liaison Officer (CELO)		<ul style="list-style-type: none"> • Advises contractor on the possible ways of implementing and complying to the EMP, relevant legislations and other conditions imposed by relevant authorities. • Works with ECO to implement EMP on site
Eskom Transmission Environmental Advisor		<ul style="list-style-type: none"> • Provide environmental advice and conducts auditing.

2.4. REPORTING STRUCTURE.

Both the ECO and CM are obliged to report any incidents and non compliance to the Eskom Project Manager. The CELO is responsible for advising and reporting to the construction manager during the construction process.



All monthly and quarterly reports to be produced by the ECO should be submitted to both the construction manager and Eskom Project Manager. These reports should be kept in the site file at all times.

2.5. ENFORCEMENT, MONITORING AND AUDITING

The Environmental Control Officer will ensure compliance with this EMP and any relevant legislation. Continuous audits must be done to help in identifying the following issues:

- Incidents such as fuel spills, concrete spills, etc. and actions taken;
- Incidents that can lead to legal contraventions and litigation;
- Complaints from affected parties including neighbouring businesses, communities, (these should be recorded and kept on file); and
- Environmental damage that needs rehabilitation.

2.6. GENERAL GUIDELINES FOR THE PROJECT

- It is the developer's (Eskom) responsibility to prevent any site degradation due to non-compliance during construction;
- All construction personnel must not be allowed to go beyond the Eskom yard where the upgrade will be taking place;
- The contractor must adhere to agreed and approved access points and haul roads and the neighbours must be notified according;
- The convenience of local communities to commute especially when going

or returning from work and school must be promoted by avoiding contributing negatively to the existing traffic flow. If this cannot be avoided, local communities and the local authority must be notified in advance;

- There must be no camping on private property without having obtained the necessary permission;
- All damages that can be caused to neighbouring properties must be repaired in consultation with the owner;
- All relevant neighbouring landowners must be notified about the construction and the duration;
- There must be regular monitoring of site works;
- All personnel must be trained, and receive regular communication on how to work in an environmental-friendly manner;
- An ECO on behalf of the Contractor is to be appointed to implement this EMP;
- Environmental audits to be carried out during and upon completion of the project; and
- The Contractor must adhere to all conditions of this EMP.

2.7. AWARENESS RAISING AND CAPACITY BUILDING

Continuous communication to all employees on environmental matters will be an integral part of implementing this EMP. Awareness raising and capacity building to increase compliance with the EMP and relevant environmental legislation will be done through things like toolbox talk on a daily basis focusing on specific activities.

3. PHYSICAL ISSUES AND THEIR CONTROL

3.1. SITE ESTABLISHMENT AND MANAGEMENT

The contractor must make sure that a proper site camp is established to accommodate workers before construction starts. The contractor must provide a method statement (See Appendix B for Method Statement Example) that includes the layout of the camp, management of ablution facilities and wastewater management.

3.1.1. ABLUTION FACILITIES AND WASTE MANAGEMENT

Acacia substation already has Eskom offices with infrastructure that can be used to connect to the site camp facilities. In the event the contractor can not connect to the existing facilities, they are responsible to provide mobile chemical toilets. The Contractor shall inform all site staff about the use of supplied ablution facilities and under no circumstances shall indiscriminate excretion and urinating be allowed other than in supplied facilities.

There should be enough toilets available to accommodate the workforce (minimum requirement is 1:15 workers). Toilets shall be serviced regularly and the ECO shall inspect toilets regularly to ensure compliance to health standards.

The Contractor must also supply a wastewater management system that will comply with legal requirements and be acceptable to Eskom. The Contractor shall supply waste collection bins where such is not available and all solid waste collected shall be disposed of at a registered waste dumping facility. A certificate of disposal for chemical waste shall be obtained by the Contractor and kept on site and in file at all times. Where a registered waste disposal site is not available close to the construction site, the Contractor shall provide a Method Statement (See Appendix C for a declaration for method statement that must be signed by the Contractor, ECO and Site Engineer) with regard to waste management. Under no circumstances may solid waste be burned on site for the upgrade of the substation

because there is no incinerator on site. Littering by employees is prohibited, and the site must be kept aesthetically attractive.

In circumstances where the camp is not clean, the ECO must ensure that this is immediately rectified. The Contractor and the ECO must enforce cleanliness of the construction site camp. The ECO must monitor and report on this requirement.

- **Management objectives**

- Ensure that proper sanitation is achieved by encouraging all employees to use provided toilets;
- Minimise the potential of diseases on site; and
- Reduce the potential to pollute water, natural habitats and soil.

- **Measurable targets**

- The whole workforce use toilets;
- No visible signs of pollution on soil or water; and
- No litigation or compensation claims.

3.1.2. NOISE POLLUTION

During the installation and upgrade process, the Contractor shall ensure that noise levels remain within acceptable limits as outlined in the Noise-Induced Hearing Loss Regulations of 2003 promulgated under section 43 of the Occupational Health and Safety Act 85 of 1993. Excessive noise must not be allowed especially after working hours and during the night. It is important to note that the project site is located near an area of biodiversity significance called the Plattekloof Natural Heritage Site (See Figure 3). All construction activities, including delivery of materials must be done in a manner that cannot lead to degradation of the area and disturbance of both animal and plant life. In this instance, it is important to strictly access the construction site through existing roads and routes.

- **Management objectives**

- Prevention of noise pollution, especially during the night; and
- Minimise the nuisance factor of construction activities.

- **Measurable targets**
 - No complaints from surrounding communities; and
 - No litigation.

Figure 3: A picture showing a board of the Plattekloof Natural Heritage Site



3.1.3. WORKSHOP, STORAGE AREAS AND SAFE HANDLING OF HAZARDOUS CHEMICALS

Properly demarcated areas for the maintenance workshop and equipment storage areas must be identified before the construction commences. Where possible and practical all maintenance of vehicles and equipment shall take place in a workshop area. During servicing of vehicles or equipment, a suitable drip tray (with a minimum depth of 10cm) shall be used to prevent carbon spills onto the soil, especially where emergency repairs are done outside the workshop area.

All employees must be notified about the dangers of soil and water pollution related to spillage of chemicals. Spill kits made of environmental-friendly material must be available on site and all vehicles that transport hydrocarbons. The ECO and the site

manager must ensure all leaking equipments are repaired immediately or removed from site to facilitate repair. All potentially hazardous and non-degradable waste must be collected and removed to a registered waste disposal site.

The workshop area shall be monitored for oil and fuel spills and such spills shall be cleaned and re-mediated to the satisfaction of the ECO. The Contractor must have a Method Statement (See Appendix D for a list of Method Statements needed for the upgrade of Acacia substation) identifying procedures for dealing with possible emergencies that can occur, such as fire and accidental leaks and spillages. The Contractor must ensure that all hazardous substances that include amongst others oil, paint, insecticides, acids, herbicides and fuel are stored in suitable containers and storage areas are bundled. A register must be kept on all substances and be available for inspection at all times.

The whole site must be monitored for spills and any spills must be contained, cleaned and rehabilitated immediately. Any leaking containers shall be repaired or removed from site (See the actions below remediation after spillages). Safety signs depicting “No smoking”, “No naked lights” and “Danger” must be used in the storage area. Containers shall be clearly marked to indicate contents as well as safety requirements. The Contractor shall supply a method statement for the storage of hazardous materials and ensure that things are done in compliance with Safety, Health and Environment policy statement.

In cases where there accidental are spillages the following shall apply:

- All contaminated soil / yard stone shall be removed and be placed in containers. Contaminated material can be taken to one central point where bio-remediation can be done or disposed off at a suitable site;
- Smaller spills can be treated on site, and identified employees must be trained to perform this function;
- A specialist Contractor shall be used for the bio-remediation of contaminated soil where the required remediation material is not available on site; and
- All spills of hazardous substances must be recorded and reported immediately to the Environmental Advisor for further remedial action that may require engaging with relevant authorities (*e.g.* the Department of Water Affairs in cases

where there is water pollution).

3.1.4. CAMPING SITE AND AESTHETICS

The site shall be kept visually and aesthetically pleasing, especially in and around the construction camp. The ECO shall regularly inspect the site to ensure that it is neat and clean. Where required the campsite shall be screened by the Contractor to ensure that there is no unacceptable visual intrusion. Screening can be done by use of shade cloth or corrugated fencing. The camp must have dedicated wash areas that are situated away from areas with shallow groundwater. The area must also have bins for waste disposal.

- **Management objectives**

- Aesthetically pleasing working areas, campsite and storage areas; and
- Minimise pollution and impacts to surrounding areas.

- **Measurable targets**

- No complaints from affected parties on or around the site;
- No signs of pollution and visible signs of litter; and
- Method Statement.

3.2. MANAGEMENT OF THE SUBSTATION TERRAIN AREA

The upgrading of Acacia substation will require terracing for the development of an area for the proposed transformer. However, it is important to note that the site where terracing will be developed is already ecologically disturbed and not very sensitive. Consideration should be made to the fact that where terracing will be done the topsoil must be collected and retained for the purpose of re-use later to rehabilitate disturbed areas not covered by yard stone. Such areas include terrace embankments and areas outside the high voltage yards. Where required, all sloped areas shall be re-vegetated using indigenous trees and stabilised to ensure proper rehabilitation is effected. These areas can be stabilised using design structures or vegetation as specified in the design to prevent erosion of steep embankments.

The retained topsoil shall be spread evenly over areas to be rehabilitated and suitably compacted to effect re-vegetation of such areas to prevent erosion. Where required re-vegetation can also be enhanced using a grass seed mixture.

- **Management objectives**

- Minimise scarring of the soil surface and land features other than on site;
- Prevent pollution of soil, surface and ground water on site and in the vicinity;
- Minimise chances of transgression of the acts of controlling pollution;
- Minimise disturbance and loss of topsoil from site;
- Minimise the possibility of cement residue affecting the surrounding environment;
- and
- Rehabilitate all disturbed areas in the substation area.

- **Measurable targets**

- Method Statement by the Contractor;
- No visible erosion scars once construction is completed;
- No visible signs of pollution during construction;
- No litigation due to transgression of pollution control acts; and
 - All disturbed areas successfully rehabilitated with the use of indigenous plants (i.e. Fynbos plants that are found in the Western Cape) where

necessary. This should be verified before site is handed over for operations

3.3. NATURAL DRAINAGE

The Contractor (See Appendix E for the ProForma to be signed by the Contractor and the Eskom Project Manager at contract award) must ensure that all activities do not interfere with any watercourses in the vicinity of the site. Should deviation of such watercourses be required as part of the contract design specification, the specifications shall be adhered to strictly. The Environmental Control Officer shall ensure that all watercourses are adequately protected to prevent downstream siltation due to erosion on site. Rubble from the construction process shall be removed from site and may under no circumstances be dumped into any natural drainage channels. The normal flow of runoff water must not be impeded, as this will enhance erosion.

- **Management objectives**

- Avoid damage and diversion of existing natural drainage channels; and
- Minimise scaring of soil surface, loss of topsoil and soil erosion.

- **Measurable targets**

- No damage to natural drainage channels;
- No loss of topsoil;
- The footprint did not exceed agreed boundaries;
- No visible erosion scars on site; and
- All damaged areas successfully rehabilitated.

3.4. ACCESS ROADS TO THE SITE

Access to Acacia substation will be easy because there are existing well-managed tarred-roads leading to the site. The substation can be accessed via the N1, Vasco Boulevard, Wingfield Place, Monte Vista Boulevard and Montague Road. Minor access routes may need to be established on-site to facilitate construction. If this is necessary, the areas must be properly demarcated with relevant signage to avoid confusion and accidents. No unauthorised access is permitted especially in the

natural heritage area.

Where necessary suitable measures shall be taken to rehabilitate damaged areas related to access of the site.

- **Management objectives**

- Minimise damage to existing access roads;
- Minimise damage to fauna and flora;
- Minimise loss of topsoil and enhancement of erosion; and
- Minimise impeding the natural flow of water.

- **Measurable targets**

- No erosion visible on access roads three months after completion of construction;
- No loss of topsoil due to runoff water on access roads; and
- No interference with the natural flow of water.

3.5. CONSTRUCTION RUBBLE DISPOSAL AND WASTE MANAGEMENT

The Contractor must provide and maintain a method statement for solid waste management. In this method statement, licensed facility(ies) for waste disposal must be identified. The method statement will also outline the proposed record-keeping of waste disposal certificates for auditing purposes. No material shall be left on site that may harm people. Broken, damaged and unused spares such as porcelain, glass, nuts, bolts and washers shall be picked up and removed from site. 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 spilled concrete shall be cleaned up immediately. There shall be no illegal waste disposal because this can result in fines. Waste must also be separated into recyclable and non-recyclable, and must be separated as follows:

- **Hazardous waste:** This includes old oil paint, etc.
- **General waste:** This includes construction rubble.
- Reusable construction material.

Recyclable material must be deposited in separated bins: This includes glass, paper and tins.

- **Management objectives**

- To keep the site tidy and neat, and reduce the potential influx of flies and related diseases on site and surrounding areas;
- Disposal of construction rubble in an appropriate manner;
- Minimise litigation and complaints by I&AP;
- Reduce visual impact and retain the “sense of place” as much as possible;
- Minimise soil and water pollution; and
- Sustainable management of waste and recycling.

- **Measurable targets**

- Appropriate disposal of rubble and waste in general;
- No construction rubble left lying around on site;
- Neat and tidy site;
- Sufficient waste disposal available on site;
- No visible signs of pollution on soil and water on site and surrounding areas;
- No incidents of litigation;
- Method statement;
- No complaints from surrounding landowners and communities.

3.6. LITTERING CONTROL

Littering by the employees of the Contractor shall not be allowed under any circumstances. The ECO shall monitor the neatness of the work sites as well as the Contractor campsite and ensure that there is provision of marked waste disposal bins.

- **Management objectives**

- Neat and healthy workplace and site

- **Measurable targets**
 - No complaints from affected parties.

3.7. DISPOSAL OF OLD EQUIPMENT

All old equipment removed during the upgrade of Acacia substation shall be stored in such a way as to prevent pollution of the environment. Oil containing equipment shall be stored to prevent leaking or be stored on drip trays should such equipment already be leaking. All scrap steel shall be stacked neatly and any disused and broken insulators shall be stored in containers.

Once material has been scrapped and the contract has been placed for removal, the Contractor shall ensure that any equipment containing pollution causing substances is removed in such a way as to prevent spillage and pollution of the environment. **A method statement shall be developed for that purpose.** The Contractor shall also be equipped to contain and clean up any pollution causing spills. Disposal of unusable material shall be at a registered waste disposal site and a certificate of disposal shall be obtained and copied to Eskom.

- **Management objectives**
 - To prevent pollution of the environment; and
 - Prevention of litigation due to illegal dumping.
- **Measurable targets**
 - No complaints from local Landowners / Regional staff / Communities;
 - No pollution of the environment; and
 - No litigation due to illegal dumping.

3.8. DUST POLLUTION

Edgemean area, where Acacia substation is located has sandy soils. Normally, there are periods where the place is very windy and this can exacerbate dust pollution during construction. It is important that the Contractor be responsible for

dust control on site to ensure no nuisance is caused to the local Landowners, neighbouring Communities or Regional staff at the substation. Watering of access roads is recommended, as this is normally the greatest cause of dust pollution. Speed limits can also be effected, especially on private dirt roads leading to the site. Any complaints or claims emanating from the lack of dust control shall be attended to immediately by the Contractor. The possibility of using grey water for dust control must be investigated as an alternative should the need arise. The control of cement and concrete dust which is toxic to soil properties is also vital (no water must be used for this purpose). Cement bags must not be allowed to scatter around the site and spread cement dust. All vehicles transporting material that can be blown off must be covered by tarpaulin and speed limits of 20km/h must be adhered.

- **Management objectives**

- Site works do not cause dust nuisance to other people in the area; and
- Reduce dust fall out.

- **Measurable targets**

- No formal complaints or claims arising due to dust pollution;
- No visible signs of dust;
- No visible signs of dust contamination on the surrounding environment; and
- No incidents reported to the ECO.

3.9. SITE CLEARING

The proposed installation of a transformer for this project will take place in an existing substation. The substation is already fenced off and it does not have trees except some portions with grass and small plants (See Figure 4). The grass and plants will be removed for clearing the construction site and the platform terraced for placing the transformer. All alien vegetation shall be removed from site during the project and disposed in suitable areas. Protected or endangered species of plants shall be retained where possible. Where such species have to be removed due to interference with structures, the necessary permission and permits shall be

obtained by the ECO from Provincial Nature Conservation prior to commencement of site works. Search, rescue and replanting of indigenous, valuable and protected species is highly recommended where possible and viable.

Figure 4: Picture showing the existing Acacia substation



The use of herbicides shall only be allowed after a proper investigation of the type of plant and correct herbicides to be used is done, the long-term effects and the effectiveness of the herbicides. Application shall be under the direct supervision of a qualified technician. All surplus herbicide shall be disposed of in accordance with the Supplier's specifications.

The Contractor for vegetation clearing, if needed, shall comply with the following parameters:

- **The Contractor must have the necessary knowledge to be able to identify different species**
- **The Contractor must be able to identify declared weeds and alien species that can be totally eradicated.**
- **The Contractor must be in possession of a valid herbicide applicators licence**
- **The Contractor shall supply a method statement regarding vegetation clearing at the tender stage.**

- **Management objectives**

- Minimise unnecessary damage to vegetation where such vegetation does not interfere with construction;
- Keep site as natural looking as possible;
- Minimise possibility of erosion due to removal of vegetation;
- Minimise scarring of the soil surface and land features;
- Minimise loss of topsoil;
- Minimise risks of veldt fires; and
- Minimise damage to natural features.

- **Measurable targets**

- Only vegetation cleared as required for site construction purposes;
- No visible erosion scars three months after completion of construction due to vegetation removal;
- No visible damage to the vegetation outside the site one year after completion of the contract due to herbicide leaching;
- All damaged areas successfully rehabilitated;
- The project footprint does not go beyond the existing substation site;
- No visible erosion scars once construction completed;
- Transplanting of indigenous plants, where possible, into appropriate areas in the yard;
- Method statement by Contractor should be available before construction

site clearance commence;

- No litigation due to unauthorised removal of vegetation and veldt fires; and
- No unnecessary damage to natural features.

3.10. FENCING REQUIREMENTS

Acacia substation is already appropriately fenced. During construction the substation must be kept locked at all times, especially when works are stopped during weekends and holidays. All claims arising from gates left open shall be investigated and if at fault, settled in full by the Contractor. If any fencing interferes with the construction process, such fencing shall be deviated until construction is completed. The deviation of fences, if necessary, shall be negotiated and agreed with the relevant landowner in writing.

- **Management objectives**
 - Use of existing gates for access to the site;
 - Minimise damage to private fences; and
 - Limit access to Eskom and Contractor personnel.
- **Measurable targets**
 - No transgressions of the Fencing Act and therefore no litigation;
 - No damage to fences and subsequent complaints from neighbouring landowners; and
 - All gates kept locked at all times to limit access to construction staff.

3.11. FIRE PREVENTION

Taking into consideration the location of the substation and its surrounding land uses no open fires can be allowed on site under any circumstance (The Forest Act, No 122 of 1984). All cooking shall be done in demarcated areas that are safe and cannot cause runaway fires. The Contractor shall have operational fire-fighting equipment available on site.

- **Management objectives**
 - Minimise risk of runaway veldt fires;
 - Maintain safety on site; and
 - Minimise damage to life and private property.

- **Measurable targets**
 - No veldt fires started by the Contractor's work force;
 - Method statement; and
 - No litigation from neighbouring landowners due to damages caused by fires.
 - No open fires shall be allowed on site under any circumstance
 - The Contractor shall have fire-fighting equipment available on site all the time.

3.12. MATERIAL STORAGE AREAS

Specifications require the protection of Eskom supplied material on site, especially conductor drums. This normally requires that a firebreak is created around a material storage area. These areas are left to rehabilitate on their own which could be disastrous. Once construction has been completed on site and all excess material has been removed, the storage area shall be rehabilitated. If the area was badly damaged, re-seeding shall be done. For seeding the same provisions as in 4.10 shall apply.

- **Management objectives**
 - Minimise disturbance of topsoil
 - Successful rehabilitation of disturbed areas

- **Measurable targets**
 - No remaining disturbance to vegetation outside the substation area
 - No loss of topsoil
 - All disturbed areas successfully rehabilitated one year after completion of the contract

3.13. TRANSPORTATION OF EQUIPMENT

Acacia substation is located next to major roads, viz. N7 and N1. The existing access to the substation is also located closer to natural heritage site with local indigenous species. It is very crucial that all equipment moved onto site or off site during the project is subject to the legal requirements as well as Eskom's specifications for the transport of such equipment. Oil filled equipment such as CT's, VT's and capacitor cans have specific safety requirements regarding their handling, transport and storage. The Contractor shall meet these safety requirements under all circumstances. All equipment transported shall be clearly labelled as to their potential hazards according to specifications. All the required safety labelling on the containers and trucks used shall be in place. If the transportation of material will disturb the flow of traffic, local residents must be notified in advance and alternative routes must be identified for their use. The Contractor must avoid transportation of material during rush hour if possible.

The Contractor shall ensure that all the necessary precautions against damage to the environment and injury to persons are taken in the event of an accident and shall supply a Method Statement to that effect.

- **Management objectives**
 - Safe handling and transport of equipment;
 - Safe handling and transport of hazardous substances; and
 - Minimise environmental pollution and damage.

- **Measurable targets**
 - All equipment delivered to site in tact without disrupting local traffic flow;
 - Local communities informed in advance if traffic flow will be affected during transportation of material;
 - No spillage of hazardous substances on roads;
 - Method Statement; and
 - No litigation due to environmental pollution.

3.14. INFRASTRUCTURE

No interruptions other than those negotiated shall be allowed to any essential services. Damage to infrastructure shall not be tolerated and any damage shall be rectified immediately by the Contractor. A record of any damage and remedial actions shall be kept on site.

All existing private access roads used for construction purposes, shall be maintained at all times to ensure that the local people have free access to and from their properties. Speed limits shall be enforced in such areas and all drivers shall be sensitised to this effect.

Any possible disruptions to essential services must be kept to a minimum and should be well advertised and communicated to the surrounding communities.

- **Management objectives**
 - Securing of the safe use of local infrastructure

- **Measurable targets**
 - No unplanned disruptions of services;
 - No complaints from Authorities, Landowners and Communities regarding disruption of services; and
 - No litigation due to losses of income.

4. SOCIAL ISSUES AND THEIR CONTROL

4.1. PREVENTION OF DISEASE

The Contractor shall take all the necessary precautions against the spreading of disease such as measles, foot and mouth, *etc.* A record shall be kept of drugs administered or precautions taken and the time and dates when this was done. This can then be used as evidence in court should any claims be instituted against Eskom or the Contractor.

The workforce shall also be sensitised to the effects of sexually transmitted diseases (STDs), especially AIDS. General health issues shall be brought to the attention of the site staff and condoms shall be supplied on site.

- **Management objectives**
 - Prevent litigation due to infestation; and
 - Prevent spreading of sexually transmitted diseases.

- **Measurable targets**
 - No complaints from Communities; and
 - No litigation.

4.2. INTERACTION WITH AFFECTED PARTIES

Successful upgrade of Acacia substation will depend on the maintenance of good relations with the affected local communities and Eskom Regional staff. The ECO and the Contractor must establish good relations with all the affected parties. All negotiations related to the project for any reason shall be between the ECO, the affected parties and the Contractor. **NO** verbal agreements shall be made. All agreements shall be recorded in writing and all parties shall co-sign the documentation.

The affected parties shall always be kept informed about any changes to the construction programme should they be involved. If the ECO is not on site the

Contractor should keep the affected parties informed. The contact numbers of the Contractor and the ECO shall be made available to the affected parties. This will ensure open channels of communication and prompt response to queries and claims.

All contact with the affected parties shall be courteous at all times, and the rights of the affected parties shall be respected at all times.

- **Management objectives**
 - Maintain good relations with affected parties

- **Measurable targets**
 - No delays in the project due to interference from affected parties

4.3. CLAIMS FOR DAMAGES

The ECO shall keep a photographic record of any damage to areas outside the demarcated site area. The date, time of damage, type of damage and reason for the damage shall be recorded in full to ensure the responsible party is held liable. All claims for compensation emanating from damage should be directed to the ECO for appraisal. The Contractor shall be held liable for all unnecessary damage to the environment.

A register shall be kept of all complaints from the community. All claims shall be handled immediately to ensure timeous rectification / payment by the responsible party.

- **Management objectives**
 - Minimise complaints from Landowners and communities
 - Prevent litigation due to outstanding claims
 - Completion of the contract on time

- **Measurable targets**
 - No claims from the Landowner or communities

- All claims investigated and settled within one month
- No litigation due to unsettled claims

4.4. CRIME, SAFETY AND SECURITY

The Contractor must ensure that a list of all local emergency telephone numbers / contact persons are kept on site and up to date. These contacts must be posted at all relevant locations throughout the site. The Contractor must also ensure that all employees do not engage in any criminal activity on site and in local communities.

- **Management Objectives**
 - Reduce potential criminal incidences.

- **Measurable Targets**

No incidents reported.

5. BIOLOGICAL ISSUES AND THEIR MANAGEMENT

5.1. FAUNA

Acacia substation is an already existing site with a functional electricity substation that is fenced and owned by Eskom. The area is already substantially altered ecologically and there are no animals to be conserved in the substation.

5.2. FLORA

Acacia substation does not contain any natural vegetation. As indicated above the site is not ecologically sensitive and there is no substantial impacts on fauna and flora that is envisaged from the proposed upgrade. However, few, if any, protected or endangered species may occur on the site. If any are found, special care should be taken not to damage or remove any such species unless absolutely necessary. Permits for removal must be obtained from the Provincial Nature Conservation should such species be affected. All plants not interfering with the operation of the substation shall be left undisturbed, clearly marked and indicated on the site plan

- **Management objectives**
 - Minimal disturbance to vegetation where such vegetation does not interfere with construction and operation of the substation; and
 - Prevention of litigation concerning removal of vegetation.

- **Measurable targets**
 - No litigation due to removal of vegetation without the necessary permits.

5.3. HERBICIDE USE

Herbicide use, where necessary, shall only be allowed with the approval of Eskom and according to contract specifications. The application shall be according to set specifications and under supervision of a qualified technician. The possibility of leaching into the surrounding environment shall be properly investigated and only environmentally friendly herbicides shall be used.

- **Management objectives**

- Control on the safe application of herbicides;
- Proper storage in designated areas of herbicides;
- Workforce educated on the proper use of herbicides; and
- Proper disposal of containers that used to carry herbicides.

- **Measurable targets**

- No signs of vegetation dying due to leaching of herbicides one year after completion of the contract; and
- No community complaints and litigation.

6. CULTURAL ISSUES AND THEIR CONTROL

6.1. ARCHAEOLOGY

If during construction artefacts are found they shall not be removed under any circumstances. No Dolomite, Breccias or Stomatolites may be removed or disturbed without the required permits from the South African Heritage Resource Agency (SAHRA). However, it is envisaged that the proposed upgrade of Acacia substation is not going to have a major impact on heritage. Minor impacts on birds and plants in the heritage site can be expected from construction vehicles but this will be of no significance. Should any archaeological sites be uncovered during construction, their existence shall be reported to Eskom immediately, **Lucia Chauke to be informed at 011 800 4427.**

- **Management objectives**
 - Protection of archaeological sites, and land considered to be of cultural value;
 - Protection of the Plattekloof heritage area against vandalism and destruction.
 - The preservation and appropriate management of new archaeological finds should these be discovered during construction.

- **Measurable targets**
 - No destruction of or damage to known heritage sites.

7. SITE REHABILITATION

All damaged areas shall be rehabilitated upon completion of the contract in accordance with design specifications. 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. Extra seed shall be sown on disturbed areas as directed by the ECO (see below for specifications). Other methods of rehabilitating disturbed sites may also be used at the discretion of the PM to comply with the conditions of the EMP, e.g. stone pitching, logging, *etc.* Contour banks shall be spaced according to the slopes. The type of soil shall also be taken into consideration.

A mixture of grass seed can be used provided the mixture is carefully selected to ensure the following:

- Annual and perennial grasses are chosen.
- Pioneer species are included.
- Species chosen will grow in the area under natural conditions.
- Root systems must have a binding effect on the soil.
- The final product should not cause an ecological imbalance in the area.

To get the best results in a specific area, it is a good idea to consult with a specialist or 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 seed the type of soil in Edgemean where the substation is located which is sandy. Re-seeding will always be at the discretion of the PM, unless specifically requested by Regional staff.

- **Management objective**
 - Minimise damage to topsoil and environment
 - Successful rehabilitation of all damaged areas
 - Prevention of erosion
- **Measurable targets**
 - No loss of topsoil due to construction activities

- All disturbed areas successfully rehabilitated within one year of completion of the contract
- No visible erosion scars one year after completion of the contract

8. POTENTIAL PROBLEMS

8.1. PRE-CONSTRUCTION

Local communities and landowners may see the construction period as interference with their daily activities. This may lead to a negative attitude towards the whole construction process.

8.2. DURING CONSTRUCTION

Damage to fences, gates and other infrastructure may occur at any time. This will create problems with local Landowners and communities and should be avoided as far as possible.

8.3. AFTER CONSTRUCTION

If damaged infrastructure is not repaired to the expectations of the affected parties, they may engage in litigation. Outstanding claims for damages may also result in litigation.

9. POSSIBLE SOLUTIONS TO POTENTIAL PROBLEMS

1. Proper continuous liaison (communication) between Eskom, the Contractor and affected parties regarding do's and don'ts.
2. The Contractor must adhere to all conditions of contract including the Environmental Management Programme (See Appendix H for Activity Environmental Management Plan).
3. Environmental awareness training and toolbox talks shall be given to all site staff regarding the conditions of this EMP, and shall include relevant posters placed strategically for information purposes.
4. Proper planning of the construction process to allow for disruptions due to rain and very wet conditions.
5. Where existing private roads are in a bad state of repair, such roads' condition shall be documented before they are used for construction purposes. If necessary some repairs should be done to prevent damage to equipment and plant.
6. All manmade structures shall be protected against damage at all times and any damage shall be rectified immediately.
7. The Contractor shall ensure that all damaged areas are rehabilitated to the satisfaction of Eskom and each and every affected party and that outstanding claims are settled.
8. Proper site management and regular monitoring of site works.
9. Proper documentation and record keeping of all complaints and actions taken.
10. Regular site inspections and good control over the construction process throughout the construction period.
11. Continuous adherence of the Contractor and all employees on site during construction to Eskom's Safety, Health and Environment Policy (**Ref. TST41-61**).
12. A positive attitude towards implementing Environmental Management by all site personnel.
13. Environmental Audits (See Appendix F for Eskom's Construction Environmental Audit Checklist) to be carried out during and upon completion of construction (at least two).

10. SITE SPECIFIC PROBLEM AREAS

Site specific problems, if any, must be shown on the layout plans (**Design**) and accompanying photographs. No-go areas, if any, must also be identified on the plans.

11. METHOD STATEMENTS FOR THE CONTRACT

The Contractor shall supply method statements for all works required as stated throughout this document as per specific contract requirement. All agreements regarding extra works for environmental compliance shall be in writing and well documented. Work shall only commence upon approval by Eskom.

The ECO shall ensure that all works are in accordance with Method Statements and Contract Specifications.

12. SITE DOCUMENTATION, MONITORING AND REPORTING

The standard Eskom site documentation shall be used to keep records on site. All documents shall be kept on site and be made available for monitoring purposes. Site inspections by an Environmental Audit Team may require 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 ECO is imperative to ensure that all problems encountered are solved punctually and amicably. When the ECO is not available, the Contract Manager / Site Supervisor shall keep abreast of all works to ensure no problems arise.

Two-weekly environmental compliance reports shall be forwarded to the Transmission Engineering Environmental Advisor (appointed per project) with all information relating to environmental matters. The following Key Performance Indicators must be reported on a two-weekly basis by the ECO:

- Complaints received from affected parties and actions taken.
- Environmental incidents, such as oil spills (See Appendix G for Eskom's Oil Spill Clean-Up and Rehabilitation Standards),, etc. and actions taken.

- Incidents possibly leading to litigation and legal contravention.
- Environmental damage that needs specialised rehabilitation measures to be taken.

The following documentation shall be kept on site by the ECO:

- Site daily diary.
- Complaints register.
- Records of all remediation / rehabilitation activities.
- Copies of two-weekly reports to the Transmission Engineering Environmental Advisor for auditing purposes.
- Copy of the Environmental Management Programme.
- Minutes of site meetings including discussions on environmental issues.
- Records of *toolbox talk*¹ held with employees.

¹ Toolbox talk refers to daily discussions by construction workers focusing on a topic of the day aimed at raising environmental awareness amongst employees.

13. REFERENCES

Conservation of Agricultural Resources Act, Act 43 of 1983 and amendments.

Corporate directive for the management of PCB, ESKADAAO3 REV 1.

Hazardous Substances Act, 15 of 1973 and amendments.

Health Act, Act 63 of 1977.

Herbicide Management, ESKPBAAD4 REV 0.

Minerals Act, Act 50 of 1991.

National Environmental Management Act, Act 107 of 1998.

National Forest Act, Act 84 of 1998.

National Heritage Resources Act, Act 25 of 1999.

National Water Act, Act 36 of 1998.

Noise-Induced Hearing Loss Regulations of 2003.

Occupational Health and Safety Act, Act 85 of 1993

Standard passive fire protection for oil-filled equipment in High Voltage yards,
TRMASAAQ8 REV 4

Standard for management of PCB, ESKASAAC2 REV1.

APPENDIX A: DECLARATION OF UNDERSTANDING BY THE CONTRACTOR

I,

Representing

Declare that I have read and understood the contents of the Environmental Management Plan for the Upgrade of Acacia Substation

Contract:

I also declare that I understand my responsibilities in terms of enforcing and implementing the Environmental Specifications for the abovementioned Contract.

Signed:

Place:

Date:

Witness 1:

Witness 2:

APPENDIX B: METHOD STATEMENT EXAMPLE: WASTE MANAGEMENT

CONTRACT:

DATE:

WHAT WORK IS TO BE UNDERTAKEN? *[give a brief description of the work to be undertaken on site that will generate waste (hazardous and non-hazardous waste)].* Attach more pages if more space is required.

WHERE WILL THE WORK TAKE PLACE? *(Where possible, provide an annotated plan and full description of the extent of the work).* Attach more pages if more space is required.

Project code and name

METHOD STATEMENT: WASTE MANAGEMENT (Continued)

START AND END DATE OF THE WORKS FOR WHICH THE METHOD STATEMENT IS REQUIRED:

Start Date: **End Date:**

HOW IS WASTE TO BE MANAGED ON SITE? (provide as much detail as possible, including annotated sketches and plans where possible).

APPENDIX C: DECLARATION for Method Statement: WASTE MANAGEMENT

1. ENGINEER

The work described in this Method Statement, if carried out to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

(Signed) _____
Print Name
Dated: _____

2. ECO

The work described in this Method Statement, if carried out to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

(Signed) _____
Print Name
Dated: _____

3. CONTRACTOR

The work described in this Method Statement, if carried out to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

(Signed) _____
Print Name
Dated: _____

APPENDIX D: LIST OF METHOD STATEMENTS REQUIRED TO ASSIST IN THE IMPLEMENTATION OF THIS EMP

- Method Statement that outlines the approximate number of people on site, the layout of the camp, management of ablution facilities, noise and wastewater management.
- Method Statement with regard to waste management.
- Method Statement to show procedures for dealing with possible emergencies that can occur, such as fire and accidental leaks and spillage of carbon fuels and oils.
- Method Statement for the storage of hazardous substances.
- Method Statement for dealing with veldt fires caused on site during construction.
- Method Statement for management of concrete and batching plants.
- Method Statement for rehabilitation of Acacia substation.
- Method Statement for waste disposal other than in a registered waste site.

**APPENDIX E: PRO FORMA TO BE SIGNED BY THE CONTRACTOR AND ESKOM
PROJECT MANAGER AT CONTRACT AWARD.**

CONTRACT NAME: _____

CONTRACT NUMBER: _____

ENVIRONMENTAL COMPLIANCE

I _____ ON BEHALF OF _____ (C)

I _____ ON BEHALF OF ESKOM

DECLARE AS FOLLOWS:

1. I AM AWARE THAT CONSTRUCTION, REFURBISHMENT OR UPGRADING ACTIVITIES CAN HAVE A MAJOR IMPACT ON THE ENVIRONMENT.
2. I UNDERTAKE TO ADHERE TO THE REQUIREMENTS OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME AND THE RECORD OF DECISION FROM DEAT.
3. I PLEDGE TO INFORM ALL SITE STAFF OF THEIR INVOLVEMENT IN MANAGING ENVIRONMENTAL IMPACTS ON SITE.
4. I COMMIT TO IMPLEMENTING ENVIRONMENTAL BEST PRACTISE ON SITE AT ALL TIMES DURING THE CONTRACT.

SIGNED: _____ DATE: _____

CONTRACTOR

SIGNED: _____ DATE: _____

ESKOM



APPENDIX F: CONSTRUCTION ENVIRONMENTAL AUDIT CHECKLIST

Name of Substation:

Date:

Name of Auditor:

	AUDIT QUESTION	YES	NO	ACTION	COMMENTS
Vegetation Management					
1	Have construction activities remained within the designated working areas?				
2	Has one access route been used?				
Oil Spills					
3	Have any oil or diesel spills occurred on site?				
4	Have oil spills been reported to the Environmental Advisor/ECO via a flash report within 24 hours of the spills occurring?				
5	Have oil spills been managed according to the Standard for Oil Spill Clean-Up and Rehabilitation – ESKASABT0				
6	Is there a stock of oil remediation chemicals on site?				
7	What is done in case of oil spill?				
Erosion					
8	Have any complaints been received from property owners regarding occurrence of erosion on their properties as a result of construction activities?				
9	Were any signs of erosion visible during the audit.				
Topsoil Management					
10	Has all the topsoil been backfilled or levelled on site?				

	AUDIT QUESTION	YES	NO	ACTION	COMMENTS
11	Is separation of soil done?				
Emergency Preparedness Procedure					
12	Are the emergency numbers available on site?				
13	Have any incidents of veld fires occurred?				
14	Is there sufficient fire fighting equipment on site?				
Disturbance to the Natural Heritage Resources					
15	Were tribal graves or archaeological sites identified during the construction activities?				
16	If yes, were construction activities stopped immediately and the Environmental Practitioner contacted?				
17	Was the South African Heritage Resources Agency contacted?				
Property Access					
18	Were entrance gates, walls and paths rehabilitated to the property owner's satisfaction?				
19	Was permission obtained from property owners before construction commenced?				
Water Management					
20	Had any incidents of water pollution occurred?				
21	If yes, was a flash report issued within 24hrs to the Environmental Management Department?				

	AUDIT QUESTION	YES	NO	ACTION	COMMENTS
22	Was the incident investigated and recommendations implemented?				
23	Are there sufficient potable water available?				
24	Are there any storm water issues reported?				
Sanitation (EMP 5.1)					
25	Are there sufficient portable toilets available?				
Social Issues					
26	Were any public complaints registered and actioned?				
Waste Management					
27	Are there sufficient waste bins on site?				
28	Are waste bins positioned correctly?				
29	Was litter noted during site inspection?				
Use of cement and/or concrete					
30	Was any excess cement of concrete noted during the site inspection?				
Legal Compliance					
31	Are copies of the following available on site, Record of Decision, EMP and Eskom Standard on Oil Spillage?				

APPENDIX G: ESKOM OIL CLEAN-UP AND REHABILITATION STANDARDS



STANDARD

TITLE: **OIL SPILL CLEAN-UP AND REHABILITATION**

REFERENCE: **ESKASABT0** REV **0**
 DATE: **NOVEMBER 2000**
 PAGE **1** OF **11**
 REVISION DATE:
NOVEMBER 2003

COMPILED BY	FUNCTIONAL RESP.	AUTHORIZED BY
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Foreword

This standard has been compiled to set a uniform standard addressing oil spill emergencies and long term action following the need identification by Eskom's Corporate Environmental Affairs Department. The standard addresses the containment and the remediation issues surrounding an oil spill. It also gives a risk rating and response reaction guideline. The standard was compiled following various discussions with staff involved in oil spills as well as response teams from various organizations

NOTE All comments for revising and updating this document must be directed to the Environmental Liaison Committee (ELC), who will in turn liaise with the Technology Standardization Manager.

Queries concerning this standard may be directed to the compilers, Ms A Lombard at Technology Services International (TSI), Rosherville or Mr M Hunter at Distribution, Megawatt Park.

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- Various Eskom staff members who participated in the oil spill questionnaire survey

Introduction

Insulating oil and other related hydrocarbon and synthetic compounds pose a serious pollution problem when released into the environment. Not only do these compounds pose a fire hazard, but with one litre of oil having the potential to contaminate in excess of a million litres of water, it needs to be handled with care. Oil can rapidly penetrate certain soil types, which may lead to extensive soil contamination as well as ground water and surface water contamination. The Water Act 36 of 1998, states that "hydrocarbons should not touch the soil or water and if they do, they shall be removed immediately".

1 Scope

1.1 Purpose

The purpose of this standard is to communicate a standard policy and response action following an oil spill on a site. It includes a rating system to enable a risk assessment that will assist with the reporting and especially the level of reporting of an oil spill.

This standard is applicable to any oil handling site and oil containing equipment, which includes distribution, transmission, generation sites as well as all contractors working on Eskom sites. It is of particular importance for employees in oil storage areas, maintenance teams and contractors to be familiar with the contents of this standard.

1.2 Applicability

This standard is applicable to all Eskom employees and contractors who in the event of their daily activities come across an oil spill.

2 Normative references

The following documents contain provisions that, through reference in the text, constitute requirements of this standard. At the time of publication, the editions indicated were valid. All standards and specifications are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the documents listed below. Information on currently valid national and international standards and specifications can be obtained from the Information Centre and Corporate Technology Standardization Division at Megawatt Park.

Erickson, MD:1993, *Remediation of PCB Spills*. Lewis publishers, Tokyo.

Waste-tech:1999, *National spill response service*.

MRO Product Management:1999, *Inland oil spill contingency plans*.

Eskom:1999, *NIOSC Insulating Oil Manual*.

ESKADABG8:Rev.0, Directive on oil spill clean-up and rehabilitation.

3 Definitions and abbreviations

3.1 Definitions

3.1.1 clean-up: The action of remediation, this may include soil excavation, bio-remediation, solvent soil wash, landfarming or electrochemical treatment.

3.1.2 containment: The prevention of the spreading of the oil spill.

3.1.3 drip: Where continuous dripping is taking place and can result in pooling of the oil.

3.1.4 explosion: A situation, which occurred due to the rupture of electrical equipment as a result of an electrical fault.

3.1.5 leak: A continuous dripping that will result in pooling of oil that will require corrective action as the electrical equipment will have to be topped-up.

3.1.6 off-site: A site, road or property not belonging to Eskom.

3.1.7 on-site: Any Eskom site (including any Eskom leased site).

3.1.8 remediation: A method of clean-up that will ensure a minimum hydrocarbon or synthetic oil presence of 1000 ppm or (0,1 %) above the background level.

3.1.9 Responsible Person: The person appointed by the relevant line manager, who will take responsibility during remedial action following a spill. This might be the environmental co-ordinator or the relevant site manager.

3.1.10 spill: Any amount of oil present out off its "normal" container – where normal refers to a transformer or a drum etc.

3.1.11 weep: Where no free running oil is visible, but the area is damp with oil. It will be an area where dust is accumulating but no effective loss of oil is evident.

3.2 Abbreviations

3.2.1 NIOSC: National Insulating Oil Steering Committee

3.2.2 PCB: polychlorinated biphenyls

3.2.3 ppm: parts per million

3.2.4 TSI: Technology Services International

3.2.5 UTO: used transformer oil

4 Requirements

4.1 General

An oil spill may be defined as being any amount of oil no longer present in its normal container or equipment. The Water Act, 1998 (Act 36 of 1998) states that "hydrocarbons should not touch the soil or water and if they do, shall be removed immediately". Oil spills can be categorized as being small or large, historic, weep, seep, drip, leaks on Eskom or neighbouring sites or major catastrophic events. However, the immediate prevention and clean-up is considered to be essential in all of the above.

4.2 Assessment of the spillage

Assessment of the oil spill will need considerable judgement to perform. Evaluating the cause, extent and ultimate corrective action can be done using the table given in annex A. The assessment shall include the following factors:

- a) identifying the source of the spill;
- b) the age of the spill;
- c) life-threatening conditions;
- d) weather conditions;
- e) properties affected (Eskom, neighbours, National roads);
- f) traffic implications;

- g) threat to any water bodies;
- h) PCB presence;
- j) soil types; and
- k) public relations threat.

4.3 Securing of sites

Where necessary, secure the site and contain the spill to avoid further pollution, determine the spill boundaries, prevent unauthorized access to the spill site and, where required, notify all parties involved. The securing can include barricades, ropes, plastic taping or covers, or any other appropriate measures in order to prevent access or spread of the contamination.

4.4 Spill on an Eskom site

4.4.1 Limit the spillage

The need for immediate corrective action to limit the spillage cannot be overemphasised as this will minimize the environmental damage and reduce remediation costs. This can involve actions such as:

- a) closing a valve;
- b) repairing the leak with rags, plugs or other appropriate material;
- c) repositioning the container so that the leaking area is at the highest level or lifting a fallen drum/container;
- d) placing a leaking container or equipment into a collecting tray or bund area; and
- e) collecting the spilt oil in a container located underneath the leak or channelling the leak into a container.

4.4.2 Containing the spillage

The containment of a spillage will involve an action that will either prevent or stop a spill from spreading. It is vital to prevent any oil spill from entering waterbodies such as drains, stormwater systems, dams or rivers. Containment of the oil near the source will minimize pollution and will enable easy clean-up and/or remediation. This shall be done using one or more of the following:

- a) soil barriers;
- b) sand bags;
- c) bund walls; and
- d) absorbent materials.

4.4.3 Removal of oil

The free oil (puddles) shall be captured and put into a suitable container such as a drum or tanker for proper disposal as soon as possible.

This oil shall not re-enter the Eskom insulating oil pool for regeneration and re-use in electrical equipment.

4.4.4 Final clean-up/remediation

After removal of excess oil, saw dust, suitable absorbents or solvents shall be used to complete the clean-up of the spill. This might include the removal of leaking equipment, cleaning of pavements, removing contaminated soil and vegetation, as well as disposing of clean-up equipment. The absorbing material shall be bagged and disposed of at a class HH registered site.

PCB material shall be incinerated, encapsulated or de-chlorinated following consultation with NIOSC who will advise on the most viable option.

4.4.5 Bio-remediation/Landfarming

Bio-remediation/landfarming are based on the principle of stimulating the relevant microbes in order to break down the hydrocarbon molecules present in an oil spill. Landfarming will entail treatment of the soil away from the affected area, whereas bio-remediation will be done in-situ. Generally these processes may need stimulation or human intervention and are normally performed after the initial remediation phase to ensure total remediation of the site. These processes will need to be completed by bio-remediation /landfarming specialists in accordance with Eskom's approved supplier/contractor list.

4.5 Spill on a non-Eskom site

This shall be considered as a major spill greater than 25 points on the assessment scale in annex A and shall be treated as such.

4.6 Recommended spill kit

To allow for a rapid response and clean-up to an oil spill, it is mandatory for all Eskom sites and vehicles handling oil to have access to a recommended basic spill kit. The vehicle kit shall be a smaller version of the site spill clean-up kit, that meets the basic requirements for the volume of oil transported. This shall be used in the event of a spill that is less than 12 points as assessed using the table in annex A.

Adequate and relevant training shall be given to all staff, maintenance teams and contractors working with oil on an Eskom site. This shall involve the actions to be taken following an oil spill as well as the use of the recommended oil spill kit.

The recommended oil spill kit shall contain the following:

- a) 2 pairs of latex or neoprene gloves;
- b) 20 heavy duty disposable bags (rubbish bags);
- c) 1 shovel;
- d) 1 hard bristle broom;
- e) 5 absorbent pads;
- f) 3 bags of absorbent material (cellulosic or other efficient material); and
- g) 1 pair of plastic goggles.

If a station or site is close to surface water, oil absorbing material for removal and containment of oil on water shall form part of the standard kit.

4.7 Remediation contractors

Because of the emergency situation surrounding an oil spill clean-up, and to avoid bureaucratic delays in obtaining necessary approvals for appointing contractors, it is recommended that annual contracts are established on an "as and when required" basis with approved and relevant hazardous or emergency response teams. This will involve the availability of such a team, and agreement on relevant costs if an unforeseen event occurs.

4.8 Testing

Samples for both hydrocarbon and PCB content or other synthetic oil level evaluation shall be taken and

submitted to TSI or approved laboratories for analysis. This shall form part of the evaluation of the oil spill assessment as well as the remediation procedure and prior to final payment, to ensure compliance with the relevant legislation.

4.9 Oil storage

To limit any potential oil spill, it is recommended that all sites where insulating oil is stored are accredited in terms of Eskom's NIOSC manual. For all other oils, the relevant Eskom standards shall be adhered to.

UTO removed from equipment shall be promptly salvaged and returned to the closest, authorized regeneration facility after its removal from the equipment.

4.10 Reporting

All oil spills shall be assessed using the standard formats in annexes A and B. The completed forms shall be copied to the environmental co-ordinator who shall ensure that all appropriate reporting is carried out in accordance with the latest legislation.

4.11 Training

The Environmental co-ordinators responsible for the site shall ensure that appropriate training is given in the use of the spill equipment, reporting and emergency response procedures.

4.12 Preventive measures

Prevention remains better than cure and for this reason each spill shall be evaluated and analysed and appropriate preventive measures adopted. Any oil site design or facility shall be evaluated using relevant tools such as the Electrical Power Research Institute (EPRI) Mineral Oil Spill Evaluation System (MOSES) MP software that is available to the Eskom line groups.

Annex A

(normative)

Model oil spill assessment table

Using your judgement and the facts available, allocate the relevant points (1, 3 or 5) to each of the following and add them together. The cumulative score will dictate the appropriate corrective action.

Condition	1	2	5
Source of the spill	Weep	Drip/Leak	Explosion/Incident
Age of spill	Historic	Happened recently - spill still moist	Happened within last 24 h
Threat to any waterbody	No threat	Threat with rain	Access to waterway
Containment	Leak is minor – can be controlled, contained and plugged with oil spill kit	Leak is moderate – cannot be successfully managed with spill kit.	Leak is serious, containment is impossible
Life threatening Conditions	Not at all	Moderate (Environmental or health risk only)	Serious (Explosion, fire, health and major environmental)
Weather conditions	Good weather and will last until spill is cleared	Moderate, but may change suddenly to weather conditions which will hamper containment	Raining
Properties affected	None	On-site (Only Eskom's property is affected)	Off-site (Eskom's neighbouring properties and public roads) ≥25 points
Public relations threat	Small	Medium	Large
Soil types	Clay or compacted ground	Loose or loam soil	Sandy soil and Gravel
Traffic implications	Not on any road	Public road	Road closed
PCB presence*	None	Less than 50 ppm in the oil	Over 50 ppm in the oil will automatically get ≥25 points

Total s	Sub total	Sub total	Sub total
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Signature _____ Name _____ Date _____ Site _____

Annex A

(concluded)

Minor spill ≤ 12 points	Moderate spill 13 – 24 points	Major spill ≥ 25 points
Clean-up must be performed and a report issued to the relevant Environmental co-ordinator	Contain and call in the assistance of the Environmental co-ordinator	Contain, call on Environmental co-ordinator who will assess the situation and if needed call upon an emergency response team

*If the PCB levels of the oil are not known through prior testing, the spill shall be treated as a PCB spill, until such time that analysis proves otherwise.

Annex B

(normative)

Model oil spill feedback form

Please attach additional notes if necessary or if the space supplied is not sufficient

1	Give a short description of the oil spill incident.	
2	Give a short description on the following: -What was done immediately after the spill was discovered? -Could it be contained and how? -Was an emergency team involved and was it a contracted team? -Was free oil evident, how was this removed and what happened to this oil? -Has final remediation begun and what is being done? -Were PCB test results available and during which phase was this established?	
3	Which role did you fulfill within the process?	
4	How many litres of oil were involved?	
5	How big was the area that was polluted?	
6	Did any water pollution occur in the following areas? -trap dam -river -dam (water supply) -streams -underground	
7	How would you describe the incident – major or minor?	
8	Were there any other hazards or issues that needed attention?	
9	What were the weather conditions? -wind -temperature -precipitation, for example, rain or fog	
10	What were the causes - please explain? -human -technical -physical -organizational	

11	What was affected? -installation - describe -establishment -off-site local -off site regional	
12	How many people were affected? -staff -locals Describe the possible risks.	

Annex B

(concluded)

13	What were the ecological effects? -pollution/contamination/damage -residential area -common wild fauna/flora -water catchment areas -land -marine or other fresh water	
14	What were the material losses (in Rands)? -material (costs to Eskom) -response -clean-up -restoration	
15	Was any community life disrupted?	
16	Was any utility such as electricity, sewage or water interrupted?	
17	Was there significant public concern?	
18	Who was notified within Eskom?	
19	Who was notified outside of Eskom?	
20	What lessons were learnt from this? -measures to prevent recurrence -measures to mitigate consequences -useful references	
21	Did you experience a lack of: -guidance -expertise -standards -directives -reference material -Eskom assistance -Outside assistance	
22	Any recommendations	
23	Any other comments	

Name _____ **Signature** _____

Date _____ **Site** _____

APPENDIX H: ACTIVITY ENVIRONMENTAL MANAGEMENT PLAN

An activity Environmental Management Plan is compiled in order to address specific building, civil, structural and electrical works

Activity	Environmental Aspect	Impact			Risk	Legal and Regulatory requirements	Preventive & Corrective Measures (Actions to be taken)
		Air	Water	Land	(H/M/L/N)		
1. Removal of yard-stone and replace after construction is complete.	a) Use of automobile vehicles	Yes	Yes	-	Medium	National Environmental Management: Air Quality Act (39 of 2004) Atmospheric Pollution Prevention Act (45 of 1965) National Water Act (36 of 1998)	Maintenance of automobile equipment to prevent excessive emissions and spillages. Use of spill-sorbs in case of spillages.
	b) Land (soil) disturbance	-	-	Yes	Low	White Paper on Integrated pollution and Waste management for South Africa	Restore all disturbed land to original gradient and/or slope.
2. Excavate for foundations	a) Use of automobile vehicles	Yes	Yes	-	Medium	National Environmental Management: Air Quality Act (39 of 2004) Atmospheric Pollution Prevention Act (45 of 1965) National Water Act (36 of 1998)	Maintenance of automobile equipment to prevent excessive emissions and spillages. Use of spill-sorbs in case of spillages.
	b) Land (soil) disturbance	-	-	Yes	Low	White Paper on Integrated pollution and Waste management for South Africa	Restore all disturbed land to original gradient and/or slope.

3. Construct foundation for the transformer	a) Generation of waste from construction material	-	-	Yes	Low	National Environmental Management: Waste Management Bill – 2006 National Environmental Management Act (107 of 1998)	Ensure that waste is collected on time and is disposed in a responsible manner. No waste should be stored on site for more than 3 months.
	b) Land (soil) disturbance.	-	-	Yes	Low	White Paper on – Integrated pollution and Waste management for S.A	Restore all disturbed land to original gradient and/or slope.
4. Reinforced concrete	a) Generation of waste from the reinforcement off-cuts	-	-	Yes	Low	National Environmental Management: Waste Management Bill – 2006 National Environmental Management Act (107 of 1998)	Ensure that waste is collected on time and is disposed in a responsible manner. No waste should be stored on site for more than 3 months.
5. IBR sheeting	a) Generation of waste from the reinforcement off-cuts	-	-	Yes	Low	National Environmental Management: Waste Management Bill – 2006 National Environmental Management Act (107 of 1998)	Ensure that waste is collected on time and is disposed in a responsible manner. No waste should be stored on site for more than 3 months.
6. Steel reinforcement	a) Generation of waste from the reinforcement off-cuts	-	-	Yes	Low	National Environmental Management: Waste Management Bill – 2006 National Environmental Management Act (1998)	Ensure that waste is collected on time and is disposed in a responsible manner. No waste should be stored on site for more than 3 months.

7. New fence	a) Generation of waste from the reinforcement off-cuts	-	-	Yes	Low	National Environmental Management: Waste Management Bill – 2006 National Environmental Management Act (107 of 1998)	Ensure that waste is collected on time and is disposed in a responsible manner. No waste should be stored on site for more than 3 months.
8. Breaking out and removing tar road to construct offloading platform	a) Waste tar	-	-	Yes	Low	National Environmental Management: Waste Management Bill – 2006 National Environmental Management Act (107 of 1998)	Ensure that waste is collected on time and is disposed in a responsible manner. No waste should be stored on site for more than 3 months.
	b) Power drills	-	-	-	Low	National Environmental Management: Air Quality Act (39 of 2004) OHS Act(85 of 1993)	Use of correct PPE to prevent hearing loss and inhalation of dust particles.
9. Support structural steelwork for equipment	a) Generation of waste from the reinforcement off-cuts	-	-	Yes	Low	National Environmental Management: Waste Management Bill – 2006 National Environmental Management Act (1998)	Ensure that waste is collected on time and is disposed in a responsible manner. No waste should be stored on site for more than 3 months.
10. Mobile toilet facilities	a) Generation of sewage waste.	-	-	Yes	Low	National Water Act (36 of 1998)	Ensure that waste is collected on time and is disposed in a responsible manner. No waste should be stored on site for more than 3 months.
	b) Use of chemicals for treatment.	-	Yes	Yes	Medium	National Water Act (36 of 1998)	Toilet facilities are not expected to be treated with chemicals on site.

APPENDIX I: ESKOM'S ENVIRONMENTAL POLICY