ENVIRONMENTAL IMPACT ASSESSMENT

STUDY REPORT

FOR THE PROPOSED INCINERATION PLANT INSTALLATION

AT

TRIUMPH POWER GENERATING PLANT

ON PLOT L.R. No. L.R. No. 18474/220

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NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY(NEMA)

THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT

ENVIRONMENTAL IMPACT ASSESSMENT/AUDIT (EIA/EA) PRACTICING LICENSE

License No : NEMA/EIA/ERPL/4315

Application Reference No: NEMA/EIA/EL/6425

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in accordance with the provision of the Environmental Management and Coordination Act Cap 387.

Issued Date: **1/3/2017** Expiry Date: **12/31/2017**

Signature…..

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ISO 9001: 2008 Certified

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Acronyms and Abbreviations

EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
EMCA	Environmental Management Coordination Act
EMP	Environmental Management Plan
ERPs	Emergence Response Plans
EA	Environmental Audit
NEC	National Environment Council
NEMA	National Environmental Management Authority
OHS	Occupational Health and Safety
PPE	Personal Protective Equipment PPE
MAVWASCO	Mavoko Water and sewerage Company

Executive Summary

Introduction

The proponent of the Proposed Project has proposed to build an Incinerator in their power generating plant in Athi River Township on Plot No. 18474/216 which is located behind East African Portland Cement Company (EAPC) and Savanna Cement off Namanga Road in Machakos County. The proposed project is meant to cater for the power plant internal needs only.

Most industries including petroleum industries, power generating plants etc generate a tremendous amount of hazardous and waste in the course of storage and usage of fuel. Fuel waste, due to its nature is considered hazardous and therefore should be handled and disposed appropriately to safeguard public health and the environment. Fuel waste incinerators are efficient waste minimization tools, used by the facilities that generate hazardous, chemical and reusable solid waste.

The incinerator was meant to be part of the whole power generating plant from the initial plan. However, as per the instruction from the NEMA waste department, it was not captured in detail in the initial Environmental Impact Assessment for the whole plant. This called for another independent EIA to be conducted specifically for the incinerator.

The incinerator will be having enough capacity and will be handling about 60 tones of waste per month, and will comprise of free standing chimney of height 2.5 times the height of the buildings in the plant complete with gay wires and associated instrumentations. The proposed project will provide for adequate space for waste storage and shall also provide an ash pit. The proposed project is estimated to cost approximately twelve million Kenya Shillings (i.e. Kshs 12,000, 000) and is estimated to take approximately six months to completion and commissioning.

As environmental concerns now need to be part of the planning and development process and not an afterthought, it is therefore advisable to avoid land use conflicts within the surrounding area. To avoid unnecessary conflicts that retard development in the country, the proponent undertook this Environmental Impact Assessment (EIA) and incorporated environmental concerns as required by NEMA.

Environmental Impact Assessment is a tool for environmental conservation and has been identified as a key component in new project implementation. According to section 58 of the Environmental Management and Coordination Act (EMCA) No.8 of 1999 second schedule 9 (1), and Environmental (Impact Assessment and Audit) regulation, 2003, new projects must undergo Environmental Impact Assessment. The report of the same must be submitted to National Environment Authority (NEMA) for approval and issuance of relevant certificates/permits. This was necessary as many forms of developmental activities cause damage to the environment and hence the greatest challenge today is to maintain sustainable development without interfering with the environment.

ANTICIPATED IMPACTS

Positive Impacts

The plant has an overall positive implication to the country, and especially urban Triumph Power Generating Company. The major threat to the environment and human health today is risks associated with waste management. The result of waste generators disposing wastes without appropriate equipment has been pollution of environmental resources and particularly water sources, air pollution, land contamination and even direct effects to human health. Other waste handlers have had poor reputations of poor disposal of waste, i.e depositing waste in water bodies and along road sides. In this regard, therefore, the following are considered main benefits of the proposed plant;

Proper internal waste management.

I. Clear record keeping of wastes generated and method used in disposal.

II. Assurity of where the waste has been taken, unlike when they are just collected from the site.

III. Ensure a clean both internal and external environment.

IV. Employment to people operating the equipment

The Site

At the time of this assessment, the 5 acre parcel of land was for power generation, whose power plant had already been constructed. The plant has been designed to have office area, fire water tanks, fuel storage tanks, fuel treatment plant, oil water interceptor, power generating engines room and KPLC substation. There is boundary fence around the whole power plant. The surrounding land is generally grassland with scattered short shrubs and trees mainly of the acacia family. The site is isolated from social activities with the nearest human habitation situated approximately 2km away. The main rail lines (Standard Gauge Railway and The old existing railway line) run on the eastern side of the plant. The water supply to the site is from a high capacity borehole that had been drilled by the proponent as well as supplied by Mavoko Water And Sewerage Company. A high level water tank had been installed at the time the assessment was done. The main road access to the facility is Mombasa Road, then off Namanga Road turnoff point at NITA. The proponent has constructed all weather 3 km concrete road from the Namanga road through to the Triumph Power Generating Plant. Detailed physical and social status of the site area in given under chapter 3 of the report (baseline information). The site is expected to be designed such as to ensure optimal utilization of space, ensure minimal waste movement, easy and safe movement for the forklifts and other machines. At full operations the plant is expected to handle about 25 tons per year of hazardous wastes including liquid, solid and sludge wastes with the catchment spanning across Kenya. Wastes will be segregated and contained safely at specific locations within the premises. Spills, emissions and friable materials will be contained in the premises.

Findings

At the time of this assessment, the parcel of land had been purchased. The surrounding area is generally grassland with scattered short shrubs and trees mainly of the acacia family. The site is

isolated from social activities with the nearest human habitation situated approximately 2km away from the Triumph Power Generating Plant. Some form of services (water supply, power and communication) is available to the site area while the access road has been renovated by the proponent

ENVIRONMENTAL MANAGEMENT PLAN

This environment management plan presents integrated scenarios with the environmental aspects, anticipated impacts during construction and occupation as well as preventive (mitigation) action plans. Other issues covered include the responsibilities, costs implications, timeframes and parameters for monitoring of the trends. The EMP matrix is designed such that it is self-implementing and can be implemented. The development and operation of the waste management plant would be expected to observe environmental conservation requirements in accordance to the national regulations. To realize this goal, acceptability and minimal effects to the physical environment as well as the wellbeing of the surrounding communities will require to be integrated in the completion of the project through constant consultations, evaluations and review of the design aspects and modes of operation throughout the project cycle. Among the factors that need to be considered in this project implementation and its post evaluation initiatives will include;

a) Preservation of the natural beauty of the immediate surrounding areas,

b) Control of soil erosion and siltation of springs downstream as public sources of water,

c) Enhanced integration of environmental, social and economic functions,

d) Incorporation of safety provisions in the premises including easy accessibility to the road, adequate in-house signage and information systems among others.

e) Enhancing the contractor's performance,

f) Realization of cordial relations among various community, economic, social and cultural groups as well as between the local community and the contractor,

g) Enhancing equity and maximizing social and economic benefits for the local community through income generation from employment,

It is recommended that specific guidelines are developed to allow integration of environmental management considerations in the construction, commissioning as well as the use of public amenities and resources within site area. The guidelines will be a basis for compliance actions, responsible practices for the local residents and appropriate code of conduct for all stakeholders to the project. Among the factors that need to be considered in this guideline will include;

i. The contractor and other players in the construction activities be prevailed upon to implement this EMP,

ii. The development should appreciate the interests of the neighboring communities at all stages of the project,

iii. Maintenance of the natural beauty of the countryside around the site area such as to include green belts and other beatification initiatives,

iv. Enhanced integration of environmental, social and economic functions in the project design and implementation plans including safety provisions,

v. A site specific environmental, health and safety plan is established soon after commissioned.

In order to implement the management plan, it is recommended that a position is created for an appropriate expertise to oversee matters of environment and social management as well as enhanced safety and security measures within and around the site. The services of an environmental expert may be required to co-ordinate and monitor environmental management for the site during construction and post monitoring audits. This would be done under the responsibility of the site contractor during construction. The responsibility relationships are presented in the EMP matrix alongside the timeframe, targets and the cost estimates.

CHAPTER ONE

1. INTRODUCTION

The Triumph Power Generating Company (TPGC) is among the leading power generating plants in the country having its operations Athiriver of Machakos County. Upon realization of the growing hazardous wastes challenges, TPGC is seeking to install a new incineration plant within their power plant to increase its waste handling capacity with enhanced safety and health and without compromising environment and public health. For this reason the company has identified a point within the Power Plant station with a designed yard for the waste collection, storage and incineration of internally generated waste. In compliance with the Environmental Management and Coordination Act (EMCA), 1999 as well as the related regulations, TPGC has undertaken this EIA as through a NEMA registered EIA Firm of Experts in include all stakeholders in the project life cycle and more so for review and necessary approval purposes by the Authority.

1.1 Project overview and justification

Industrialization in Kenya and the implementation of Environmental Management and Coordination (Waste Management) Regulations, 2006, has necessitated the need to develop a hazardous waste treatment facility that can cope with the increased demand from industry and at the same time meet the ever demanding regulatory framework. Triumph Power Generating Company was started with an objective to provide power supply to the main electricity arm of Kenya KPLC as well as internally manage their own hazardous wastes. The company currently uses the services of Jupiter Oil Limited in their hazardous waste management activities. However, it intends to manage waste produced within the plant. This goes well with the NEMA statement, “your waste is your own responsibility.” TPGC intends to have a hazardous waste management program to be in place that is both economical and meets international standards, especially ISO 14000 considerations. Besides, without the means to treat and dispose hazardous wastes, it is not possible to enforce the current environmental legislation.

The management of hazardous wastes in Kenya is regulated under the Environmental Management and Co-ordination Act (EMCA, 1999)), EMCA (Waste Management) Regulations (2006) and other related regulations controlling the disposal of Hazardous. These regulations establish an order of preference for the management of hazardous wastes to be: minimization, recycling, treatment, and land filling. The installation of the incineration facility at Triumph Power Generating Plant will both assist the economic growth of the company and provide a proper treatment and disposal route that is affordable. The power plant has in place relevant Local Authority approvals. This Environmental Impact Assessment Study (EIAS) report is submitted to the National Environment Management Authority (NEMA) for prompt approval and to enable the proponent to proceed on with the installation and operation of the incineration plant in within their already built power plant at the proposed site.

1.2 OBJECTIVE SCOPE AND CONTENT OF THE EIA PROCESS

1.2.1. Objectives

The purpose of this EIA is to ensure adequate identification of potentially negative environmental impacts. Secondly to propose workable mitigation measures and thirdly to formulate an environmental management plan (EMP) articulating envisaged impacts. The overall objective of the study on the other hand is to ensure that all environmental concerns are integrated in all the project development processes with an aim of managing hazardous waste without compromising the natural environment and the ecology of the area.

Specific objectives include:

i. To identify possible environmental impacts, both positive and negative

ii. To assess the significance of the impacts

iii. To assess the relative importance of the impacts of relative plan designs, and sites

iv. To propose preventive mitigation and compensative measures for the significant negative impacts of the project on the environment.

v. Generate baseline data for monitoring and evaluating how well the mitigation measures are being implemented during the project cycle.

vi. To present information on impact of alternatives

vii. To present the results of the EIA that can guide informed decision making and safe operation of the incineration plant

1.2.2. Scope

The Environmental Impact Assessment was conducted at the site and the surrounding area. The assessment involved the physical examination, interviews with beneficiaries, neighboring communities, relevant consultants and government agencies. To generate environmental impacts assessment study report for submission, it involved a systematic examination of all proposed activities. The project assessment investigates and analyses the anticipated environmental impacts of the proposed development in line with the Environmental (Impact Assessment and Audit) Regulations of 2003. Consequently, the report will generate the following:

- Nature of the project
- The location of the project including the physical area that may be affected by the project activities
- The activities that shall be undertaken during the project phases

- The potential environmental impact of the project and mitigation measures to be undertaken during and after the project cycle
- An action plan for prevention and management of possible accidents during the project cycle
- A plan to ensure that the health and safety of the workers and the neighboring communities
- The economical and socio-cultural impacts to the local community and the nation in general
- The project budget
- Any other information that the proponent may be requested to provide by NEMA

1.2.3. Criteria

The environmental impact assessment was carried out in line with the environmental management, statutory and regulatory requirements in Kenya as outlined in section two of this report, the Environmental (Impact Assessment and Audit) Regulations 2003 and best practice guidelines on safety and health as per the Occupation Safety and Health Act, 2007. Following the preliminary visit of the proposed site, the following was undertaken

i. Screening of the project, a process that identified the project as being among those that requiring EIA under schedule 2 of the EMCA 1999

ii. A scoping exercise that identified the key issues to be identified in the study

- ❖ Documentary review on the nature of the proposed activities, policy and legal framework, environmental setting of the area and other available relevant data/information
- ❖ Detailed discussions with the proponent and the consultation with the relevant officials in the regulatory authorities
- ❖ Physical investigation of the site and the surrounding areas using a pre-prepared checklist identifying possible environmental and human safety issues that are likely to be affected
- ❖ Reviewing the proposed project designs and implementation plan/schedules with a view to suggesting suitable alternatives
- ❖ Developing an environmental management plan with responsibilities, schedules, monitorable indicators and time frame among other aspects
- ❖ A comprehensive report including all issues as listed in the Environmental (Impact assessment and audit) Regulations 2003

1.3 TERMS OF REFERENCE (TOR)

The environmental Impact Assessment (EIA) report considered the following aspect and other that proved of significance during the study

1. Project developments impacts on the ecology. This in essence covered:

The impacts of the development on biodiversity both within and outside the project development site

- ✓ Impacts on habitat quality and issues of habitat disruptions
- ✓ Surface water runoff and containment

2. Social implications of the development within the locality, region and nationally. This included:
   - ✓ Economic implications of the development
   - ✓ Security, risk and safety
   - ✓ Employment
   - ✓ Livelihoods
   - ✓ Public health implications
   - ✓ Demand and development of infrastructures and social amenities

3. Assess the impacts of development on landscape and land use:
   - ✓ Determine the impact on change on civic shape, scenery, aesthetic modifications
   - ✓ Examine the compatibility and complimentarily of the development of the surrounding land uses

4. Assess the impacts of the development on current demands on water source as well as possible implications on surface and ground water qualities and quantities

5. Develop an environmental management plan (EMP) that would mitigate the possible impacts on the environment

1.4 Duties of the Proponent

The report emphasizes the duties of the proponent and the contractor/supplier during the project phase. It will be the duty of the proponent to ensure that all legal requirements as pertaining to the development are met as specified by the law.

1.5 Duties of the contractor/supplier

I. Prepare and maintain an approved time and progress chart showing clearly the period allowed for each section of the work

II. The contractor/supplier is to comply with all regulations and by-laws of the local authority including serving notices and paying of the fees

III. The contractor shall make good at his own expense any damage he may cause to any public and private roads and pavements in the course of carrying out his work

IV. The contractor/supplier shall be responsible for all the action of the sub-contractor in the first instance

V. The contractor or supplier shall take all possible precaution to prevent nuisance, inconvenience or injury to the neighbouring properties and to the public generally, and shall use proper precaution to ensure that safety of wheeled traffic and pedestrian

VI. All work which may produce under level of noise, dust vibration or any other discomfort to the workers, and/or guest of the client must be undertaken with care with all necessary precautions taken

VII. The contractor or supplier shall upon completion of working remove and clear away all plant rubbish and unused materials and shall leave the site in a clean and tidy state to the certification of the site engineer. He shall also remove from the site all rubbish and dirt as it is produced to maintain the tidiness of the premise and its immediate environs

VIII. The standard of workmanship shall not be inferior to the current British codes of practice or the Kenya Bureau of Standards where existing. No materials for use in the permanent incorporation into the works shall be used for any temporary works or purpose other than that for which it is provided. Similarly, no material for temporary support shall be used for permanent incorporation into the works.

IX. All the materials and workmanship used the execution of the works shall be of the best quality and description. Any material condemned by the site engineer shall immediately be removed from the site at the contractor/supplier expense

CHAPTER TWO

2. PROJECT DESCRIPTION

2.1 Nature of the project

The proponent (TPGC) intends to install its waste handling incineration plant at Triumph Power Generating Plant located approximately 1.5Km from the Savanna Cement Company. This is necessitated by the increased demand for proper waste handling facility by the increasing industrialization within the country, internal need to handle their own waste properly as required and the desire for maintenance of a clean environment. The plant has been designed to handle at least 60 tonnes of hazardous waste per month. When complete, the project will have an incineration plant, waste handling and sorting yard and waste holding point.

2.2 Site Location

The proposed project site is located off the Namanga Road near Kitengela town in Athiriver of machakos county on plot No. **L.R. 18474/220** registered under Triumph Power Generating Company Limited.

2.3 Site Characteristics

At the time of this project and site assessment, the site had already been curved out, fenced and the power generating plant constructed and operating. Boreholes had been dug within the power plant. Fire fighting water storage was available in tanks of capacity 3000M^3 and a proper well maintained fire system put in place. The plain where the site is situated is generally grassland with scattered short shrubs and trees mainly of the acacia family. The site is isolated from social activities with the nearest human habitation situated approximately 2km. The access road has been upgraded to all weather road by Triumph Power Generating Plant off the Namanga road to the power plant. Detailed physical and social status of the site area in given under chapter 3 of the report (baseline Information).

2.4 Proposed site development

While the general solid wastes management is being addressed through local authorities (direct services, out-sourcing, partnerships and privatizations) handling of hazardous wastes still remains a great challenge to the authorities as well as environmental and public Health fields since this sub-sector of waste management requires specialized handling. Among the options available for the management of hazardous wastes include incineration in accordance to the guidelines in the Environment Management and Coordination Act (Waste Management regulations), Gazette Notice No. 121 of September 2006). The integrated waste management facility is being designed to facilitate handling of hazardous wastes and will accommodate the following basic components;

2.4.1 Waste reception

Since the plant is being installed basically for internal use, no waste shall be received from outside. The sludge and waste oil will be directed to the sludge tank, then directed to the incineration plant through pipes. This will ensure no manual handling of the waste.

Some other waste may be put in the plant manually.

2.4.2 Waste Sorting

The main waste that will be produced at the plant is waste oil and sludge. This waste will only be directed to the incineration plant directly and no sorting is required.

2.4.3 Incineration facility description

TPGC has been using the services of Jupiter Oil Limited in handling their hazardous wastes. The company is in the process of ensuring proper accountable handling of hazardous waste they produce through installation of a new incineration plant at the within the Triumph Power Generating Plant in Machakos County. The design, acquisition and final installation has been done and will be in conformity to the Waste Management Regulation, 2006, guidelines, criteria, procedures for installing/operating incinerators. In addition it has been proposed that the company regularly subject its operation to air quality measurements to ensure sound environmental management in its operation.

2.4.4 Waste disposal

Waste water emanating from operation areas as well as surface run off from the premises will not be channelled into the natural drainage system via an interceptor that has already been installed at the power plant

2.4.5 Water supply

Water is supplied from Mavoko Water and Sewerage Company (MAVWASCO). Other than piped water, high capacity boreholes have been sunk at the site to meet water requirements for the whole plant.

2.4.7 Support services

The site will not be complete until support facilities are put into place. These will include;

I. Offices,
II. Sanitation facilities (toilets, bathrooms, hydrants, wastewater drains,
III. Health and safety provisions (fire extinguishers, hydrants, signage, exits, first Aid points etc,
IV. Security arrangements

At the time this assessment, all the above mentioned facilities had already been put up since the power generating plant was already in operation.

2.5 Site alternatives

2.5.1 Alternative 1 (Existing Locations)

The current site for incineration is located within Athiriver Township and is near some settlement area more than 2Km to the west of the power plant. It is, therefore, important that the operations are relocated to a suitable site with minimal impacts to people's lives and the general environment.

2.5.2 Alternative 2 (Proposed Location)

Following the current scenario illustrated above on the current site, the proposed site is the only other location found suitable. This conclusion has been arrived at due to the following considered reasons;

I. The land is legally owned by the proponent as shown by the land ownership documents. This makes the development more feasible to the proponent,
II. There are no significant settlements around the site, and hence it will be possible to present a case of appropriate zoning in future to the Local Government Authorities to ensure minimal social impacts
III. There are no significant environmental sensitive features around the site (no surface water bodies, no forest cover, no wetlands, not sensitive habitats noted, etc.). It is, therefore, likely to have minimal environmental impacts,
IV. The proponent is ready to abide by the law for a long term suitability of the site.

2.5.3 PROJECT COSTS AND IMPLEMENTATION SCHEDULE

The proposed project budget is estimated at **Ksh. 12,000,000.00 (Twelve Million Kenya Shillings Only).** The quoted cost specifically refers to the cost of equipment purchasing and installation as highlighted below.

#	Item	Amount (Ksh)
1.	Incinerator Equipment	**12,000,000.00**
2.	Environmental Impact Assessments	
3.	Legal Fees	
4.	Construction/Installation	
Total		**12,000,000.00**

CHAPTER THREE

3. POLICY, LEGAL ADMINISTRATIVE FRAMEWORK

3.1 Introduction

The Environmental Impact Assessment is a useful tool for protection of the environment from the negative effects of developmental activities. It is now accepted that development projects must be economically viable, socially acceptable and environmentally sound. It is a condition of the Kenya Government for developers to conduct Environmental Impact Assessment on the development Projects. There is an existing policy, legal and administrative framework regulating the proposed project. The government has established regulation to facilitate the process of EIA study and EA. The regulations are contained in the Kenya Gazette supplement No. 56, legislative No. 31, legal notice No. 101 of 13th June 2003. In addition, the government has a number of National Policies and statutes to enhance environment and sustainable development. Some of the policies and legal provisions are discussed below.

3.2 Policies

Both the development and environment policies are being formulated by the respective ministries in consultation with relevant stakeholders. Government intentions in reducing air emissions has been on the rise ever since through initiatives of tree planting. This target will be realized through investments by government, private sector, civil society and individuals. Environmental Impact Assessment (EIA) is a methodology used to identify the actual and probable impacts of the projects and programmes on the environment and to recommend alternatives and mitigating measures. The assessment is required at all stages of project development with a view to ensuring environmentally sustainable development for both existing and proposed public and private sector development ventures. The National EIA regulations were issued in accordance with the provisions of Environmental Management and Co-ordination Act (EMCA) of 1999. The EIA Regulations must be administered, taking into cognizance provisions of EMCA 1999 and other relevant national laws. The intention is to approve and license only those projects that take into consideration all aspects of concern to the public as they impact on health and the quality of the environment.

3.2.1 National Environmental Action Plan (NEAP)

The NEAP for Kenya was prepared in mid 1990s: It was a deliberate policy effort to integrate environmental considerations into the country's economic and social development. The integration process was to be achieved through a multi-sectoral approach to develop a comprehensive framework to ensure that environmental management and the conservation of natural resources are an integral part of societal decision-making

3.2.2 The National Poverty Eradication Plan (NPEP)

The NPEP has the objective of reducing the incidence of poverty in both rural and urban areas by 50 percent; as well as the capabilities of the poor and vulnerable groups to earn income. It also aims to narrow gender and geographical disparities and a healthy, better educated and more productive population.

This plan has been prepared in line with the goals and commitments of the World Summit for the Sustainable Development (WSSD) of 1995. The plan focuses on four WSSD themes of the poverty eradication; reduction of unemployment; social integration of the disadvantaged people and the creation of an enabling economic, political, and cultural environment. This plan is to be implemented by the Poverty Eradication Commission (PEC) formed in collaboration with Government Ministries, community based organizations and private sector.

3.2.3 National Policy on Water and Resources Management and Development

While the National Policy on water resource management and development (1999) seeks to enhance systematic development of facilities in all sectors for the promotion of the country's socio-economic progress, it also recognizes the by-product of this process as wastewater. It, therefore, calls development of appropriate sanitation systems to protect people's health and water resource from any source of pollution. Industrial and business development activities therefore should be accompanied by corresponding waste management systems to handle the waste water and other wastes emanating from such processes. The same project requires that such projects should also undergo comprehensive EIA studies that provide sustainable measures to be taken to ensure environmental resources and people's health in the immediate neighbourhood and further downstream are not impacted by the emissions. As a follow-up to this, EMCA 1999 requires annual environmental audits to be conducted in order to ensure that mitigation measures and other improvements identified during EIA study are implemented. In addition, the policy provides charging levies on waste on basis of quantity and quality. The "polluter-pays-principle" applies in which case parties contaminating water are required to meet the appropriate cost of remediation. The policy provides for establishment of standards to protect water bodies receiving waste water, a process that culminated in the enactment of the environment Management and Coordination (Waste Management) Regulations 2006.

The key objectives of the policy include:

- To ensure that from the onset, all development policies, programs and projects takes environmental consideration into account.
- To ensure that independent environmental impact assessment (EIA) report prepared for any industrial venture or other development before implementation
- To come up with effluent treatment standards that will conform to acceptable guidelines. This has already been done by NEMA through the Environmental Management and Coordination Waste Management) Regulations 2006, and environmental Management and Coordination (water Quality) Regulations 2006.

3.3 Legal Aspects

The key National laws that govern the management of environmental resources in the country have been briefly discussed in the paragraph below. Note that whenever any of the laws contradict each other, the environmental management and coordination act prevails

3.3.1 The Environmental Management and Coordination Act, 1999

a. **Background and administrative Structures**

The environment Management and Coordination Act of 1999 received a presidential assent on January 6th, 2000 and was gazetted on January 14th, 2000. The main objectives of the act are:

- Provide guidelines for the establishment of a legal and institutional framework for the management of environment in Kenya
- Provide a framework of legislation for over 77 statutes in Kenya that contain environmental provisions
- Provide guideline for environmental impact assessment, environmental audit and monitoring, environmental quality standards and environmental protection orders

In 2001, the government established the administrative structure to implement the act. The two main administrative structures are:

i. The National Environmental Council (NEC)

The National Environmental Council (the council) is responsible for policy formulation and directions for the purpose of the Act. The Council also sets national goal and objectives and determines policies and determines policies and priorities for the protection of the environment.

ii. The National Environment Management Authority (NEMA)

The responsibility of the National Environment Authority, (NEMA) is to exercise general supervision and co-ordination over all matters relating to the environment and to be principle instrument of government in the implementation of policies relating to the environment. In addition to NEMA, the act provides for the establishment and enforcement of environmental quality standards to be set by the technical committee of NEMA known as the standards and Enforcement review Committee (SERC).

b) EMCA requirements for Environmental Impact Assessment and Audit

The Act aims to improve the legal and administrative co-ordination of the diverse sectoral initiatives in the field of environment so as to enhance the national capacity for its effective management. The Act harmonizes the sector specific legislations touching on the environment in a manner designed to ensure greater protection of the environment in line with national objectives and the sustainable development goals enunciated in Agenda 21 of the Earth Summit held in Rio de Janeiro in 1992. The ultimate objective is to provide a framework for integrating environmental considerations into the country's overall economic and social development. The second schedule of the Act lists the projects for which an EIA and/or EA must be carried out. Section 68 of the Act specifies that accurate records should be maintained and annual reports

submitted to NEMA, as required. This project report has been undertaken in accordance with the Environmental (Impact Assessment and Audit) regulation 2003, which operationalize the Environment Management and Coordination Act (EMCA) 1999. The report is prepared in conformity with the requirements stipulated in the (EMCA) and the Environmental Impact Assessment and Audit regulations 2003 regulation7 (1) and the second schedule. Part II of the said act states that every person is entitled to a clean and healthy environment and has the duty to safeguard the same. In order to achieve the goal of a clean environment for all, new projects listed under the second schedule of Section 58 of EMCA No 8 0f 1999 shall undergo an environmental impact assessment. This includes development activities such as the installation of this new incineration plant. In additional to the legal compliance above, the following legal aspects have also have been taken into consideration

c) The Environmental Impact (Assessment and Auditing) Regulations, 2003

Legal Notice No. 101 stipulates the ways in which environmental experts should conduct Environmental Impact Assessment and Audits in conformity with the stated requirements. It is concise in its report content requirements, processes of public participation, licensing procedures, inspections and any possible offences under the Act.

d) Environmental Management and Coordination (Waste Management) Regulation 2006

The Legal Notice No. 121 stipulates the responsibility of any waste producer. Part II section one states that: "No person shall dispose of any waste on a public highway, street, road, recreational area or in any public place except in a designated waste receptacle. And that; any person whose activities generate waste shall collect, segregate and dispose or cause to be disposed off such waste in the manner provided for under these Regulations". Subsection three of Part II highlights the way waste should be handles stating that, "any person whose activities generates waste has an obligation to ensure that such waste is transferred to a person who is licensed to transport and dispose off such waste in a designated waste disposal facility".

e) Water Quality and Waste Management Regulations 20006

The regulations were gazetted in September 2006 and come into force in 1st April, 2007. The regulation details the waste management requirements and also requires application of a license to all those premises discharging the waste to the environment.

3.3.2 The Water Act 2002

The purpose of the Water Act is to provide the management, conservation and use and control of water resources and for the acquisition and regulations of use of water, to provide for the regulation and management of water supply and sewerage supply. Except for waters that are wholly situated in a private landowner's domain, the act vests the right over all surface and ground water in the state. This is only subject to the rights which users may acquire under license from time to time. The overall power for the control of every body of water is exercised by the minister. The minister has the duty to promote the investigation, conservation and proper use of

water resources throughout Kenya. The act provides for a water resource management authority whose functions include, *inter-alia,* developed principles and procedures for allocation for water resources, monitor national water resource management strategy, determine applications for permits for water use, regulate and protect water resources quality from adverse impacts, manage and protect water catchments, e.t.c. In addition, under the water (catchments board) rules promulgated by the minister, the country is divided into six catmint boards, vis-avis Tana Catchments board, Rift Valley Catchment's Board, Athi River Catchment's Board, Ewaso-Nyiro Catchment's Boar, Lake Victoria (North) Catchment's Board and Lake Victoria (South) Catchment's Board. But these boundaries are subject to variation depending on available hydrological information. Under the act, the minister may declare an area to be a conservation area and direct that special measures be taken for the conservation for the ground water therein. Every person who has been using ground water in an area declared to be a conservation area and who desires to continue with the use must obtain a permit within six months of the order. It's an offence to disobey such an order.

Protection of water supply is clearly a critical issue under the act. Accordingly, whenever the minister is satisfied that special measures are necessary for the protection of a catchment area from each quarter is obtained; he may declare such an area to be a protected area. By order, the minister may regulate or prohibit the activities within that area which may be contrite to the requisite conservation goals.

An in-depth analysis of the new water Act reveals that the Act has created an integrated water resources management framework in Kenya which is participatory and likely to have a wider acceptance and implementation than the predecessors. Part II, section 18 of the act provides for the National monitoring and information systems on water resources. Following on this, sub-section 3, allows the water resource management authority to demand from any person or institution specified information documents samples or materials on water resources. Under these rules, specified information document, samples or materials on water resources may be kept by a water user and the information thereof furnished by the authority. Section 73 of the Act allows a person with a license (licensee) to supply water and make regulations for purposes of protecting against degradation of water resources. Section 75 and Sub-section 1 allows the licensee to construct and maintain drains, sewers and other works for intercepting, treating or disposing any foul water arising or flowing upon land for preventing pollution of water sources within his/her jurisdiction. Section 94 of the Act makes it an offense through or convey or cause or permit to be thrown or conveyed, any rubbish, dirt, refuse, effluent, trade waste or other offensive or unwholesome matter or thing into or near to water resources in such a manner as to cause or be likely to cause pollution of water resource. Section 23 indicates that the authority shall approve community projects after they are approved by the persons owning or occupying at least two thirds of the particular area concerned in the project and that provision is made by the project for an adequate alternative supply of water when and if the available levels to other users is. It also prohibits cancellation of a permit of a community project without the consent of the minister. Section 24 requires all beneficiaries of a community project whose construction is funded in full

or in part by the government, if the minister so determines, to pay a rate or charge for that benefit.

3.3.3 The public health Act cap 242

Part IX, Section 115 of the Act states that no person or institution shall cause nuisance or condition liable to be injurious or dangerous to human health. Section 116, requires local authorities to take all lawful, necessary and reasonable practicable measures to maintain areas under their jurisdiction clean and sanitary to prevent occurrence of nuisance or condition liable for injurious or dangerous to human health. Such nuisance or conditions are defined under section 188 wastes, sewers, drains or refuse pits in such estate, situated or constructed as in the opinion of the medical officer of health to be offensive or injurious to human health. Noxious matter or waste flowing or discharged from any projects into a public street or into the gutter or side charnel or watercourse, irrigation channel or bed not approved for discharge is also deemed as a nuisance. Other nuisances are accumulation of materials or refuse which in the opinion of medical officer of health is likely to harbor rats or other vermin. On the responsibility or local authorities, Part XI section 129 of the Act states in part "it shall be the duty of every local authority to take all lawful, necessary and reasonable practicable measures for preventing any pollution dangerous to health of any supply of water which the public within its district has a right to use and does use for drinking or domestic purposes……"

Part XII section 136 states that all collection water, sewage, rubbish, refuse and other fluids which permits or facilitates the breeding or multiplication of pests shall be deemed nuisance and are liable to be dealt with in the manor provided by this act.

3.3.4 The Physical Planning Act, Cap 286

The local Authorities are empowered under section 29 of the act to serve and maintain all land planned for open spaces, parks, urban forests and green belts, the same section therefore, allows for prohibition or control of the use and development of land and building in the interest of proper and orderly development of an area. Section 30 states that any person who carries out development without permission will be required the land to its original state. It also states that NO licensing Authority shall grant land license for commercial or industrial use or occupational or any building without development permission granted by the respective local authority. Finally, section 36 states that if in connection with a development application, local authorities is of the opinion that that the proposed development activity will have injurious impact on the environment, the applicant shall be required to submit together with the application of the environmental impact assessment (EIA) report. EMCA, 1999 echoes the same by requiring that such an EIA is approved by the National Environmental Management Authority (NEMA) and should be followed by annual environmental Audits.

3.3.5 The penal Code Cap 63

Section 193 of the code states that any person or institution that voluntary corrupts or foils water for public springs or reservoir, rendering it less fit for its ordinary use is equally of an offence.

Section 192 of the same act states that a person who makes or vitiates the same atmosphere in any space to make it noxious of health of a person/institution in dwellings or projects in the neighbourhood or those passing along public way commits an offence

3.3.6 Occupational Safety and Health Act (OSHA) 2007

The Act requires all employers to register their workplaces by making an application to the Director of Occupational Health and Safety Services before they start any operations. The Act also sets minimum standards that are to be maintained in such workplaces to safeguard health, safety and welfare of workers. These are all aimed at elimination of hazardous wastes from workplaces. The act also requires that all workplaces to display the abstract of the act for all workers to read and remind themselves on how to protect themselves from hazard.

The act and its subsidiary legislation makes provision for health, safety and welfare persons employed in factories and other places of work such as in building construction and project operations are defined. The act prohibits emissions of dust, fumes or impurities into the atmosphere without proper treatment to prevent pollution or other ill effects to life and property. These provisions require that all practical measures be taken to protect all persons employed in a factory from air emission or impurities originating from any process within the factory. The act also requires that no discharges should be made into the environment from factories and workplaces without proper treatment that requires them harmless to the environment. The act also has specific measures that need to be taken to protect health, safety and welfare of workers and environmental conservation. The same act also requires all operation that fall under it to apply for registration as such to the Directorate of Occupational Health and Safety Services.

3.3.6.1 Safety and Health Committee Rules of 2004

The rule states that any employer/proponent/occupier who employs more than twenty persons must establish a committee to address health, safety and welfare of workers. The employer must also cause to be carried out a health and safety audit of all its operations in an annual basis by a registered health and safety advisor who should forward such a report to the Directorate of Occupational Health and Safety Services.

3.3.6.2 First Aid Rules

These have details on first aid requirements in terms of facilities and capacity building among residential workers.

3.3.6.3 Hazardous Substances Rules

These regulate the handling, transportation and use of certain listed chemicals which may have negative effects on the body when one is expected.

3.3.6.4 Noise Prevention and Control Rules of 2005

These rules have set minimum and maximum exposure limits beyond which workers and members of the public should not be exposed to noise without adequate means of protection. The rules also have exposure limits for exposure out of workplaces. The rules have several

recommendations on a comprehensive noise control program for workplaces that includes a requirement for medical examination of workers who are exposed to noise. The rules have also set the minimum noise levels that should emanate from a facility to public/neighbouring areas by day or by night.

3.3.6.5 Building Operations and Works of Engineering Rules

The rules guides health and safety matters in all building/construction and civil engineering works These rules states clearly that it is the duty of the proponent to ensure health, safety and welfare of all workers are and authorized visitors to the site before commencement of operations, the proponent should notify the Director of Occupational Health and Safety Services of the intention so that from then on, the director advises and follows up on the necessary conditions to safeguard the health, safety and welfare of workers on site. The rules also states that qualified and experienced persons must be appointed to act as safety supervisors by the proponent. These should supervise the enforcement of the standards to achieve the objectives mentioned above. The rules have specific sections on excavation, transport, demolition, formwork and scaffolds, lifting and lifting equipment and other safety measures.

CHAPTER FOUR

4. BASELINE INFORMATION OF THE STUDY AREA

4.1 Environmental setting

Evaluation of the physical and biological environmental was undertaken through observations around the site, records and available literature. The following sub-sections provide an outline the existing status in this regard.

4.2 Topography and Drainage

The area is generally flat at an average altitude of 1,840m above sea level ranging from Athi plains and the northern section of the Kapiti plains extending westwards rising from 1,493m to 1,829m in the faulted region along Ngong Hills and with distant hills in the horizon on the eastern and northern directions (Lukenya and Komarock). The western and southern directions are flat though with significant urban, industrial and human settlements. There are occasional shallow valleys, however, created by seasonal floods or excavations in mining activities (one example being gypsum extraction some 5 km to the north. Human activities' in the area is limited and far apart and hence no significant effects to the landforms. While the general slope is towards the east and northeast, the site slants gently to the north towards the seasonal river. This surface slope also determines the local drainage direction. The Athi River basin determines the general drainage status of the area and constitutes part of the greater Athi catchment spanning to the Indian Ocean. The area is generally dry and no permanent surface water sources are available, unless it is raining.

4.2.1 Hydrology and Water Resources

As mentioned above, there are limited surface water sources in the area with Athi River being the only stream at more than 15km to the northwest. All other streams are dry and when it rains, flash floods are likely that also dries up as soon as they occur. It was not possible, therefore, to sample water for quality analysis since none was flowing at the time of this assessment. Groundwater is perhaps a reliable source of water for operations in the area, but no borehole is located within the proximity of the site. Environmental and Combustion Consultants Limited target to develop a borehole at the site to provide water for construction and operations of the facility thereafter. Rainwater harvesting systems will also be installed throughout all the roof surfaces to supplement uses requiring low quality water needs.

4.2.2 Geology and Soils

The site area is underlain with the typical geological formations. Luvisols and Alisols cover the area indicating the presence of clays and sediments intercalated between lava flows. The top soils are generally of black sandy clay type overlying tuff beds and their distribution is attributed to erosion of former land surface or the presence of old lake. A more tenable explanation seems that the soils that bear direct relationship to the tuff bed are products of erosion of nearly horizontally bedded members of the Athi series that outcrops in the area and would be formed where the appropriate tuff bed outcrops out on the hillside, summit or valley.

The Kapiti phonolite is exposed in the southeastern corner of the area near Athi River Township. Outcrops are not extensive and are confined mainly to the Athi River from a point approximately two miles west of the National park boundary downstream to North Eastern border of the area. More extensive outcrops occur in the north and west along the valleys forming the north-western border of the Kapiti plains.


Soil and Geological Strata from the site

4.2.3 Biodiversity

The site is located within a lowly developed industrial zone and the surroundings are still characterized with natural vegetation comprising of withered grass species (*Themeda thriandra, Cynodon dactylon* and *Cenchrus ciliarias),* Shrubs like mainly *Balanities aegyptica* and some poisonous weeds including *Solanum incunum* and *Datura stramonium.* The most dominant tree species (Acacia) is *Acacia xanthopholea* (yellow bark). Topis and gazelles are the main wild animal species found grazing within the vicinity of the site but the local community reported occasional appearance of zebras, giraffes and other lesser grazers in the national pack.

Typical ground cover in the area

Nature of grass (suitable for wildlife and cattle grazing)

 *Seasonal streams vegetation*	 *Typical shrubs in the area*
 Access road to the plant	 Triumph Power plant.

4.2.4 Climatic Conditions

The area is characterized by a bimodal rainfall with the long rains coming in March through May and short rains coming between October and December. The annual rainfall is reported as 600mm while April is the wettest months. The driest period comes January to February. Annual average temperature is reported as 20^{o}C with a maximum of 24.9^{o}C and 12.5^{o}C. The hottest months are January to March while the coolest is June – July matching the rainfall pattern. The wind direction is westerly but speed varies over the temperature trends.

4.2.5 Air Quality

The site is located near some industrial activities ie the Savanna Cement and the East African Portland Cement industry. However, the industries are more than 2Km away. Save for natural dust (particulate matter) resulting from the dry conditions and withered plants, air pollutants including hydrocarbons, NOx, SOx, CO2 and CO and other emissions are not expected to be detected.

4.2.6 Energy Sources

The nearest grid power supply is approximately 2km from the site to the north drawn from the main Namanga road. The current typical source of energy in the area is firewood and charcoal as well as LPG.

4.3 Social setting

4.3.1 Population distribution

The proposed site area is lowly populated. The nearest residential house is about 5 or more km to the west and none to the east.

4.3.2 Land Use Trends

The proposed site is located near EAPC and compactable with the land planning requirements. Major physical land use features are as follows; **North:** The northern side of the site is generally an open grassland characterized with wildlife grazers and cattle grazing as well as the Nairobi National Park.

General northerly direction land status

4.3.3 Economic Patterns

Notable economic activity at the site was only cattle grazing mainly by the local community (Maasai). Years back, the railway station near EPZ was used as the reception for cows, goats and sheep sold for slaughtering in various places of the country including Kenya Meat Commission plants. This no longer takes place and the station currently has no economic use. Mavoko municipality is the nearest (~25km) west economic centre being a convergence point from Nairobi city, Machakos and Kajiado. It is also a stopover market for travelers to and from Mombasa to upcountry and areas in between them. Kitengela market is an extension of Athi River. Among the economic activities in the area include industrial activities (metallurgical industries, slaughter houses, cement factories, tanneries, distilleries, etc.) general trading and commercial activities (shops, stores and open air markets), livestock (pastoralists, zero grazing, poultry, etc.) and institutional (schools and colleges). Employment and housing business is also a notable investment.

4.3.4 Noise Levels

No notable sources of noise in the area except the power generating engines.

4.2.5 Sensitive Areas

There are no significant sensitive cultural features and/or areas in the vicinity of the site. However, it was noted that it falls within the outer fridges of the dispersal area of the corridor linking the Nairobi National Park and the Amboseli where only limited numbers of grazers are observed.

4.4 PUBLIC PARTICIPATION

The consultants interviewed some of the immediate neighbours of the proposed project site with a view of seeking their comments on the potential negative environmental impacts of the proposed project to the neighbourhood. This was done by the use of questionnaires (attached in the previous EIA project report), to find out views from the neighbours towards the project.

4.4.1 Consultation with interested and affected parties

The consultation process included to a large extent public consultation through structured interviews with interested and affected parties. Non-structured interviews were administered to all the Non-interested and affected parties.

4.4.2 The Questionnaire

The respondents filled in questionnaire on issues relating to: (1) Acceptance of the proposed project by the respondents and (2) Whether the proposed project will have negative impacts on the following:

- Local residents
- Natural ecology of the area
- Recreational and leisure facilities
- Public health and safety
- Water resources and quality
- Soils
- Road transport

CHAPTER FIVE

5. ANTICIPATED IMPACTS AND MITIGATION MEASURES

5.1 Introduction

The proposed plant will be handling hazardous wastes through incineration. It is, therefore expected that there are potential emission of various gases and particulate matter into the atmosphere, depositions of particulate matter onto land and vegetation to the north of the plant and discharge of effluent and contaminated runoff into open drains around the premises. This scenario implies potential linkages with the surrounding environment and ecological setting that require to be addressed during the construction and upon commissioning. The following sections outline these linkages as well as proposed corrective measures.

5.2 Positive Impacts

The plant has an overall positive implication to the country, and the power generating plant. The major threat to the environment and human health today is risks associated with waste management. Not all waste sources are capable of handling hazardous and toxic materials within the premises without compromising the health of their own workers or the neighboring communities. The result of waste generators disposing wastes without appropriate equipment has been pollution of environmental resources and particularly water sources, air pollution, land contamination and even direct effects to human health. In this regard, therefore, the following are considered main benefits of the proposed plant;

(i) Mopping up of hazardous and toxic materials that may be generated in the plant and not exposing them to the external Environment.

(ii) Ensure proper handling and disposal of all hazardous waste generated within the plant which could be dumped into public garbage disposal sites or water bodies and end up having greater negative implications on human health.

(iii) Save the power plant the time of waste storage and cost of contracting external waste handlers.

5.3 ANTICIPATED NEGATIVE IMPACTS

5.2.1 Construction phase

Particulate Matter There will be minimal production of particulate matter during the project execution. This is because; the intended installation will be in the already constructed power plant. The construction of the power generating plant was commenced after appropriate approvals were obtained from the Machakos County Council and NEMA. However, particulate matter will result from the nearby cement industries.

The main impacts of the dusty conditions are;

(i) Aesthetic and visual problems, though there are no notable settlements within the vicinity of the site,

(ii) Potential risks of health (mainly bronchial infections) though there are no notable inhabitants in the immediate neighbourhood,

(iii) Deposition of dust on vegetation hampering development of the same,

(iv) Air pollution aspects including contribution towards climate change.

Noise Levels Like dust emissions, construction hand tools and transport trucks will be a major source of noise to the surrounding areas. It was noted that the immediate western land has not been developed and hence effects of noise during construction will not have any significant social implications.

Water Quality There is a seasonal river on the lower end of the plant about 5Km. However, the water released from the plant passes via an interceptor and tests are normally conducted on the effluent released. No impacts, therefore, are anticipated on water surface water quality. However, oil spills from the machinery and depositions at the construction site camp has the potential for contamination of surface runoff (that may eventually end up into surface water streams) or infiltrate into the groundwater sources.

Land Degradation No significant impacts in this regard are anticipated.

Health and Safety The main concern in this regard is the occupational welfare of the construction workers from the effects of dust and emissions from the machineries. There are also potential physical risks from moving machinery, falling from high places especially when installations on heights as chimneys as well as personal injuries from objects around the construction site. Neighbouring residents are not likely to be affected since the construction site will be fenced off to keep off intruders. However, access by cattle herders will require to be addressed. It could be a point of high road safety risk in this regard.

Biodiversity There will be no loss of bio diversity since the installation will be in an existing power plant.

Social Impacts There are no displacements or direct interference with any social groups within and around the site since no settlements were found at the time of this assessment. Anticipated social impacts would be related to gaseous emissions, generation of dust and noise but there are no inhabitants in the immediate neighbourhood of the site.

5.2.2 OPERATIONS

Air Quality Major potential point sources of particulate matter (chemical residuals and smoke) and gaseous emissions in and around the proposed premises are expected to be as follows;

i. The incineration will involve burning hazardous at very high temperatures (between 800^{o}C – 1,500^{o}C). Particulate matter will comprise of ashes and flue gases from the burning process and smoke as a combustion product. Other emissions from this point is

hydrocarbon residuals, carbon dioxide, carbon oxide, nitrogen oxides and sulphur oxides from fuels and related combustion processes,

ii. Over all, it is estimated that the smoke of opacity within the premises could be slightly more than the 20% opacity level recommended by the European Union, though there are no matching standards in the country.

Impacts associated with the above air pollution would include;

i. Health effects mainly bronchial infections, skin problems, visibility, etc. This is likely to affect the employees and the immediate residents and communities (at the moment there are no inhabitants in the immediate neighbourhood),
ii. Soil quality degradation that may result from deposition of pollutants from the plant operations or carried to other areas through surface runoff,
iii. Pollution of water sources through direct deposition, surface runoff and/or infiltration into groundwater aquifers,
iv. Emissions of acetylene gas into the air have a potential to cause fire in the premises with far reaching implications on the neighbouring land users.

Noise Levels

The proposed plant operations are likely to generate some little amounts of noise levels from pumping of waste oil and sludge from the sludge tank to the incinerator. This situation is likely to have occupational health and safety implications as well effects to the workers. Currently, there are no settlements or other businesses in the immediate neighborhood, but any such future land use may imply that noise levels be maintained at the recommended levels of 45dBA at the residential areas during the night and 45dBA during the day with an occupational noise levels of 75dBA. Measurements confirmed this as the existing baseline situation.

Environmental Pollution

The key environmental pollution anticipated from the site activities includes the following;

i. Discharging wastewater into open drainage system around the premises that would subsequently be carried into public water sources through surface runoff. Pollutants in this case include hazardous residuals, heavy metals, suspended solids, oils and lubricant residuals as well as mixture of contaminants brought along the hazardous waste materials. This has potential impacts on peoples health and the aquatic life,
ii. Discharge of oil residuals into open drains from point sources (moving machine parts, storage areas, delivery bays, etc) are potential sources of environmental contamination,
iii. Deposition of emitted particulate matter and dust on land affects the soil quality that and the effect could also compromise on the integrity of water sources (both the surface and ground aquifers). The area is generally dry and accumulation of pollutants on soil provide heavy pollution loads in storm water and consequently surface water sources,
iv. Deposition of particulate matter as well as the fly ash from the incinerator kilns could be undesirable for disposal onto open land. One reason is because the flash is an atmospheric pollutant and deposition could be an aesthetic nuisance,
v. Aerial emissions are perhaps the worst feature of an incineration activity. Hydrocarbons, nitrogen oxides, sulphur oxides and flue gas are among contaminants anticipated into the

air with significant implications to the residents and commercial activities on the windward direction,

vi. Disposal of inert solid waste from the premises could become an extended environmental problem that would affect physical environmental quality, biodiversity and public health at points of disposal. Such waste including fry ash, drums, scrap metals and kiln tiles are notable potential waste requiring planned disposal strategy.

Health and Safety

The health of the plant workers varies from one section to another as outlined below;

(i) Health risks are found in the management of the hazardous waste holding areas, the transfer routes and preparation procedures. The risks including exposing the workers to a wide range of chemical poisoning, toxicity or long term health complications. The neighbourhood could also be affected through wind or surface runoff transferring contaminants from the waste holding areas to the external environment. In this plant however, there is no manual handling of wastes. Waste oil and sludge is pumped into the sludge tank, then will be moved to the incinerator through a pipework connection hence such risks will be minimal.

(ii) Combustion areas are the most critical sections in respect of health and safety. The kilns emits fumes and particulate matter originating from the wastes burning exposing the workers directly handling the same as well as others working elsewhere within the same premises. The affected workers are exposed through inhalation, skin and to some extent ingestion. Emissions from the kilns is also likely to reach external recipients through stacks if not well designed and managed,

(iii) Heat is also a serious impact to the employees operating the kilns since they are likely to be open. The general ambient heat around the entire premises is also likely to be relatively high extending the risk to more workers,

(iv) Personal accidents and risks of getting injured by falling objects to the workers and visitors while moving around the premises cannot be ignored. Heavy, corrosive and hot objects are among potential risks to safety anticipated in the proposed premises,

(v) There are risks of fire outbreaks from kilns, oil and fuel storage areas posing potential danger to not only the site, but also the neighbouring land users,

5.2.3 DECOMMISSIONING PHASE

The plant is designed for a lifespan of between 50 – 100 years subject to effective maintenance. During this period, it is possible that necessary retrofications will be carried out on the equipment, plant layout could be reviewed and processes could be changed while major structural changes and expansions might be found necessary. At the end of the plant life, a scheduled plant will be necessary to remove the site component, a process referred to as decommissioning. The following decommissioning actions will be required;

i. Removal of any major section of the plant will require a decommissioning process to ensure safe removal, movement, transfer, reuse or disposal. Such actions will be required for furnaces, galvanizing plant and the acetylene gas plant,

ii. Any desired expansion of the plant, installation of a major component or notable changes to the plant component will require an environmental impact assessment study carried for review and approval by NEMA,

iii. For total removal of the plant, prior notice will be given to NEMA at least one year before,
iv. A comprehensive decommissioning audit report of the entire plant will be mandatory at the ultimate removal at the end of the plant life.

5.3 MITIGATION MEASURES

Following are global mitigation measures while specific actions are presented in the matrix under Table 1 below.

5.3.1 MANAGEMENT MEASURES

Corporate Initiatives While planning the site management, it will be necessary to consider the following basic aspects on environmental conservation;

(i) The health and safety of the workers, the neighbouring communities and on-site installations should be of key importance and necessary mechanisms should be provided at all times during the project cycle,
(ii) Emissions into the environment (gaseous, heat, particulate matter and noise) have undesirable off-site effects on public health, particularly those in the windward direction. In this regard it will be necessary to plan for a monitoring mechanism and maintenance of records on air quality profiles as part of the corporate capacity building plan,
(iii) Capacity building in environmental conservation will also be a necessary item in the site management such as to address the entire management structure as well as suppliers of goods and services.

Site Operations Appropriate financial and human resources will require to be provided for continuous improvement of the environmental performance at the premises and the surroundings. In this regard performance evaluations, reviews of management practices and assessment of material consumption and capacity of the workers are among the operational aspects that will require constant attention.

Infrastructural Maintenance Management of environment at the active site cannot be complete until an effective monitoring and maintenance schedule is established. This includes a continuous performance improvement, integration of environmental issues in hygiene and sanitation, provision of basic "green" facilities (e.g. hazardous waste receptacles, safe in-house movement and performance evaluation from customers) are some of the continuous improvement tools that may be applied. Other important tools include;

(i) Carrying out regular operation performance appraisals,
(ii) Follow scheduled maintenance of equipment and facilities,
(iii) Documentation and record-keeping on resource utilization and conservation,
(iv) Observing good house-keeping at all times with specific focus on waste management,
(v) Regular review of site planning,

(vi) Contractual documents with customers and goods/service suppliers to reflective environmental responsibility,

(vii) Undertake scheduled monitoring and statutory annual environmental auditing.

Capacity Building The environmental issues identified in this report require that Triumph Power Generating Company establish appropriate technical and physical capacity to ensure sustainability and continuous improvement in environmental management. Capacity is required in;

(i) Documented guidelines on environmental conservation to enable the firm identify environmental issues and adopt appropriate action plan towards minimizing impacts to the environment, health and safety.

(ii) The guidelines should be established and formulated into a corporate policy statement, an environmental policy, environmental management programme, environmental management operational manuals, standard operation procedures, standard contractual documents for customers as well as goods and service suppliers and a legal register,

(iii) Physical infrastructure for environmental management at the site maintained at optimum performance levels. Among the basic structural features are in-house solid waste storage arrangements to prevent residuals reaching the external environments, waste water (leachate and wash water) drains and the related containment reservoirs,

(iv) Awareness and skills in environmental management for the operators, supervisors, support staff, customers and material suppliers,

(v) A qualified environmental officer to oversee all matters related to management and conservation aspects who would also take charge of health and safety issues including basic training on specific skills and technical understanding on environmental, health and safety to all workers, a general awareness to the customers, contractors and suppliers.

5.3.2 OPERATIONAL MEASURES

Hazardous Wastewater Management The following are basic aspects for inclusion in the site design and the wastewater handled in accordance with waste regulations Legal Notice No. 120 of September 2006;

I. Construct a concrete slab for holding of the scrap metals coming from the field. The waste slab should also be fitted with surface runoff traps from which the leachate should be handled as hazardous wastewater. This is not applicable to the plant since they will only be dealing with waste oil and sludge which will be stored in an already installed sludge tank.

II. Surface runoff and spills from the galvanizing areas should be collected and channeled into an oil interception chamber, stabilization/ sedimentation tank and a treatment facility before discharge. Appropriate design for wastewater treatment plant should be developed and approved for implementation.

III. Maintain appropriate records on wastewater quality for compliance evaluation and comparison with the gazetted standards on a continuous basis,

IV. Isolate domestic wastewater from process wastewater for containment in septic tanks and regular exhaustion,

V. Oil storage areas should be provided with slabs with surrounding bunds to contain any spilt oils. Runoff from the oil storage areas.

Hazardous Solid Waste Management Handling of solid wastes at the site will require the following components and handled in compliance with the waste regulations Legal Notice No. 121 of September 2006;

i. The waste slab should be provided with compartments for segregation of various categories of waste classified on source and physical nature that should also be handled separately,

ii. Provide solid waste holding bins at strategic locations around the premises and install transfer stations and modalities of waste removal to approved dumping grounds. Hazardous materials should be handled through incineration,

iii. Fry ash and other incineration residuals should not be disposed on land but rather be disposed off in landfills or other approved dumping grounds,

iv. Oils and grease from moving machine parts and other sources should be handled as hazardous wastes in accordance with the waste regulations,

Aerial Emissions Gaseous and particulate matter is perhaps the most critical environmental aspect associated with the proposed operations. The following measures should be considered to reduce the elated impacts;

i. Hazardous wastes holding yards require to be kept moist at all times to prevent dust emission into the atmosphere and the windward side of the site during in-house movement or just in storage.

ii. The kilns should be designed with provisions of flue gas trapping, smoke interception and stacks fitted with scrubbers (for gases) and filters for particulate matter removal,

Health and Safety Attention should also be on the health and safety of the workers, visitors, customers and neighbouring community such as to include;

i. All moving machine parts and high temperature areas should be fitted with guard rails and restrict access,

ii. Provide all employees with personal protective gear and enforce application at all times within the place work,

iii. Workers operating within the high temperature zones (melting, rolling mills and galvanizing plant should not exceed 2hrs continuous presence or/as may be directed by the Occupational Health and Safety Experts,

iv. Segregate scrap materials on sources basis and devise safe modes of handling each category with particular focus on those likely to be hazardous/toxic.

v. Training and induction of all employees and visitors on site to enhance safety.

5.4 MITIGATION MEASURES

Table 1: Impact – Mitigation Matrix

Development Stage	Environmental Aspects	Anticipated Impacts	Recommendations Mitigation Measures
Operations	Social Impacts	Income Generating Initiatives: No directly negative impact to income generation on the area. Positively affecting the local social and economy	✓ Enhance employment opportunities for the local community, ✓ Provide leadership on opportunity for collaboration with waste recyclers, ✓ Ensure sustainability through cost savings from waste minimization at sources and recycling options,
		Social and Cultural Issues: ➢ Social nuisance from pollution to physical environment such as land and air by emissions from the site, ➢ Social complaints and concerns on health and safety, ➢ Cultural intrusion from employee intrusion, ➢ Conflict on land use, ➢ Conflicts at off-site solid waste dumping areas, ➢ Potential of social diseases (HIV/AIDS, TB, etc.).	✓ Maintain efficiency in the emission reduction point sources and minimise external effects, ✓ Establish a public relation strategy with the neighbourhood for enhanced co-existence, ✓ Undertake statutory annual environmental audit for continuous improvement on social issues. ✓ Enhance monitoring system on social concerns, ✓ Sensitize workers and communities on protection against HIV/AIDS spread, ✓ Invest in social responsibility initiatives, ✓ Comply with labour laws and related regulations.
		Health and safety: ➢ Risk to workers' health from aerial emissions originating	✓ Provide all workers with the necessary personal protective equipment and ensure application at all times,

		from the site operations, ➢ Risks to life through outbreak of fires, ➢ Health problems from excessive heat, ➢ Risks of fire to the site property and that of the neighbours, ➢ Risks from internal movements of workers and customers, ➢ Slippery surfaces, e.g. store rooms,	✓ Enhance good hygiene practices to reduce exposure of the employees and customers to infections, ✓ Provide suitable signage for fire escapes and convenience directions, ✓ Develop a disaster management manual on a wide range of health, safety and security issues, among them fire accidents, ✓ Undertake scheduled fire safety drills,
Operations	Solid Waste Management	➢ Risks to Health and safety, ➢ Risks to environmental pollution, ➢ Ground water quality degradation at off-site disposal sites, ➢ Aesthetic pollution in the site and neighbourhood (acetylene gas production residuals – calcium oxide slurry), ➢ Public nuisance at off-site disposal sites, ➢ Illegal waste dumping	✓ Develop a procedure for waste segregation on site, through provision of necessary containers for various waste categories, ✓ Contracts with external waste recyclers and/or handlers should include conditions on waste transfers and verification of final destination, ✓ Characterize all wastes and keep a record of types and quantities. Annual waste audit may be necessary.
	Compliance	➢ Penalties from non-compliance,	✓ Environmental compliance to be based on the provisions of EMCA, 1999 and the Waste Regulations thereof (Legal Notices 120 and 121 of September 2006), ✓ Undertake annual environmental audits as per the law, ✓ Establish environment compliant objectives for the specific operations in liaison

			of a legal expert,, ✓ Establish a corporate environmental policy, ✓ Establish an environmental management committee with a qualified team leader, ✓ Increase workers awareness on environmental policies and their responsibilities, ✓ Develop a legal register for continuous compliance self evaluation

CHAPTER SIX

6.0 ENVIRONMENTAL MANAGEMENT PLAN

This environment management plan presents integrated scenarios with the environmental aspects, anticipated impacts during construction and occupation as well as preventive (mitigation) action plans. Other issues covered include the responsibilities, costs implications, timeframes and parameters for monitoring of the trends. The EMP matrix is designed such that it is self-implementing and can be implemented.

6.1 The EMP Guiding Principles

The development and operation of the waste management plant would be expected to observe environmental conservation requirements in accordance to the national regulations. To realize this goal, acceptability and minimal effects to the physical environment as well as the wellbeing of the surrounding communities will require to be integrated in the completion of the project through constant consultations, evaluations and review of the design aspects and modes of operation throughout the project cycle. Among the factors that need to be considered in this project implementation and its post evaluation initiatives will include;

i. Preservation of the natural beauty of the immediate surrounding areas,
ii. Control of soil erosion and siltation of springs downstream as public sources of water,
iii. Enhanced integration of environmental, social and economic functions,
iv. Incorporation of safety provisions in the premises including easy accessibility to the road, adequate in-house signage and information systems among others.
v. Enhancing the contractor's performance,
vi. Realization of cordial relations among various community, economic, social and cultural groups as well as between the local community and the contractor,
vii. Enhancing equity and maximizing social and economic benefits for the local community through income generation from employment,

6.2 Environment Management Policy

It is recommended that specific guidelines are developed to allow integration of environmental management considerations in the construction, commissioning as well as the use of public amenities and resources within site area. The guidelines will be a basis for compliance actions, responsible practices for the college residents and appropriate code of conduct for all stakeholders. Among the factors that need to be considered in this guideline will include;

i. The contractor and other players in the construction activities be prevailed upon to implement this EMP,
ii. The development should appreciate the interests of the neighbouring communities at all stages of the project,
iii. Maintenance of the natural beauty of the countryside around the site area such as to include green belts and other beatification initiatives,

iv. Enhanced integration of environmental, social and economic functions in the project design and implementation plans including safety provisions,
v. A site specific environmental, health and safety plan is established soon after commissioned.

6.3 Specific Management Issues

6.3.1 Health and Safety

Safety Issues Collaboration with relevant environmental and health related authorities, compliance to OSHA 2007 as well as appropriate experts would be necessary to provide necessary advice in this regard. At the site, appropriate safety measures would be observed, but it will also be necessary to involve the workers and neighboring communities on awareness and sensitization at all times, e.g. provision of personal protection equipments to all workers and non-interference by the neighbourhood.

Health Issues Control emissions from the machineries as well as dusty conditions throughout the construction cycle and check operation points upon commissioning.

6.3.2 Site Operation

It will be necessary to monitor certain social and economic trends associated with the zone operations. Commissioning of the facility, it is anticipated that it will motivate increased traffic flow into the area, reduce vehicular speed at the entrance point and heavy commercial trucks accessing the zone. Road accidents would be expected to rise initially before taking a predictable trend and residents residing in the area will learn to live with the new surroundings. More economic activity opportunities will also appear leading to a larger shopping centers around the free zone area.

6.4 Management Responsibilities

In order to implement the management plan, it is recommended that a position is created for an appropriate expertise to oversee matters of environment and social management as well as enhanced safety and security measures within and around the site. The services of an environmental expert may be required to co-ordinate and monitor environmental management for the site during construction and post monitoring audits. This would be done under the responsibility of the site contractor during construction. The responsibility relationship is as follows;

I. TPGC will be responsible for all coordination activities and liaisons, particularly in regard to issues of environment, social and safety issues,
II. The Project Manager is the Contactor's link with the TPGC on matters of environmental and social nature and is responsible of implementing the environmental management plan established under this report,
III. It would also be recommended that a Public Relations Office (PRO) created on the basis of ability to directly interact with the local community for social sustainability. Upon commissioning, the Management should establish a PR office.

IV. NEMA shall be responsible of surveillance of environmental and social aspects of the project implementation. It will be expected that their concerns are communicated to the TPGC.

6.5 ENVIRONMENTAL MANAGEMENT PLAN

Table 2: EMP Matrix

Environmental /Social Impact	Proposed mitigation measures	Responsibility	Monitoring Plan/indicator	Status	Time Frame
Noise pollution	➢ Maintain plant equipment. ➢ Operations should only be carried out only during 0800hrs-1700hrs.	Contractor Management	Amount of noise	80,000.00	Quarterly
Traffic density	➢ Proper signage to be put in place to notify neighbours of the activity and presence of heavy vehicles and to direct traffic. ➢ Strict adherence to traffic rules.	Contractor Management	Clear, well maintained sign boards along the roads.	30,000.00	Daily
Security	➢ Adequate lighting and an alarm system installed. ➢ Employ security personnel to guard the facility.	Management	Level of crime in the area.	80,000.00	Daily
Oil leaks and spills	➢ In case of an oil spill, oil absorbent materials e.g. absorbent granular or pad absorbents should be used to clean up the spill then the oil soaked pads and granules should be well disposed off.	Contractor	No oil spills and leaks on the site	400,000.00	Weekly
First aid	➢ A well stocked first aid kit shall be maintained by a qualified personnel	Management	Contents of the first aid kit.	10,000.00	Monthly
Waste water disposal	➢ Conduct inspections for drainage pipe blockages or damages and fix them. ➢ All waste water should be channelled to the existing sewer line.	Management	Effluent presence on open drains.	60,000.00	Weekly Daily
Fire preparedness	➢ Fire fighting emergency response plan to be developed.	Management	-Number of fire drills carried.	100,000.00	Regularly Annual fire

	➢ Ensure all fire fighting equipment is maintained, serviced and inspected as per Fire Risk Reduction Rules, 2007. Fire hazard signs and fire exit signage, and assembly point ➢ A trained standby fire watch should be commissioned to watch for fires, fire code violations or potential fire code violations		-Proof of inspection on fire fighting equipment. -Fire Signs put up in strategic places. -Availability of fire fighting equipment.		Audits
Environment Health and Safety	➢ Train workers on personal safety and disaster preparedness ➢ A well stocked first aid kit shall be maintained by a qualified personnel ➢ Report any accidents / incidents and treat and compensate workers injured while on duty ➢ Conduct Annual Health and Safety Audits	Management	Copies of Annual Audit Reports	100,000.00	Annual Audits
Sanitation facilities for employees	➢ Provide sufficient and suitable sanitary conveniences ➢ The washrooms should be kept clean and in good working conditions ➢ Provide water storage tank for the washrooms	Management	Separate washrooms (Gents & Ladies)	Inclusive in the bill of quantities	Daily

CHAPTER SEVEN
7. CONCLUSION AND RECOMMENDATION

7.1 Conclusion

From the foregoing, it is concluded that the proposed hazardous waste management plant is in an appropriate location in as far as land use and interactions with human social and economic setting is concerned. There are no habitations in the neighbourhood, no significant sensitive environmental features are found within the vicinity. The proposed development has been approved by Machakos County Council subject to compliance with all regulations while land transfers to the ownership of the proponent have been accomplished. However, there are certain social concerns that touch on general environmental pollution, groundwater contamination, health of the workers, attraction of human settlements in future and soil contamination. For this reason, appropriate preventive measures have been developed in this report. The measures, if integrated in the site design and operations and maintained throughout the site lifespan, will ensure environmental and social sustainability of the factory.

7.2 Recommendation

It is recommended that the hazardous waste management plant be licensed to proceed subject to full implementation of the environmental management plan in addition to observing the mitigation measures established for every impact identified. Among the specific recommendations include,

I. Ensure waste and wastewater management regulations are complied with through provision of appropriate facilities including wastewater treatment facility, solid waste collection bins and transfer arrangements. Hazardous waste holding units should be isolated from the external environment at all times,
II. Aerial emissions be controlled through appropriate extraction fans in the operation areas into bag houses, electrostatic precipitators and installed scrubbers in the stacks to ensure no hazardous residuals finds their way back in to the natural environment,
III. Safety measures for the workers and the neighbouring community shall be integrated in the entire project cycle,
IV. Compliance with the existing laws and regulations shall be upheld at all times,
V. The above environmental management plan shall be adopted and applied as the basis for addressing environmental and social aspects throughout the project cycle with necessary amendments as may found appropriate. In this connection, it will be the guiding tool for future audits and monitoring exercises.

REFERENCES

(1) Kenya gazette supplement Acts 2000, Environmental Management and Coordination Act Number 8 of 1999. *Government printer, Nairobi*

(2) Kenya gazette supplement Acts *Building Code 2000 by government printer, Nairobi*

(3) Kenya gazette supplement Acts *Land Planning Act (Cap. 303) government printer, Nairobi*

(4) Kenya gazette supplement Acts *Local Authority Act (Cap. 265) government printer, Nairobi*

(5) Kenya gazette supplement Acts Penal Code Act (Cap.63) *government printer, Nairobi*

(6) Kenya gazette supplement Acts *Physical Planning Act, 1999 government printer, Nairobi*

(7) Kenya gazette supplement Acts *Public Health Act (Cap. 242) government printer, Nairobi*

(8) Kenya gazette supplement number 56. Environmental Impact Assessment and Audit Regulations 2003. *Government printer,* Nairobi

Appendices

Appendix 1: Land ownership documents.

Appendix 2: Power plant design with incinerator location.

Appendix 3: Incinerator Designs.

Appendix 4: Budget

Appendix 5: Power Plant NEMA EIA license

Appendix 6: County Approval

Appendix 7: Air Quality test results

Appendix 8: Soil Test results

Appendix 9: Questionnaire.

Appendix 1: Lease agreement between TPGC & EPZ

Export Processing Zones Authority

Administration Building
Viwanda Road,
Off Nairobi - Namanga Highway
Athi River, Kenya.
E-mail: info@epzakenya.com
Website: www.epzakenya.com

P.O. Box 50563 - 00200
Nairobi, Kenya.
Tel: +254-45-6626421/6
Wireless: +254-20-2511989
ISDN line: +254-45-6621000
Fax: +254-45-6626427

CONF/EPZ/1192/VOL.I(31)

24th November 2010

The Chairman
Triumph Power Generating Co. Ltd
P. O. Box 11640 – 00400
NAIROBI

LEASE OF PART OF PLOT LR 18474/216 PORTION NO 6

I refer to your letter dated 3rd November 2010 regarding the lease of a portion of plot LR 18474/216.

The Authority has no objection to your request to have portion No. 6 instead of 13. Meanwhile, we advise that you undertake exhaustive site investigation in order to avoid further requests on changes.

The correct land number will be indicated in the lease once survey is complete. The terms and conditions of your tenancy remain the same. We shall forward an offer for the additional 5 Ha you have requested for.

J. N. Kosure
Ag. CHIEF EXECUTIVE

JM/aw

Export Processing Zones Authority

Administration Building
Viwanda Road,
Off Nairobi - Namanga Highway
Athi River, Kenya.
E-mail: info@epzakenya.com
Website: www.epzakenya.com

P.O. Box 50563 - 00200
Nairobi, Kenya.
Tel: +254-45-6626421/6
Wireless: +254-20-2511969
ISDN line: +254-45-6621000
Fax: +254-45-6626427

CONF/EPZ/1192/VOL I (29)

22nd October, 2010

Triumph Power Generating Co. Ltd
P. O. Box 11640 - 00400
NAIROBI

LEASE OF PART OF LR. 18474/216 PORTION NO. 13

I refer to your letter dated 4th October, 2010.

I am pleased to advise that we have considered your proposal to inter-change your allocated plot number 16 with plot number 13 and find it acceptable, especially for zoning purposes. Your letter of offer dated 5th March, 2009 refers to a portion of Land ref: 18474/216 and this is correct for portion number 13.

I note further that your rent is paid up to March 2011. Your next rent will be due in April 2011. You may access the plot number 13 and proceed with construction.

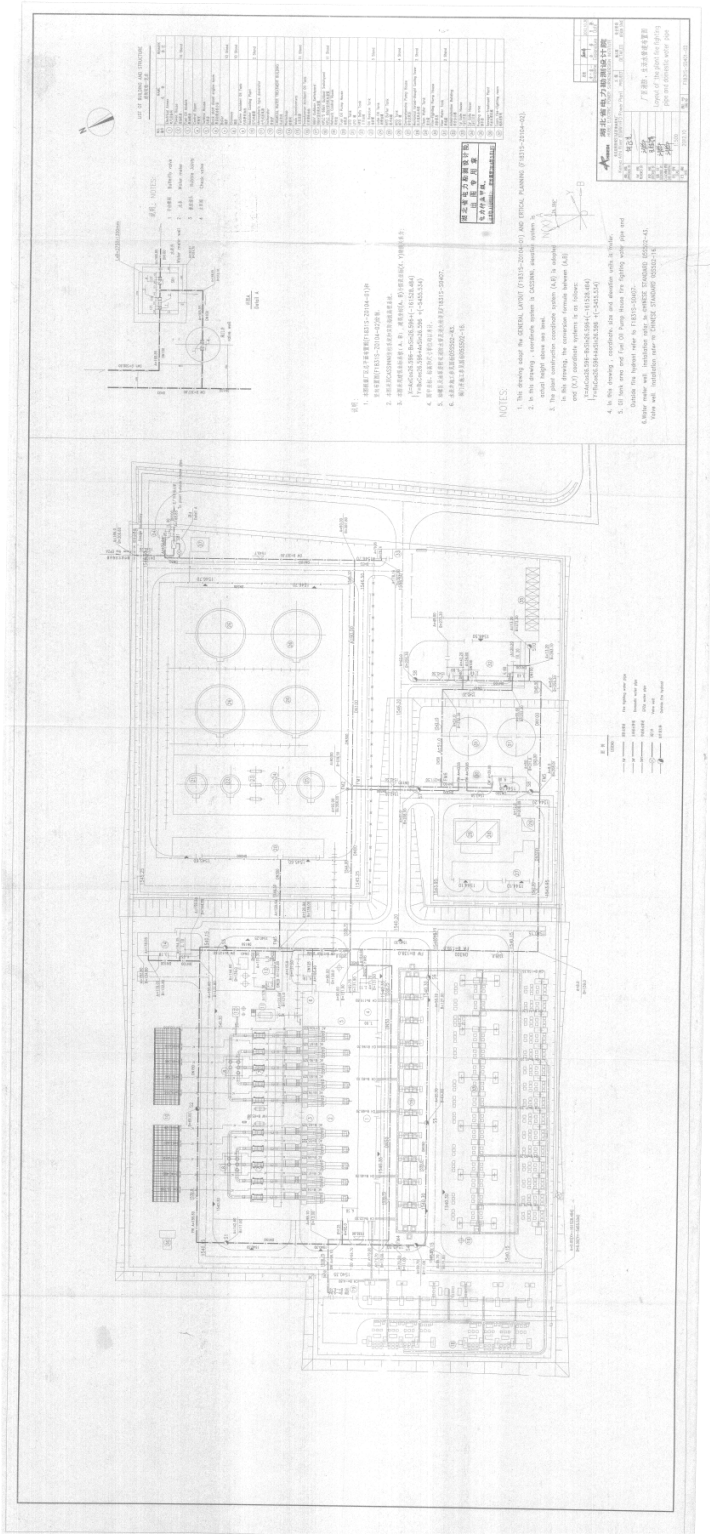
The correct land number will be indicated in the lease once survey is completed. The terms and conditions of your tenancy remain the same.

J. N. Kosure
Ag. CHIEF EXECUTIVE
JM/aw

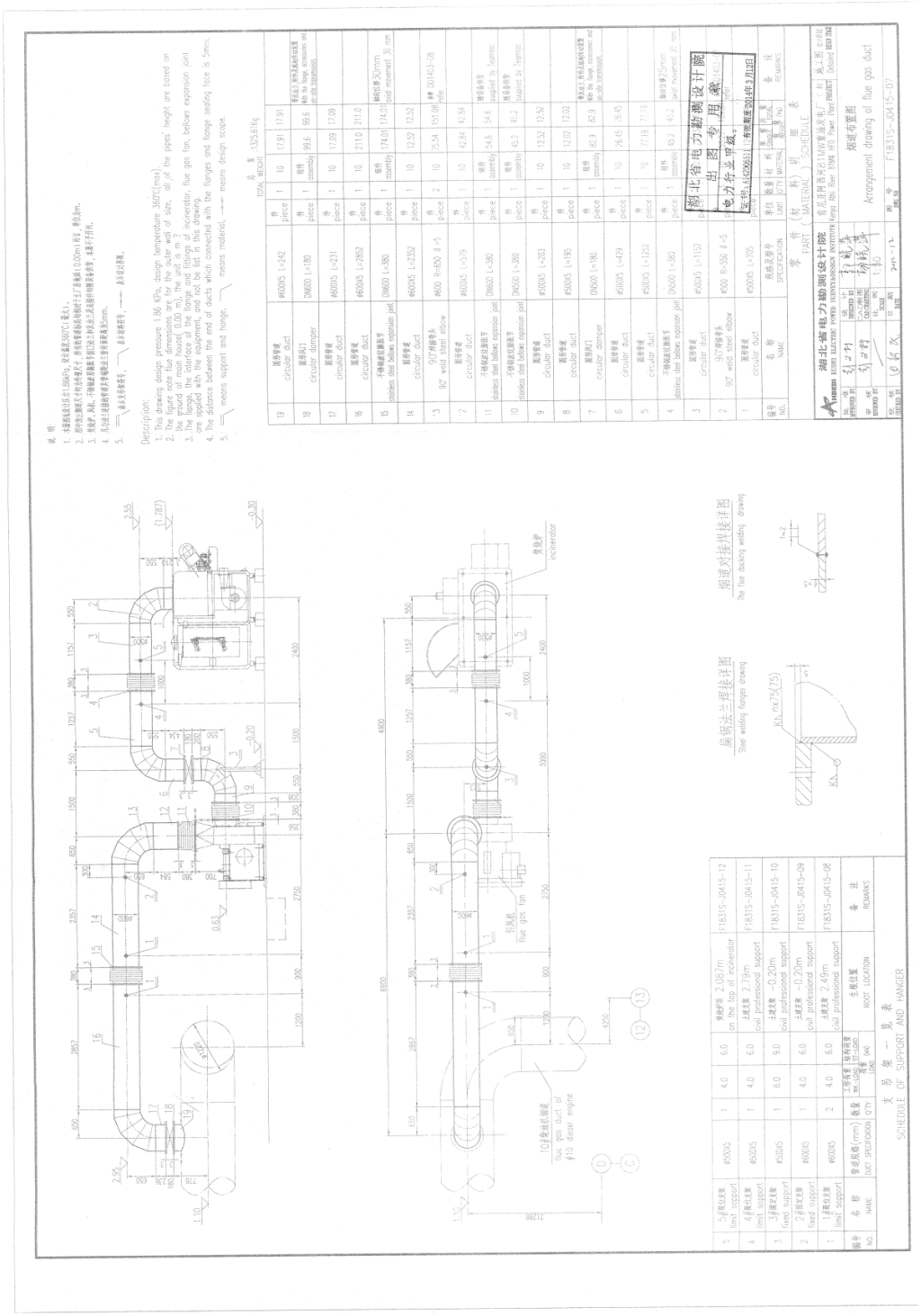
...Promoting, facilitating & creating enabling environment for investments...

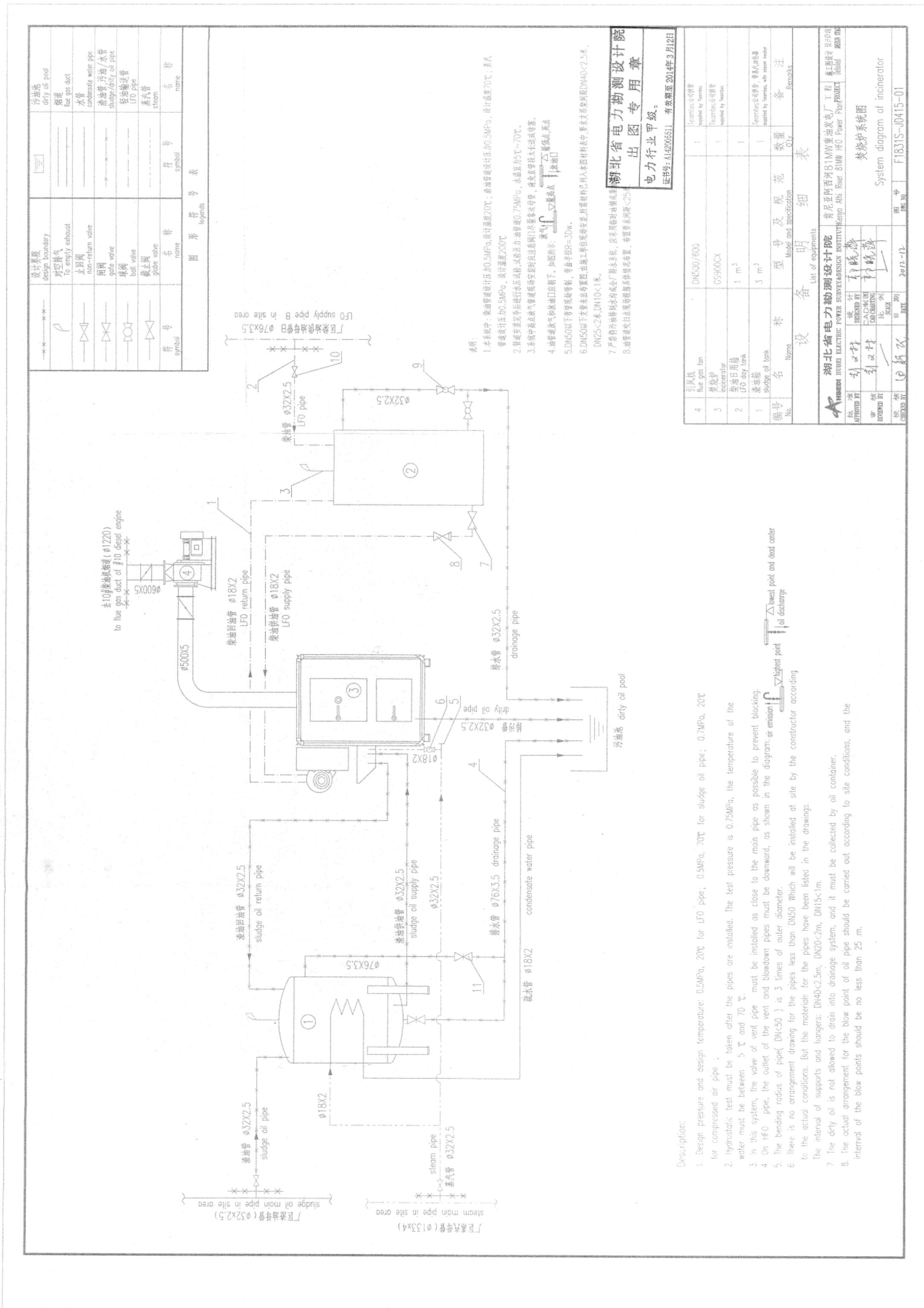
ISO : 14001 : 2004 ISO : 9001 : 2008

Appendix 2: Power plant design with an incinerator.



Appendix 3: Incinerator Designs.

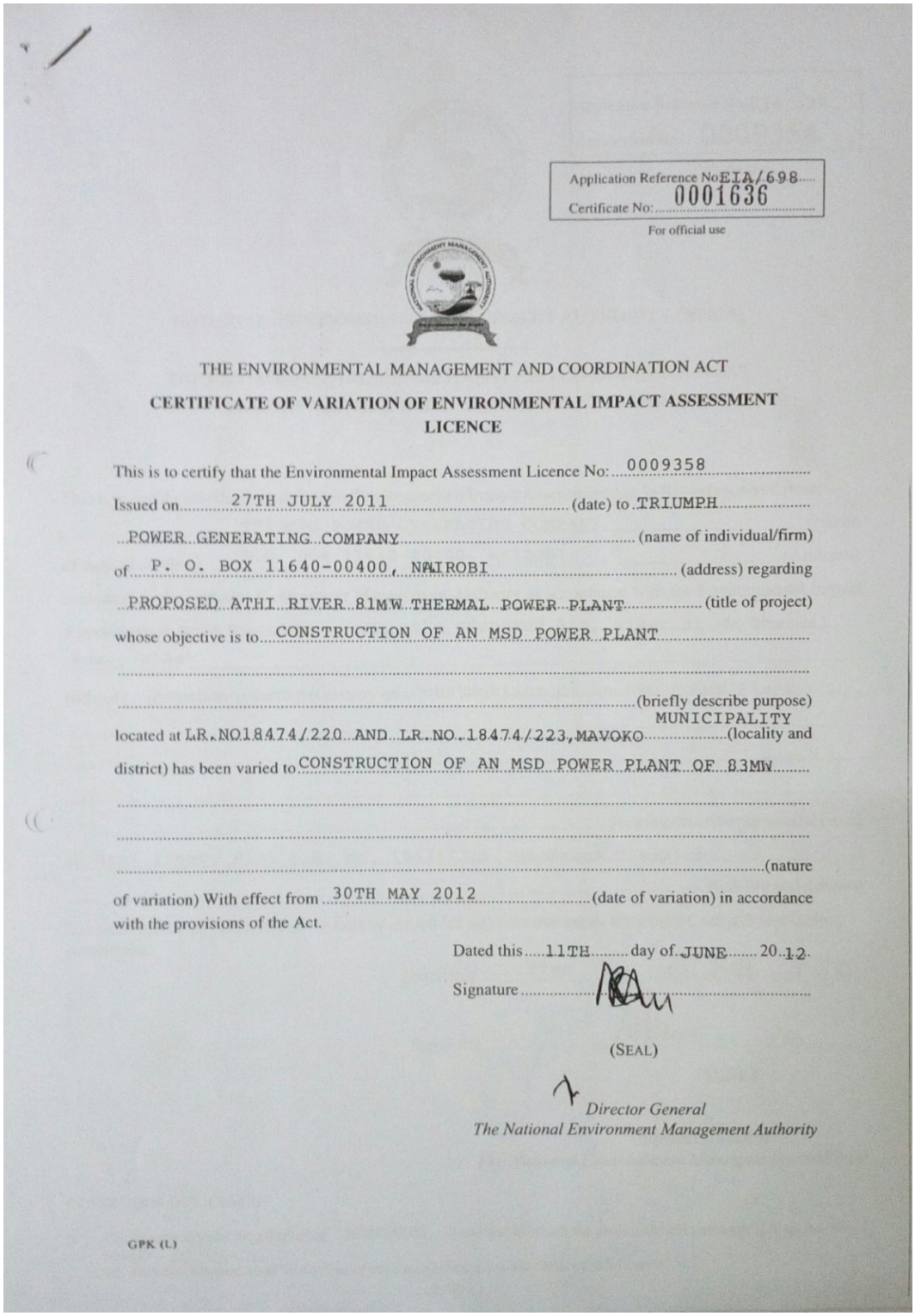



System diagram of incinerator
F1831S-J0415-01

Appendix 4: Budget

#	Item	Amount (Ksh)
1.	Incinerator Equipment	**12,000,000.00**
2.	Environmental Impact Assessments	
3.	Legal Fees	
4.	Construction/Installation	
Total		**12,000,000.00**

Appendix 5: Power Plant NEMA EIA license



Application Reference No: EIA/698
Certificate No: 0001636
For official use

THE ENVIRONMENTAL MANAGEMENT AND COORDINATION ACT

CERTIFICATE OF VARIATION OF ENVIRONMENTAL IMPACT ASSESSMENT LICENCE

This is to certify that the Environmental Impact Assessment Licence No: 0009358
Issued on 27TH JULY 2011 (date) to TRIUMPH
POWER GENERATING COMPANY (name of individual/firm)
of P. O. BOX 11640-00400, NAIROBI (address) regarding
PROPOSED ATHI RIVER 81MW THERMAL POWER PLANT (title of project)
whose objective is to CONSTRUCTION OF AN MSD POWER PLANT
(briefly describe purpose)
located at LR.NO18474/220 AND LR.NO.18474/223, MAVOKO MUNICIPALITY (locality and district) has been varied to CONSTRUCTION OF AN MSD POWER PLANT OF 83MW
(nature of variation) With effect from 30TH MAY 2012 (date of variation) in accordance with the provisions of the Act.

Dated this 11TH day of JUNE 20 12.
Signature
(SEAL)

Director General
The National Environment Management Authority

GPK (L)

Appendix 6: County Approval

MUNICIPAL COUNCIL OF MAVOKO

P.O. Box 11 ATHI RIVER ,Telephone: 22406/7, Telegram: MAVOKO

FIFTH SCHEDULE

FORM P.P.A.2 **{S.33 (1) (A)}**

Registered No. Application 816/1/2012

NOTIFICATION OF APPROVAL OF DEVELOPMENT PERMISSION.

TO: TRIUMPH POWER GENERATING COMPANY LIMITED

P.O. BOX 11640-00400

NAIROBI.

Your application, numbered as above, submitted on...18/01/2012...for Permission to Build **BUID 83 MW POWER PLANT .... On L.R. No...18474/220 & 18474/223** Situated in ... **EPZ(ATHI RIVER NORTH)...** has been approved subject to the following/appended condition(s)

a. To be undertaken under certificate of workmanship.
b. Renewing your approval if your construction is not completed within 24 months.
c. To ensure a copy of this form P.P.A 2 is attached to the copy of the plan on site always.
d. To submit structural drawings/ civil works to the Town Engineer for approval
e. Renewing your approval if your construction is not started within 12 months and not completed within 24 months.
f. To indemnify the council of any responsibility in the works by filling in the indemnity form.
g. To submit to the council certificate of completion/workmanship upon completion.
h. Observe the recommended setbacks and building lines.
i. Ensure the council inspects the building as per section 16 of building code.
j. Erection of construction signboard(see overleaf for instructions)
k. Obtaining certificate of occupation from council before the building is occupied
l. Obtaining NEMA authorization
m. The land not constituting part of disputed public utility
n. Abiding by all details and specifications of your approval
o. Satisfying all other lawful requirements of your proposal.

NOTE: The implementation of the structural works remains the sole responsibility of the project engineer

MUNICIPAL COUNCIL OF MAVOKO
P. O. Box 11 - 00204, ATHI RIVER
THIS DEVELOPMENT IS APPROVED
SUBJECT TO CONDITIONS ON FORM PPA II
SIGNED: ..... DATE: 4/06/2012
MUNICIPAL PLANNER

Dated...4/06/2012...

Signed.....

J.W. MWANIKI
for TOWN CLERK
MUNICIPAL COUNCIL OF MAVOKO

Appendix 7: Air Quality Results.

RESULTS OF AIR MONITORING AT TRIUMPH POWER PLANT -ATHI RIVER:16/11/2016

AIR MONITORING RESULTS.

Location	Hazard	Reading	OEL
EMS 1	IN THE TANK FARM		
	CO	< 5.000 PPM	50 ppm
	SO_2	<1.16mg/nm^3	5 ppm
	NO_2	< 1.05mg/nm^3	5 ppm
	CO_2	359PPM	5,000 ppm
EMS 2	AT THE OFFICE BLOCK		
	CO	< 5.000 PPM	50 ppm
	SO_2	<1.16mg/nm^3	5 ppm
	NO_2	< 1.05mg/nm^3	5 ppm
	CO_2	458 PPM	5,000 ppm

Report by : Cleophas Musumba

Date: 18th November , 2016

Appendix 8: Soil Test Results.

SGS

Date: 04/01/2017

SGS Kenya Limited Laboratory Services
SGS Kenya Ltd
SGS House
Ali Punjani Street
P.O. Box 90264
80100 Mombasa
Kenya

GEOSCAN CONSULTANTS
P O BOX 990-00200
NAIROBI
KENYA

Analysis Report MA16-07258.001

PRODUCT DESCRIPTION	SOIL
SAMPLED BY	CLIENT
SAMPLE RECEIVED	22/12/2016
ANALYSIS STARTED	28/12/2016
MARKS	DELIVERED IN A KHAKI PACK SOIL SAMPLE A-NEAR THE OFFICE BLOCK This report refers to a submitted sample and all details in respect of source, quantities, marks are not verified or confirmed.

TESTS	METHOD	RESULT	UNITS
TPH C8-C44	SGS TW 56	3.56	mg/kg
Benzene	SGS TW 44	<0.01	mg/kg
Ethylbenzene	SGS TW 44	<0.01	mg/kg
Toluene	SGS TW 44	<0.01	mg/kg
Xylene	SGS TW 44	<0.01	mg/kg

Authorized Signatory

Walter Ogara - Multi-Lab Manager

Technical Signatory

Mue Bahati-Chemist

[illegible]

Page 1 of 2

SGS Kenya Ltd. [illegible]

Member of the SGS Group (Société Générale de Surveillance)

Appendix 9: Questionnaire (Attached).