UGANDA ELECTRICITY TRANSMISSION COMPANY LIMITED

SAFETY RECORD

NUMBER OF EMPLOYEES [redacted] 35

DAYS SINCE LAST LOST TIME [redacted] 306

LAST LOST TIME INJURY [redacted]

"OUR TARGET IS ZERO ACCIDENT

VISITOR PA

ENVIRONMENTAL AUDIT

FINAL DRAFT REPORT

FOR THE

AGGREKO THERMAL-POWER PLANT

SUBMITTED BY

EMA CONSULT LTD

MAY 2006

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Acknowledgement

The Environmental Auditors for Aggreko Thermal Power Generation Plant at Lugogo Sub-station would like to thank all the people who assisted in one way or another in the audit. We are particularly indebted to the audit team: John Othieno and Andrew Omalla from Uganda Electricity Transmission Company Limited; Dr. Natal Ayiga and Elizabeth Aisu Sociologists; Moses Ntaro the Environmental Health Specialist and Mike Nolan, Project Manager Aggreko.

We thank the management and staff of Uganda Electricity Distribution Company Limited Pole Treatment Yard, Lugogo Rugby Sports Club, Kingsway Second-hand Car Yard and Lugogo Water Suppliers, who share a boundary with the Plant. These participated in the public consultations and raised pertinent neighbourhood issues.

Samuel Vivian Matagi
Lead Auditor

Eddie Luyiima
Senior Environmental Auditor

Abbreviations and Acronyms

AIDS	Acquired Immune Deficiency Syndrome
BOP	Best Operating Practices
CAO	Chief Administrative Officer
C	Compliant
CO_2	Carbon dioxide
CO	Carbon monoxide
DEO	District Environment Officer
DWD	Directorate of Water Development
EA	Environmental Audit
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
EMA	Environmental Management Associates
EMP	Environmental Monitoring Plan
ESIA	Environmental and Social Impact Assessment
ERA	Electricity Regulatory Authority
GHGs	Green House Gases
GoU	Government of Uganda
HIV	Human Immuno – Deficiency Virus
IDA	The International Development Association
ISO	International Standards Organization
kV	Kilovolt
LC	Local Council
MSDS	Material Safety and Data Sheet.
MW	Megawatt
MWh	Megawatt – hour
MSDS	Materials and Safety Data Sheet
NA	Not Applicable
NC	Non Compliant
NEMA	National Environment Management Authority
NEMP	National Environment Management Policy
NGO	Non-Governmental Organization
NO_2	Nitrogen dioxide
PM	Particulate Matter
SO_2	Sulphur dioxide
ToR	Terms of Reference
UETCL	Uganda Electricity Transmission Company Ltd
VOCs	Volatile Organic Compounds
WB	World Bank

Executive Summary

Demand for electricity in Uganda has continued to grow at 24 MW per year without substantial new generation capacity. According to Electricity Regulatory Authority (ERA), the prolonged drought, which has led to a sharp drop in the water level of Lake Victoria, has worsened the electricity generation situation.

Following the acute shortage of hydropower generation, the government of Uganda was forced to use thermal power as a temporary measure. An international bid was tendered and Aggreko International Power Projects emerged as the best bidder. The contract stipulates that Aggreko supplies 50 MW 24/7 for 3 years. As any other thermal power generating facility, Aggreko Thermal substation at Lugogo impacts on the environment. This report presents the first external environmental audit conducted on Aggreko's thermal electricity generation facility at Lugogo Kampala sub-station in Uganda.

The general requirements of the environmental audit were to assess the environmental compliance of Aggreko Lugogo Power Thermal sub-station operations against existing and proposed Ugandan legislation. In the absence of Ugandan legislation, or where appropriate, operations at the facility were assessed for compliance with guidelines and accepted best management practices from other relevant organizations, such as the World Bank, ISO 14001:2004 Environmental Management Systems.

In order to fulfil the requirements of the environment audit as per the Audit Criteria, a number of methods were used to collect data. These included the following; review of relevant documents, three factory walks, collection of air emission samples, water sample collection and analysis, waste and noise measurements. A Stakeholders Analysis using key informant interviews\and and focused group discussions was carried out to establish social economic issues. An Environmental Audit Checklist guided the audit.

Project Description

Electric power generation is done at two sites adjacent to UEDCL and Lugogo sub-station along the 4th Street. The facility provides 50 MW for 6 hours per day and 25 MW for 12 hours per day with availability factor exceeding 85 %. The smaller lower eastern site generates 10 MW while the larger upper western site generates 40 MW. The lower site has two 4.8 MW connections to the main electric grid. Those connections provide power to Jinja Road feeder and Coffee Marketing Board feeder. Both are on the 11kV system. The 40 MW site has a total of 5 connections to the main grid. One 22.4 MW connection is made to the 33 kV Kisugu feeder and four 4.8 MW connections to the following feeders on the 11kV network: Kololo, Kampala Industrial, Kitante II, Kisugu and Kibuli feeder.

The facility is comprised of 64, 1250 kV, generators each providing 400V at 50 Hz: eleven, 6.3 MVA 0.4/11kV Transformer packages: two 20 MVA 11/33kV Transformers and a set of switchgears. The facility operates in parallel with the utility grid and the generator sets operate at constant load and power factor. Each generator is fitted with electro loading shedding and synchronizing units. A back feed from the 33kV network and each 11kV connection point energizes the Transformers. The generators are synchronized at a voltage reference of 400 volts.

Audit findings

Aggreko has versatile and robust environmental management system enshrined in its Global Environmental Practices manual. However in its main limitations are that it is not ISO 14001 Environmental Management Systems certified and although the parent company in Dubia is ISO 9001-2002 Quality Management System certified. Documentation and record keeping of the environmental management system was not satisfactory. Although audit findings were easy to observe, audit evidence was hard to come by because of lack of appropriate documentation and recording keeping. Environmental impacts were identified. Noise levels are approximately above national standards but wthin World Bank limits and it was not possible to measure stack emissions, although the air quality in the vicinity of the facility was satisfactory. Handling, use, storage and disposal of solid waste, wastewater, oil, hazardous waste,

batteries and fuel was satisfactory done. House keeping, fire prevention and suppression, spill prevention and response are adequately addressed. First Aid, emergence response, accident response and risk assessment are appropriately handled. Noise is nuisance to the workers and neighbours. Furthermore ear protection equipment is not given to all workers, for instance the guards are not provided and it is not enforced to those who have.

Environmental Action Plan

A number of mitigations / action plans have been recommended in order to bring the facility into compliance. Those include actions to ensure workers safety and proper management of oil spills, wastewater, solid wastes, emission and noise control, precaution against fire accidents and electrocution and the periodic monitoring of noise and emission levels as well as water quality and actions for Best Operating Practices.

Environmental monitoring Plan

Noise, stack emissions, ambient air quality and effluent quality are to be continuously monitored. A monitoring Plan has been fully drawn covering all the above Environmental concerns. The government Environment lead agency NEMA together with Aggreko power plant management are charged with this responsibility.

The consultant concludes if the recommendations are put in place; the impacts identified will be put to control so as to comply with the set audit criteria.

1.0 INTRODUCTION

1.1 Background

In Uganda, power demand is increasing at 8% per annum due to economic growth, leading to constant load shedding (ERA, 2006). Electricity demand has continued to grow at 24 MW per year without substantial new generation capacity. Currently, the electricity supply is insufficient. This is evident as electricity demand in the evening is about 350 MW yet the country generates only 250 MW, leaving a shortage of 100 MW during the evening hours. On the other hand, during the day the demand is almost 300 MW representing a power deficit of 50 MW. According to Electricity Regulatory Authority (ERA), the prolonged drought, which has led to a sharp drop in the water levels of Lake Victoria, has worsened the electricity generation situation.

Following the acute shortage of hydropower generation (because of the drought in the region that has reduced river inflows on the Kenyan, Tanzanian, and Rwandan sides of the lake Victoria.and the resulting drop in water levels in the lake at Nalubaale and Kiira hydropower stations) the government of Uganda was forced to use thermal power as a temporary measure. An international bid was tendered and Aggreko International Power Projects emerged as the best bidder. The contract stipulates that Aggreko supplies 50 MW 24/7 for 3 years. This report presents the first external environmental audit conducted on Aggrekos' thermal electricity generation plant at Lugogo, Kampala sub-station in Uganda.

1.2 Company profile

Aggreko was incorporated in 1962 in the Netherlands. It's now a Scottish firm listed on the London Stock Exchange. Aggreko works worldwide in the supply of temporary power stations. Its international group (International Power Projects) based in Dubai in the United Arab Emirates specifically handles multi-mega watt, temporary thermal generation power projects. Aggreko's multi–megawatt packages comprises generators, load banks, transformers, fuel tanks, cables and switch gear; including full project

planning, installation, commissioning, and operating services. The power company is currently running contracts in Angola, Philippines, Spain, Nigeria, Australia, Sri-Lanka and Russia, which reflects its international business diversity. The production of over 1000 MW dedicated fleets makes it a world leader in temporary thermal power generation. Aggreko has been able to achieve this because of its rapid mobilization, turnkey responsibility, flexibility, non capital layout and guaranteed power generation once the contract has been signed.

In Uganda it was registered as a company in February 2005 and licensed in May the same year by the Electricity Regulatory Authority appendix 1 and 2 respectively.. The company has a workforce of 35 personnel. These are distributed in different work disciplines; which include a project Manager, an Administrator, 2 senior mechanical engineers, 2 senior electrical engineers, 9 mechanical engineers and 9 electrical engineers.

1.3 Site location

The 50 MW temporary Thermal Plant is located on two sites in Kampala along the 4th Street at Uganda Electricity Transition Company Limited sub-station at Lugogo. The Plant produces 10 MW on the eastern lower plot and 40 MW at the western upper plot.

1.3 Audit criteria

The general requirements for an environmental audit are to assess the environmental compliance of Aggreko Lugogo Power Thermal sub-station operations against existing and proposed Ugandan legislation. In the absence of Ugandan legislation, or where appropriate, operations at the facility were assessed for compliance with guidelines and accepted best management practices from other relevant organizations, such as the World Bank. The following audit criteria were used: -

- The National Environment Act CAP 153
- Environmental Audit Guidelines for Uganda NEMA (1999)
- The Draft National Environment (Audit) Regulations (2004) for Uganda

- The World Bank (Pollution Prevention and Abetment Handbook) 1998
  - Environmental Audit in Industrial Projects
  - Thermal Power: Rehabilitation of Existing Plants
  - Summary of Air Emissions and Effluent Discharge Requirements presented in the industry Guidelines
  - Urban Air Quality Management
- Environmental Management System ISO 14001:2004,
- Aggreko Global Environmental Health and Safety, Best Operating Practices

Under this criteria the following documents were reviewed: -

- Aggreko Company Profile
- Aggreko Environmental Project Brief
- Aggreko Internal Audit Report
- Environmental Laws and Regulations of Uganda
- Aggreko Technical Specifications
- Aggreko Process Flow Chart
- A Summary of the current organization structure
- Results of air, wastewater, and noise sampled

1.4 Objective of the Environmental audit

The overall objective of the Audit as stipulated in the TOR was to identify the present levels of pollution especially air, wastes and noise pollution and the potential costs to improve the situation. Inadequate environmental management and Occupational Health and Safety issues in facilities to be financed and determine the need for remedial actions to bring those facilities into compliance with National Environmental Management Authority (NEMA) and World Bank safeguard policies and to recommend actions to improve and strengthen environmental health and safety management at the plant.

Specific Objectives of the Environmental Audit

i. to identify and assess potential adverse environmental social effects of the planned program

ii. to make recommendations that can be used for mitigating adverse effects resulting from implementation

iii. to prepare an environmental management plan that can assist in implementing mitigation measures recommended

iv. to ensure that the programme activities conform with both national and World Bank safeguards

1.5 General methodology

The audit process followed the scheme summarised in Fig 1.1. In order to fulfil the requirements of the environment audit as per the NEMA Guidelines and Draft Environmental Audits Regulations 2004, ISO 14001-2004 and World Bank safeguards, a number of methods were used to collect data. These included the following.

- **Document Review**. Literature was gleaned to review the present Environmental Legislation that relate to thermal electric generation and all the plants documents related to environmental management. Documents reviewed included; the company profile, environmental impact statements/ project briefs, internal environmental audit report, technical description of the company processes, health, safety and environmental manuals and procedures, Shell Uganda Limited health, safety and environmental manuals, company environmental emergency preparedness and response plans, occupational health and safety data sheets.

- **Site view (factory walk)**. Three guided factory walks were conducted. During each walk the thermal generation process was observed. The environmental, health, safety and occupational practices at the facility were noted. Non compliance and recommendations for improvement were noted during the factory walks.

- **Scientific data collection and analysis**. Samples were taken from the air and water. Key pollution indicator parameters were analysed in analytical laboratories to determine the levels of non-conformity with environmental standards. Noise

levels were also measured and compared with national standards. In the absence of national standards World Bank recommended guideline levels were used.

- **Stakeholders Consultation including the community.** Focus Group Discussions and in-depth interviews were conducted with key stakeholders and staff of the UETCL, Aggreko and NEMA, the neighbouring communities including the caryard, UEDCL and Transtract workshops.

- **Use of Environmental Audit Checklist.** An Environmental Audit Checklist was developed. This checklist was used by the auditors to systematically guide the audit.

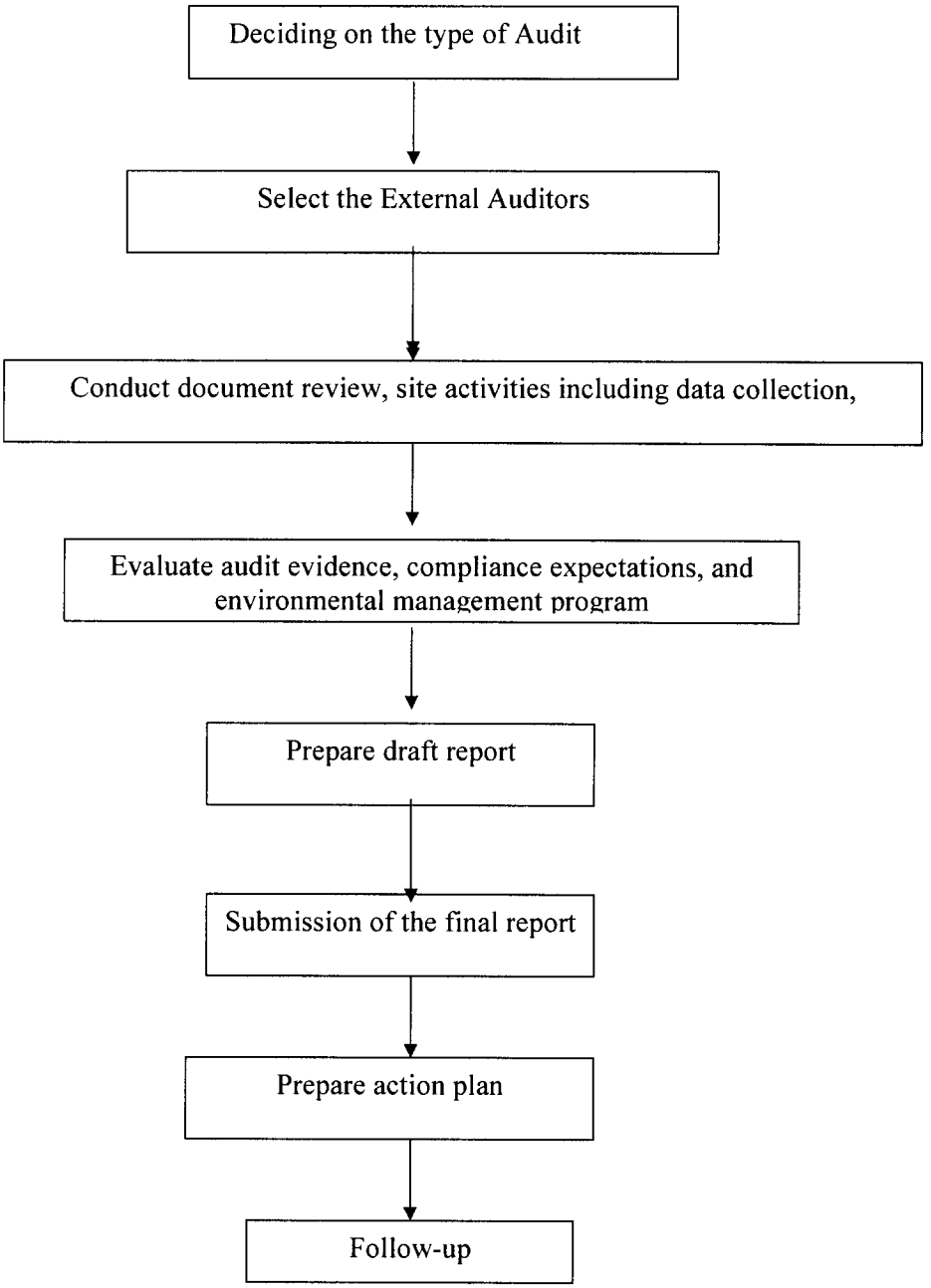

Fig. 1.1 Summary of the environmental audit process

2.0 REVIEW OF POLICIES, LAWS, REGULATIONS AND INSTITUTIONAL FRAMEWORK FOR ELECTRIC POWER GENERATION IN UGANDA

2.1 The energy policy for Uganda

The main goal of the Energy Policy is to meet the needs of Uganda's population for social and economic development in an environmentally sustainable manner. The policy seeks to establish availability, potential and actual demand for the various energy resources in the country. The policy further seeks to increase modern affordable and reliable energy services as contribution to poverty eradication and to improve energy governance and administration. The policy encourages the GOU to ensure that energy policies promoted should not only stimulate development but their environment impacts are properly managed.

The GOU energy policy allows for the liberation of the energy supply and use. Open and competitive markets are allowed to operate in the energy sector. Especially the private sector participation in the provision of electricity is encouraged. It is however, recognized that some rural areas are not viable for the private sector to invest in. Therefore the policy allows the GOU to priorities underserved areas and initiate grid extensions or off grid investments based on other technologies such as photovoltaic solar grids or home systems, or wind-based technologies, and concession the operation and management (O&M) of such schemes to local authorities or private sector operators.

2.2 National environment management policy

The National Environment Management Policy (NEMP) was adopted by Cabinet in 1994. Its overall goal is the promotion of sustainable economic and social development that enhances environmental quality without compromising the ability of future generations to meet their own needs. One of the strategies identified to achieve this goal is Environmental Impact Assessment. The policy clearly states that an Environmental Assessment should be conducted for any project that is likely to have

potential adverse impacts on the socio-cultural, physical and biological environment. This statement is further embedded in the *National Environment Statute* No. 4 of 1995 which makes Environmental Audit a legal requirement for eligible projects, policies and programmes. NEMA is the institution that will review this Environmental Audit.

2.3 World Bank policy on environmental assessment (OP 4.01)

World Bank requires Environmental Assessment (EA) of projects proposed for Bank financing to help ensure that they are environmentally sound and sustainable, and thus to improve decision making of the Bank on the project. This audit was carried out inline with the Bank's requirements. The World Bank Pollution Prevention and Abatement Guidelines and Occupational Health and Safety Guidelines have been reviewed and were found to be complimentary with the laws of Uganda. The stipulated standards for noise as per the World Bank guidelines are similar to the Uganda National standards for noise. However, national standards for air emission levels in Uganda are still under draft.

2.4 The Constitution of the Republic of Uganda 1995

The Constitution of the Republic of Uganda recognizes the importance of conserving the Environment. The Constitution states in Part "The State shall promote sustainable development and public awareness of the need to manage land, air and water resources in a balanced and sustainable manner for the present and future generations". It also states that "the State shall take all possible measures to prevent or minimize damage and destruction to land, air and water resources resulting from pollution or other causes."

The Constitution further stipulates, "The State, including local governments, shall promote the rational use of natural resources so as to safeguard and protect the biodiversity of Uganda. Article 39 and 41 states that everyone has a duty to maintain a sound environment. Article 245 refers to protection and preservation of the environment and states that, Parliament shall provide for measures intended to, protect

and preserve the environment from abuse, pollution and degradation: manage the environment for sustainable development and promote environmental awareness".

2.5 National Environment Act CAP 153

The National Environment Act, CAP 153, the EIA Regulation (1998) and Environmental Audit
Regulations (2004) under draft require that an Environmental Audit be undertaken by the developer, where the lead agencies, in consultation with NEMA, are of the view that the project;

- May have a negative impact on the environment
- Is likely to have a significant impact on the environment

The National Environment Act provides a basis for requiring an Environmental Audit. In Part ii –General Principles, section 3(3) C requires that *any on- going activity be subjected to an environmental audit in accordance with section 22 of this Act.* In section 22, *NEMA shall in conjunction with the Lead Agency, be responsible for carrying out an Environmental Audit of the activities that are likely to have significant effects on the environment.*

Section 53 states that every person has a duty to manage any waste generated by his activities or activities of those persons working under his direction in such a manner that he does not cause ill health to the persons or damage the environment.

2.6 The Water Act CAP 152

The Water Act, 1995 Section 31 subsection (1) prohibits pollution of water and states that a person commits an offence if, unless authorized under this Act, one causes
(a)Waste to come into contact with any water
(b) Waste to be discharged directly into water.

2.7 The Public Health Act, 1964 Cap. 269

Section 56 prohibits any person from causing a nuisance. However, section 59 details what constitutes a nuisance. Any chimney emissions in such a quantity or toxicity level that it may be hazardous or injurious to health is a nuisance. Section 57 of the some act authorizes the Local authorities to cause the abatement of a nuisance.

2.8 The Local Government Act 1997

The Local Government Act establishes a form of government based on the Districts as the main unit of administration. The districts are given legislative and planning powers under this Act. They also plan for the conservation of environment within their local area. District Environment Committees established under section 15 of the National Environment Act, Cap 153 are supposed to guide the district authorities in that regard. District authorities must, therefore, be consulted at an earlier stage of project implementation since they have a stake in the project as overseers of all environmental issues in their local areas of operation.

2.9 The Factories Act 1964

This Act makes provisions for the health, safety and welfare of persons employed in factories and other places. *Section 13 of the Factories Act requires that every factory be kept in a clean state, including floors, walls, workrooms and ceiling or top of rooms. Further more section 14 (1) states that a factory shall not; while work is carried out be so over crowded so as to cause risk of injury. Section 15 provides for ventilation and circulation of fresh air in each workroom and section 15 provides for the welfare of persons employed in the factories.*

2.10 Workers' Compensation Act 2000

Section 28 of The Workers' Compensation Act (2000) states that: Where a medical practitioner grants a certificate that a worker is suffering from a scheduled disease causing disablement or that the death of a workman was caused by any scheduled disease; and the disease was due to the nature of the worker's employment and was contracted within the twenty-four months immediately previous to the date of such disablement or death, the worker or, if he or she is deceased, his or her dependants shall be entitled to claims and to receive compensation under this Act as if such disablement or death had been caused by an accident arising out of and in the course of his or her employment.

If on the hearing of an application for compensation in terms of subsection (I) of this Section the court is satisfied on the evidence that the allegations in the certificate are correct, the workman or his dependants, as the case may be, shall be entitled to compensation under this Act as if the contracting of disease were an injury by accident arising out of and in the course of the workman's employment. The provision of personal protective equipment (PPE) to employees minimizes accidents and injuries.

2.11 The Petroleum Supply Act 2003

This Act that repealed the Petroleum Act, CAP 97 of the 1964 Laws of Uganda and the Uganda Oil Board Statute of 1991 provides for anyone intending to enter the petroleum supply chain to apply to the Commissioner of Petroleum Supply for grant of a petroleum construction permit or a grant of petroleum license. When executing this project, the above legislations have to be put under consideration and observed for the smooth implementation of the development.

2.12 The Electricity Act 1999

Under the Electricity Act, Electricity Regulatory Authority (ERA) is mandated to review proposed investments in the energy sector and guides the promoters through implementation. The main functions of ERA, among others, include:

- Issuing licenses for generation, transmission, distribution, of electricity
- Processing applications for investors in the energy sector

- Enforcement of requirements under the Act to ensure compliance in Establishing tariffs, reviewing, and approving rates of investment in the electricity sector
- Advising the minister regarding the need for electricity projects
- Developing and enforcement of energy standards

The Electricity Act lays down procedures and legal requirements for the development of transmission lines. Part VII (69) deals with acquisition of land. It provides that whenever a developer is to acquire land, he should acquire it by agreement with the owner. However if the owner does not agree with the developer, the licensee notifies the minister to impose such terms as he may deem fit to acquire the land. Section 37 deals with way leaves for the construction of transmission lines. It allows for the placement of electric lines below ground, across any land, and above ground across any land not covered by building. Within the way leaves, no buildings are allowed and crops may only be authorized if they are of a certain height.

2.13 The Investment Code 1991

The Investment Code No.1 of 1991, Section 19 requires that an investment licence may also contain an understanding by the investor to take measures to ensure that the operations of his/her business do not cause injury to the ecology or environment.

2.14 National Environment (Waste Management Regulations)

Those Regulations made in accordance with section 54 (2) of the National Environment Act (CAP 153) are meant for management of waste that NEMA may consider necessary. Under Regulation 5(1), a person who owns or controls a facility or premises, which generate waste, shall minimize the waste generated by adopting the following cleaner production methods.

- Improvement of the production process thoroughly:
- Conserving raw materials and energy
- Eliminating the use of toxic materials
- Reducing toxic emissions and waste
- Monitoring the production cycle from beginning to end by-

- Identifying and eliminating potential negative impacts of the product
- Enabling the recovery and reuse of the by -product where possible
- Reclamation and recycling
- Incorporating environmental concerns in the design and disposal of a product.

Under Regulation 11 (1), no person shall discharge any hazardous substances, chemical, oil or mixture containing oil in any water or any other segment of the environment except in accordance with guidelines prescribed by the Authority in consultation with the Lead Agency. Under subsection 4: the owner or operator of a production or storage facility, motor vehicle or vessel from which a discharge occurs shall mitigate the impacts of the discharge by giving immediate notice of the discharge to NEMA and other Government officials: and immediately beginning clean –up operations using the best available methods.

Until that person has undertaken mitigation measures, NEMA may seize the production or storage facility, motor vehicle or vessel.

2.14 National Environment (Noise Standards & Control Regulations) 2003

Under sections 23 and 107 of the Environment Act these regulations are aimed at ensuring the maintenance of a healthy environment for all people in Uganda, the tranquillity of their surroundings and their psychological well-being by regulating noise levels.

This is done through prescribing the maximum permissible noise levels from a facility or activity to which a person may be exposed and the provision for control of noise and for mitigating measures for the reduction of noise. Under regulation 8, it is the duty of the owner of a facility or premises to use the best practicable means to ensure that the emission of noise from his/her premises does not exceed the permissible noise levels.

Section 6(1) of these regulations requires that the maximum noise levels from a facility in the general environment specified in Part 1 of the First Schedule as "mixed residential (with some commercial and entertainment)", shall not exceed 55 dBA and 45 dBA during day and night time respectively. This regulation will have a direct influence on daytime or nighttime noise levels generated at the proposed facility both during construction and operational phases. The noise levels at Aggreko are given in Appendix 11.

Table: 1 Maximum permissible noise levels relevant to the project

Facility	**Noise limits B (A) (Leq)**	
	Day	**Night**
Operation of the facility	75	65
Residential buildings	50	35
Mixed residential (with some commercial and entertainment)	55	45
Time frame: Day – 6.00a.m -10.00 p m; Night: 10.00 p.m. – 6.00 a.m. The time frame takes into consideration human activity.		

2.15 The National Environment (Standards for Discharge of Effluent into Water or on Land) Regulations 1999

The Standard for Effluents or Wastewater before it's discharged into water is prescribed in the schedule to these Regulations. Every Industry or establishment shall install at its premises, anti- pollution equipment for the treatment of effluent chemical discharge emanating from the Industry or establishment. In accordance to these Regulations, Agrekko Thermal Power Plant has to comply with this standard.

2.16 The Electricity Regulatory Authority (ERA)

The Electricity Regulatory Authority is a corporate body established to oversee the implementation of the Electricity Act 1999. Under the Act, ERA is mandated to review

proposed investments in the energy sector and guides the promoters through implementation. The main functions of ERA, among others, include:

- Issuing licenses for generation, transmission, distribution, of electricity;
- Processing application for investors in the energy sector
- Enforcement of requirement under the act to ensure compliance with regulations
- Establishing tariffs, reviewing, and approving rates of investment in the electricity sector
- Advising the minister regarding the need for electricity projects
- Developing and enforcement of energy standards

The Electricity Act lays down procedures and legal requirements for the development of generation of electricity. Part VII (69) deals with acquisition of land. It provides that whenever the developer is to acquire land, he should acquire land; he should acquire it by agreement with the owner. However if the owner does not agree with the developer, the licensee notifies the minister to impose such terms as he may deem fit to acquire the land.

The procedures for actual works for an electricity project line as stipulated in the Act are:

- ERA Board gives notice to the local authority before survey is carried out;
- The notice served should indicate the plan of the proposed work is to be made available for inspection;
- The persons served have 14 days to consent or consent subject to certain conditions and terms;
- The developer begins the survey work and final routes are earmarked and drawn;
- Before construction the surveyors are authorized to clear vegetation to prevent interference with the works;
- Access roads are constructed for every section of the line to allow maintenance crews to access the line.
- Buildings and crops that are within the corridor of the transmission line are demolished and the owners paid compensation for such damage as provided by

section 56 of the Act. The compensation is only for the crops and buildings and not the land;

- Any dispute arising from the payments is determined by the District Commissioner and with appeals to the minister responsible for energy.

3.0 DESCRIPTION OF THE FACILITY AT LUGOGO

Electric power generation is done at two sites adjacent to UEDCL and Lugogo sub-station along the 4th street. These were installed under a contract of build, own and operate by Aggreko International Power Projects. The contract further requires Aggreko to constantly supply UETCL without fail a three phase output with aggregate capacity of 50 MW at 11 kV and 33 kV at 0.85 lagging power factor. The facility provides 50 MW for 6 hours per day and 25 MW for 12 hours per day with availability factor exciding 85 %. The smaller lower eastern site generates 10 MW while the larger upper western site generates 40 MW. The lower site has two 4.8 MW connections to the main electric grid. Those connections provide power to Jinja Road feeder and Coffee Marketing Board feeder. Both are on the 11kV system. The 40 MW site has a total of 5 connections to the main grid. One 22.4 MW connection is made to the 33 kV Kisugu feeder and four 4.8 MW connections to the following feeders on the 11kV network: Kololo, Kampala Industrial, Kitante II, Kisugu and Kibuli feeder.

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The facility is comprised of 64, 1250 kV, generators each providing 400V at 50 Hz: eleven, 6.3 MVA 0.4/11kV Transformer packages: two 20 MVA 11/33kV Transformers and a set of switchgears. The facility operates in parallel with the utility grid and the generator sets operate at constant load and power factor. Each generator is fitted with electro loading shedding and synchronizing units. A back feed from the 33kV network and each 11kV connection point energizes the Transformers. The generators are synchronized at a voltage reference of 400 volts.

3.1 Thermal electricity generation

The engine-driven power plant uses diesel as fuel. Diesel is delivered to the fuel storage tank at the receiving bay by Shell Uganda Ltd fuel tankers. The fuel meters measure quantities of diesel; the first meter (A) belongs to Shell Uganda Ltd while the second meter (B) belongs to Aggreko which counter checks the quantities of fuel supplied. The fuel is stored in the fuel storage tanks. Fuel is pumped into the generators through two outlets meters C and D. Meter "D" counter checks the amount

of fuel delivered at the generators (see Figure 3.1). Each generator has its own fuel supply line. The type of engines used is the medium-speed four-stroke trunk piston engines. These engines operate on the air-standard diesel thermodynamics cycle. Air is drawn and forced into cylinder and is compressed by a piston. Fuel is injected into a cylinder and is ignited by heat of the compression of air. The burning mixture of fuel expands, pushing the piston. Finally the products of combustion are removed from the cylinder, completing the cycle. The energy released from combustion of fuel is used to drive the engine, which rotates the shaft of an alternator to generate electricity. The electricity is stepped up at the transformer to meet the UETCL demand. The production process is controlled and monitored at the control panels. There are two electricity meters E and F. F counter-checks E before the generated electricity is sent to the national grid.

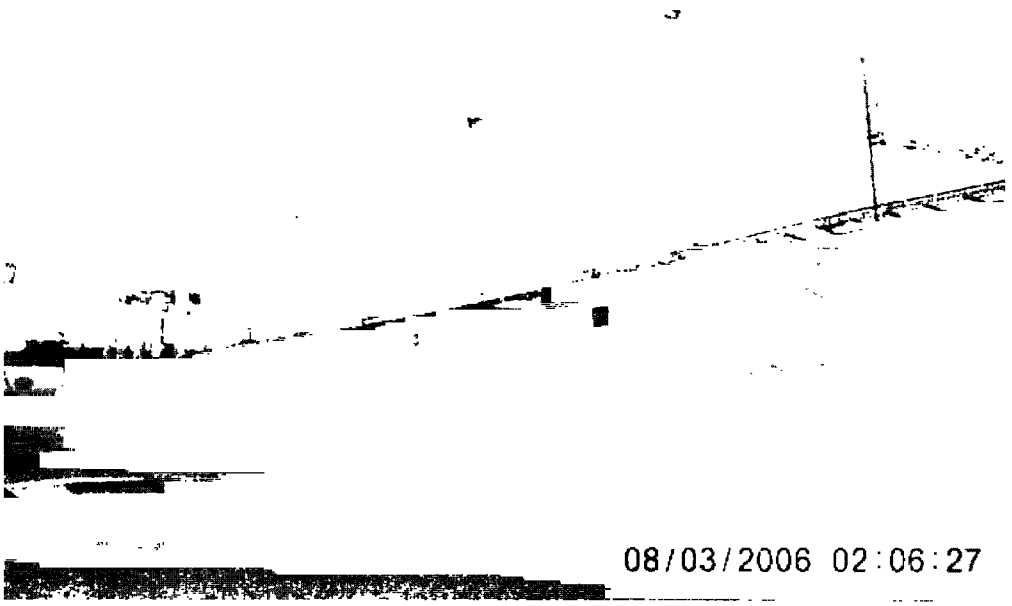
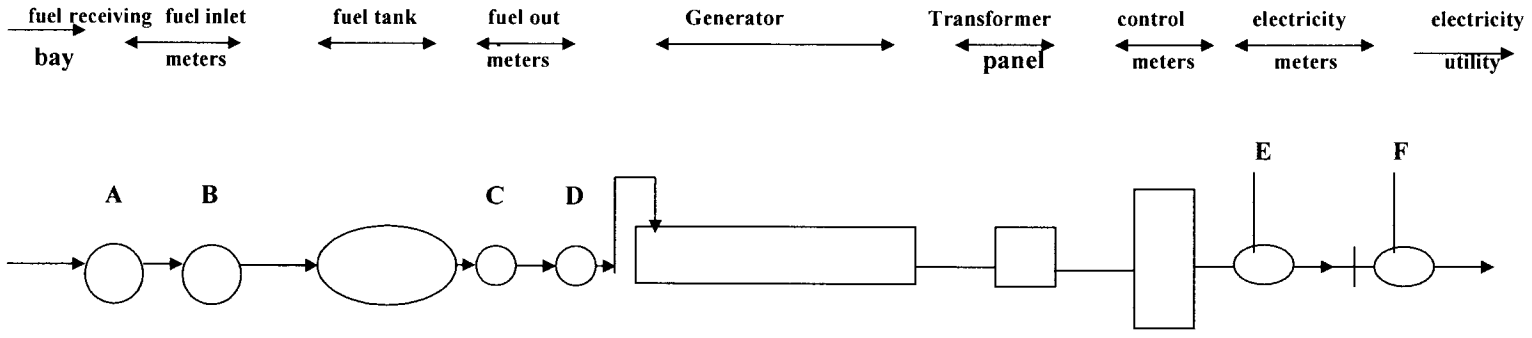


Plate 1: Thermal electric power generators by Aggreko at Lugogo Sub-station

Figure 3.1 Aggreko thermal electric power generation flow chart



A Inlet fuel meter

B Inlet fuel check meter

C Outlet fuel meter

D Outlet fuel meter

E Electricity meter

F Electricity check meter

4.0 ENVIRONMENTAL PRACTICE AND AUDIT FINDINGS

This section presents the Environmental Management Practices at Aggreko Lugogo Thermal Power Station and how the Company has complied with its Global Environmental Health and Safety Best Operating Practice Policy Statement and procedures outlined in its Global Environmental Health and Safety Best Operating Practice Manual. Aggreko International Power Projects is ISO 9000-2002 Quality Management Systems certified (Appendix 3).

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It is Aggreko's objective world wide to operate in a safe, responsible manner, which protects the environment as well as safeguard the health and safety of its employees. Based on this objective as derived from the Aggreko PLC Global Environmental Health and Safety Policy Statement, the company is mandated to follow the Global Environmental Health and Safety Best Operating Practice Manual. The Aggreko Best Practice Operating Manual was arranged into two sections. The policy section and the operating practice. The policy statement states the requirements to be achieved and the Best Operating Practices manual details how the requirements are to be achieved.

Although Aggreko Environmental, Health and Safety Best Operating Practice Manual is very robust and is based on ISO 14000: 2004 standard, its elements do not match those stipulated in the standard. However its ISO 9000: 2002 Manual is consistent with the requirement of the standard. Other short falls of EH&S includes a clear-cut spell out objectives, environmental targets, the scope of EH&S and legal requirements. Below are the detailed findings of the audit which are divided into: - factory inspection, analysis of noise, air and water quality and public consultation.

4.1 Factory Inspection

Global Environmental, Health and Safety Policy Statement	
Policy Statement	It is the objective of Aggreko to operate worldwide in a safe, responsible manner, a manner in which operations protects the environment as well as safeguarding the health and safety of our employees, our customers and communities in which we operate. We are committed to promoting a culture and maintaining a framework that ensures continual improvements in environmental, health and safety performance.
Evidence based on BOP	The company has a well documented Environmental, Health and Safety Policy with key commitments on the following: - ▪ compliance with applicable laws and regulations ▪ setting and reviewing environmental objectives and targets ▪ prevention of pollution ▪ communication of the policy ▪ the policy considers Health and Safety issues and ▪ continuous improvement
Consultant's comments	Aggreko Environmental, Health and Safety Policy far exceeds the requirements of ISO 14001. Unfortunately the Policy Statement posters are inconspicuously displayed. They should be displayed at more suitable places at the facility for the public and employees to see i.e. common/visitors waiting room, fuel delivery bay, control rooms, general notice board and tea/refreshment rooms.

Best Operating Practice 01 – EH & S Representatives	
Policy Statement	The policy statement requires that every Aggreko location should have a designated EH &S Representative who should coordinate all activities involved in the EH & S Best operating

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	Practices.
Evidence based on BOP	There was no evidence on record for the appointment of a Management Representative at Lugogo Substation yet this is a requirement for ISO 14001.
Consultant's comments	The consultant recommends that a record be made on the appointment of a Management Representative who will over see the implementation of the Policy at Lugogo thermal power sub-station.

BOP 02 – EH & S Induction of New Employee	
Policy Statement	To ensure our work environment is the safest possible, it is the policy of Aggreko that you are provided with a copy of our Global (BOP) and that our general safety requirements are reviewed with you so that you gain a working knowledge of our best practise and standard procedures. BOP states that training will include Environmental concerns (Appendix 4).
Evidence based on BOP	Copies of BOP are provided to employees. Training has been provided on Health and Safety issues. However the policy requires that training should include environmental concerns. There was no recorded evidence on training on issues concerning environment such as how to handle wastes, oil spill prevention. Induction and no training plan was provided
Consultant comment	▪ Aggreko should carry out a training needs assessment and come up with a training plan to include environmental concerns. ▪ The company should provide a BOP on how evaluation of competence on new employees

BOP 03 – EH & S Meeting/ Training	
Policy Statement	Aggreko facilities are required to conduct a monthly employees EH&S /Training.
Evidence based on BOP	They always hold monthly meetings where EH&S employee issues are discussed and solutions found. There was evidence in training First Aid and fire prevention and suppression. Appendix 5 shows meeting evidence.
Consultant's comments	▪ Aggreko should carry out a training needs assessment and come up with a training plan to include environmental concerns. ▪ The company should provide a BOP on how evaluation of competence on new employees ▪ The course content and duration (curriculum) should be documented and recorded.

BOP 04–Contractor EH & S	
Policy Statement	The Environmental, Health and Safety concerns of a contractor's employees working at Aggreko locations, are the responsibility of the location manager in conjunction with the contractor
Evidence based on BOP	• All contractor employees are given induction and training in EHS. • Copies of EHS of contractors like Shell are well displayed on site particularly on the fuel receiving bays Appendix 6. • Contractor employees are provided with PPE
Consultant's comments	All contractors should show their EHS Policy.

BOP 05– Continue Innovation Program	
Policy Statement	Aggreko encourages workers to participate in continued innovation program (CIP), which is in place to gather, improvement ideas from all employees.
Evidence based on BOP	There was evidence that suggestions and ideas for continual improvement are discussed in the monthly meetings. The best ideas are forwarded to headquarters in Dubai for assessment. The employees whose ideas are implemented are given a prize of US$ 200. Appendix 7 shows a continuous and improvement proposal form completed by Electrician Kajubi Danny Mwebe.
Consultant's comments	Satisfactory incentives motivate employees to continue to improve and be innovative on issues regarding EH&S.

BOP 06–First Aid	
Policy Statement	Aggreko locations must provide a first–aid kit along with first-aid trained person.
Evidence based on BOP	A First Aid Box had been provided inside each of the two control rooms, at the office premise and in Shell office at the site. Evidence for replenishment and check was identified in only one of the kits. Inspection of the kits was done and contents shown in Plate 2. During the assessment of First-Aid procedures and usage of the kit, the Auditors verified that First-Aid training was carried out and learning actually took place. Ayebare Nicholas who is an Electrical Technician was very knowledgeable on the use of the First Aid Box while handling electric shocks. The Auditors identified no accident or injury that had occurred at the plant since it started operating in Uganda.
Consultant's comments	A stretcher was not provided for along with the First-Aid kit. We recommend that stretchers be provided for purposes of moving victims as specified in BOP.

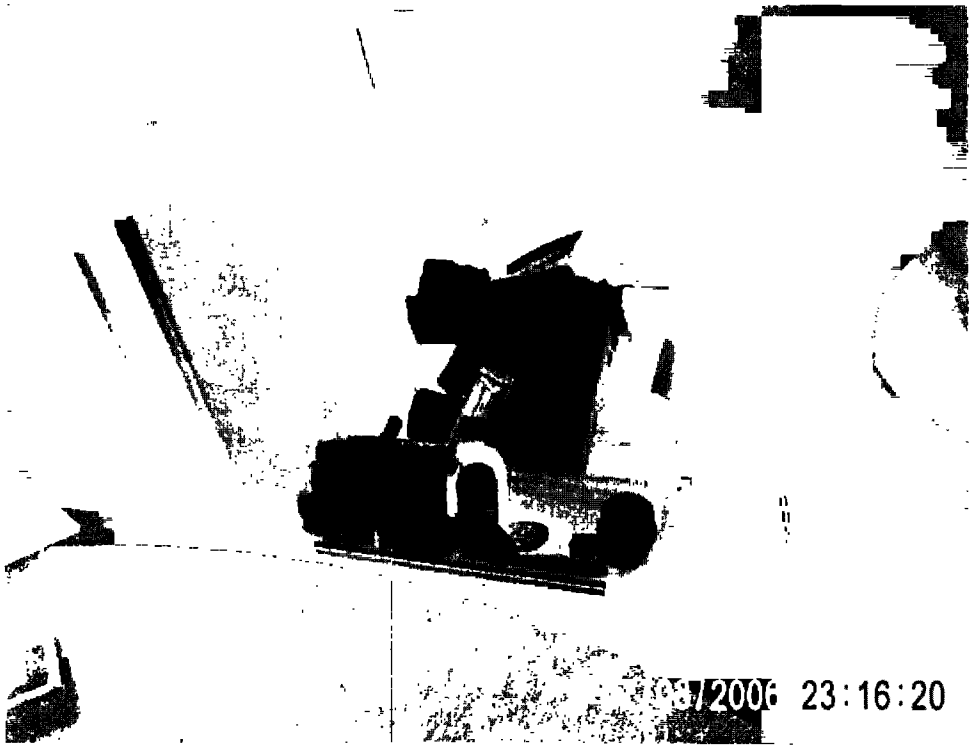

Plate 2 Contents of a First Aid Kit

BOP 07 – Fire Prevention	
Policy Statement	Aggreko will execute measures to prevent fires from occurring. Aggreko will provide adequate fire extinguishing equipment to minimize injury to personnel and damage to property.
Evidence based on BOP	No fire accident has ever occurred. The company has fire-fighting equipment including fire extinguishers and hydrants. Aggreko does not rely on local emergency support system. Despite the fire fighting training, there was no evidence of the company conducting drills. There were no training records regarding fire fighting drills.
Consultant's comments	Aggreko Management should develop a training plan to include fire fighting drills. The company has to keep record on any training conducted.

Plate 3: Fire suppression equipment

BOP 08-Personal Protective Equipment	
Policy Statement	To protect employees against potential hazards when engineering controls have been exhausted, Aggreko will provide its employees with appropriate PPE. Any PPE worn by Aggreko employees will comply with all industry standards and regulation.
Evidence based on BOP	Although hearing protectors were provided to all workers, their use was not adequate. Rubber Apron used during battery charging and HV PPE were provided. Despite the enforcement of use PPW/E by the senior shift engineer along with company bonuses of 150,000 Ugandan shillings given to employees for proper use of PPE, some workers can not consistently wear PPE. However, the system of workers supervising one another in order not to lose the bonus seems to be producing

	results. Security guards and visitors at the site were not provided with hearing protection
Consultant comment	The BOP 08 does not show collective action taken when fault is identified. Therefore, we recommend that a disciplinary procedure be developed by the management incorporating the views of workers. The security personnel should also be provided with hearing protection equipment.

BOP 10- House Keeping	
Policy Statement	Housekeeping is a fundamental and necessary activity on all Aggreko locations and must be performed by every employee. All works sites, office, yard, stores etc. must be maintained in a clean and tidy condition to save costs, avoid pollution, accidents and fire hazards
Evidence based on BOP	It was found that flammable items were not allowed to accumulate. These were used immediately on site and only small quantities of quantities were stocked on site e.g. small amount of paint thinner.
Consultant's comments	Good house keeping is practised at Aggreko. However, the company needs to conduct in-house training on house keeping and maintain records as evident for the next audit.

BOP11-Office Safety	
Policy statement	Office lay out including the office equipment should be ergonomically designed to provide a safe workplace for the employees.
Evidence based on BOP	The workplace complied with most of BOP11- Office safety. Absence of a designated smoking area that had resulted into some smoking practice in the general office was a health hazard

	identified.
Consultant comment	In order to maintain sufficient fresh air in the general office, smoking should be confined in one place in accordance with the BOP11 and Public Health Act 1964 Cap. 269, Section 59. The general office should be made a smoking free environment.

BOP 13-Risk Management	
Policy Statement	The Global E H&S Management System is designed to recognize, evaluate and control operational risks.
Evidence based on BOP	Risk assessment was done once in the entire year by a member from Dubai Headquarters. It focused on activity done, extent of injury, environmental impacts, costs involved and exposure.
Consultant comment	The consultant did not find any record to prove that the risk assessment was done. Yet according to the BOP 13-Risk Management, every site under Aggreko worldwide is supposed to conduct such an assessment. The consultant recommends that records are kept for any risk assessment conducted.

BOP – 14 Emergency Response Plan	
Policy Statement	All locations must have a written Emergency Response Plan (ERP) which is communicated to employees' polices and procedures to be followed in the event of emergency.
Evidence based on BOP	Emergency Response Plans were well displayed in the following areas: control rooms, main office, fuel tanks and generator sites. The procedure details out what do to in case of an accident such as fire. Shell Uganda Ltd the suppliers of fuel (diesel) also displays their emergency plans mainly on their fuel tanks.
Consultant comment	The consultant recommends that monk drills should be carried out to test the effectiveness of the emergency plans. There should include what to do before, during and after an accident.

BOP 15- Accident Reporting and Investigation	
Policy Statement	It is the responsibility of all Aggreko employees to report all accidents or incidents whether or not they result in personal injury, damage to vehicle and or property damage
Evidence based on BOP	Aggreko has never had any accident. But by the last day of the audit a near miss accident had occurred. There was an electrical flush but fortunately the employee was far and thus nothing occurred.
Consultant's comments	The consultant was satisfied with the measures Aggreko has put in place to minimise accidents.

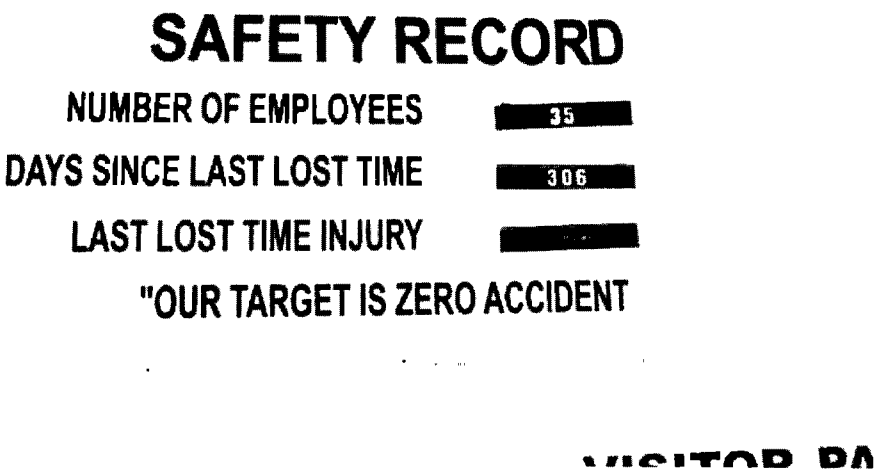

Plate 4: A Poster in front of Aggreko Office

BOP 16 -Occupational Health	
Policy Statement	Aggreko is committed to eliminate adverse effects associated with work related tasks. Our policy is to conduct risk assessments and eliminate the source of the risk. If this is not possible, Aggreko will execute engineering control, prior to the introduction of administrative controls like the use of PPE.
Evidence based on BOP	Although there are hazards such as noise and use of toxic chemicals, protective equipment is provided. Pre-placement medical examination is done on all employees. Routine medical examination was lacking. There was no occupational related disease that had been reported since the commencement of the power plant.
Consultant's comments	To check the effectiveness of the use of PPE it is important that Aggreko always carries out a routine medical examination. This will help in monitoring the health of the workers. Noise is the single most important occupational hazard. Yet the enforcement of wearing ear protection equipment is not adequately enforced.

BOP 17- EH&S Audits / Inspections	
Policy Statement	Annual Audits will be conducted by the EH&S department or designated competent person at selected Aggreko location unless historical data dictates
Evidence based on BOP	Aggreko Lugogo Management contacted a local Environmental consultant who has been conducting the company's Internal Environmental Audits. The first one was carried out in November 2005 and it recommended the following. 1. To determine levels of stack emissions at thermal power installations 2. To determine levels of emissions in areas surrounding the premises 3. Non- Aggreko employees especially guards to be given

	hearing protection 4. To determine noise levels up to 50m from Aggreko perimeters 5. Place labels on waste bins indicating types of waste to be deposited 6. Quantify solid waste into contaminated and non-contaminated waste 7. Segregate waste into contaminated and non-contaminated waste 8. Carry out fire drills for staff at the site 9. Personal protective equipment to be used at all times where appropriate when handling specific tasks 10. First Aid training to be provided at least to one person on the site.
Consultant's comments	The Internal Environment Audit Report came up with time frame to accomplish the above recommendations. The following actions were observed being taken at the site • Segregate waste into contaminated and non-contaminated waste • Waste bins are marked in colours to indicate types of waste deposited • The rest of the recommendations were said to have been implemented however no records were availed to the auditors to justify the fact that they were done. The consultant recommends that records should be generated and kept for future reference by management of Aggreko Lugogo sub-station.

BOP25-Electrical Safety	
Policy	The policy comprises the following:

Statement	• only qualified, competent and authorized employees are allowed to perform switching, troubleshooting, metering or calibration on live Aggreko circuits; • under no circumstance are Aggreko personnel are allowed to terminate or any cable or device carrying electric voltage; • under no circumstance are Aggreko personnel allowed to terminate customers electrical installation points, unless under the direct supervision/guidance of a licensed electrician operating under the local jurisdiction governing the project; • all Aggreko equipment must be earth grounded in accordance with standard electrical engineering practices; and • exposure of personnel to open circuit/voltage should be limited to absolute minimum and only if it cannot be avoided.
Evidence based on BOP	Electric safety precautions adequately followed and BOP implemented. The one key lock system practiced by the personnel working in potentially hazardous areas is in operation. Another good electrical safety practice observed is "first touch if you claim or confirm that the equipment or area is dead or isolated". This prevents any malicious act against any employee. Existence of a system to automatically switch off the Aggreko power plant when either Aggreko or UETCL control point gets an electrical problem is in place.
Consultant's comments	Electrical safety precautions at the plant were satisfactory.

BOP – 26 – Batteries and Battery Charging	
Policy Statement	Used batteries must be stored in a compatible secondary containment and charging must be conducted in a well-ventilated area only by competent personnel.
Evidence based on BOP	The battery charge area was properly ventilated. Eye wash facility provided within less than 10 meters and the rubber apron which is the PPE used during charging was observed at the charging area. Used batteries secondary containment storage was not provided at old battery storage area. Collection, transportation, recycling and disposal of used batteries is entrusted to Uganda Batteries Limited which is a reputable company dealing with recycling of batteries.
Consultant's comments	In accordance with the BOP-26, used batteries secondary containment storage should be provided at battery charging area.

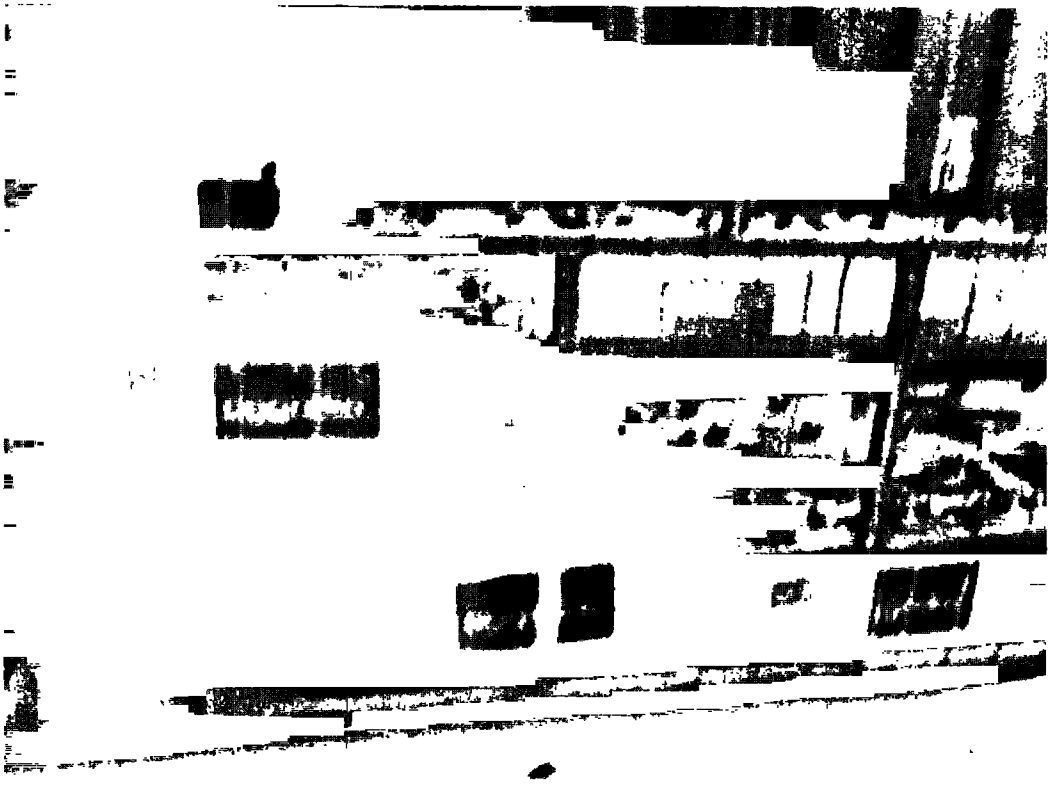

Plate 5. Battery Charging Area

BOP 29 – Material Safety Data Sheet (MSDS)	
Policy Statement	To ensure that all Aggreko employees are informed of the identity and nature of hazardous chemicals they may be exposed to in the workplace and prevent any exposure from causing an injury or illness.
Evidence/Audit finding	The policy and the BOP are very elaborate. MSDS were displayed and eligible. Workers were well informed on dangers associated with battery acid, diesel and spray paints.
Auditor's comment	Material safety data sheets were adequately displayed.

BOP 33- Fuel Operations	
Policy Statement	Fuelling operations must be conducted in a manner to avoid spillages and fires
Evidence based on BOP	Aggreko contacted Shell Uganda Ltd to supply diesel. The following are in place. • Shell Uganda Ltd, Environmental Policy is well displayed on its facilities including diesel tanks. • Absorbent are provided at the fuel receiving bay. • Sand is placed in a container on every fuel tank so as to control any spillage and prevent fire out break. • Dry chemical power fire extinguisher are placed adjacent to the fuel tanks and the operating procedures are well labelled and placed adjacent to the tanks. • Fire hydrants are in place. • A bonded containment to contain spillage is around every fuel tank • Signs of no smoking are well placed outside the bonded wall
Consultant's comments	Fuel operations are satisfactory and conform to Shell Standards.

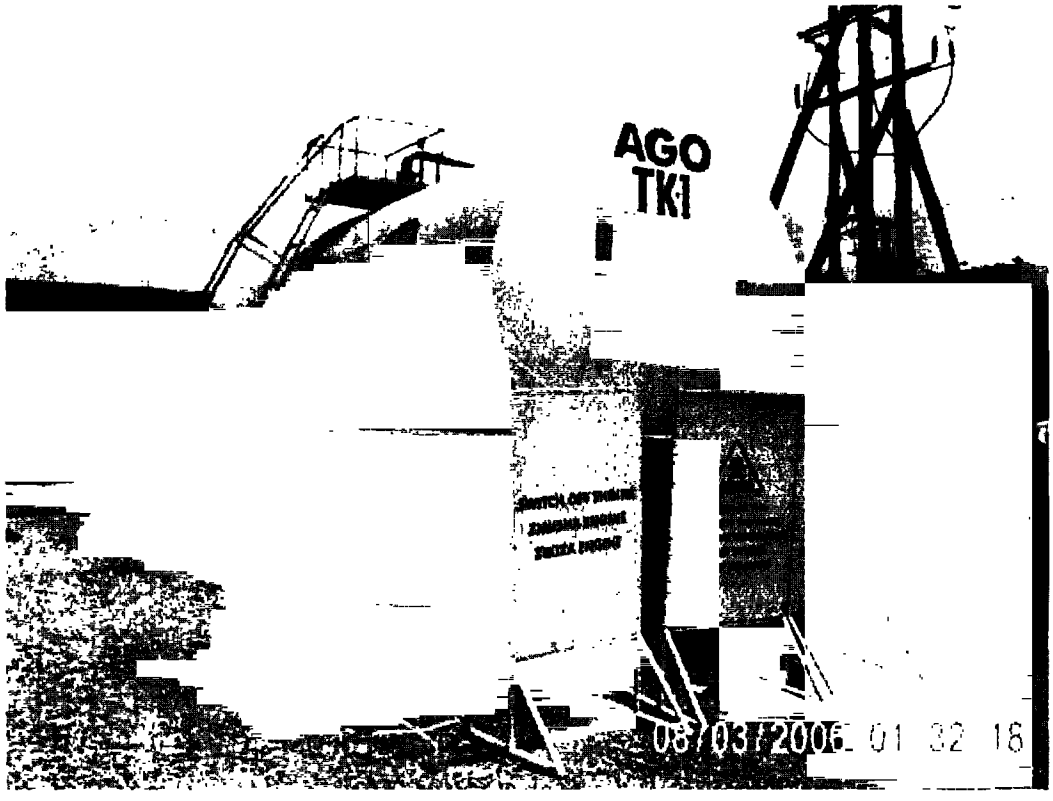

Plate 6: Fuel storage tank on the low generation plant.

BOP 36- Spill prevention	
Policy Statement	Aggreko will ensure that all steps are taken to prevent any accidental spills that could be harmful to our environment
Evidence based on BOP	The following are in place to prevent spillages • The fuel tanks and generators have bonded walls. The bonded walls are capable to prevent oil spills from over flowing. • All the drainage on the two sites lead to an oil interceptor before discharging into the city council drainage channels, i.e. Lugogo channel. • All petroleum products are stored in tanks or under a roof to prevent rain water washing them off.

	• Good housekeeping methods are in place while fuelling and transfer operations • Fuel distribution has non-return valves which prevents back flows
Consultant's comment	Satisfactory precaution measures are in place.

Plate 7: Drums of oil stored in an oil spillage containment yard

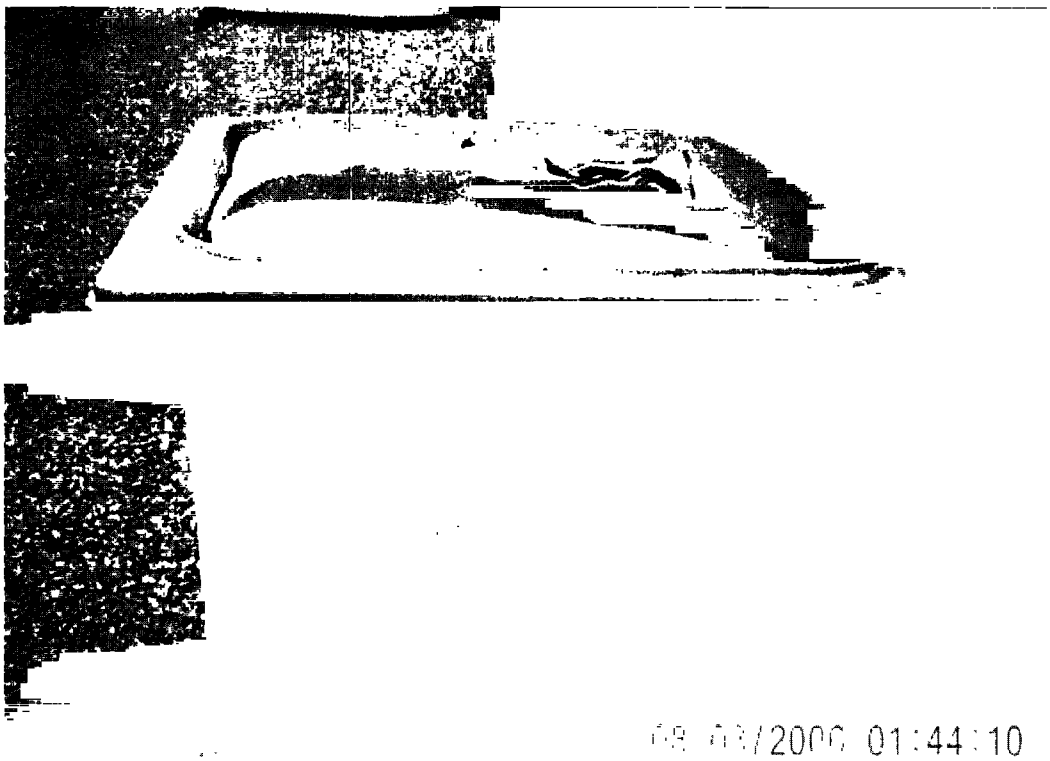

Plate 6: Oil spill emergency spill kit

BOP 37- Spill response	
Policy Statement	Its Aggreko's Policy that we do everything we can to prevent spills and to maintain the environment in the areas which we work in, in the same condition as it was before we established our business
Evidence based on BOP	The company has the following emergency responses in place • The company has a spill emergency response plan. • There are absorbent pads, oil absorbent materials and metal drum designated for storage of spent clean up equipment. • Each site has a drainage channel that leads into an oil interceptor before it discharges into the Kampala City Council drainage system i.e. Lugogo channel. Oil from the interceptor is manually

	removed and disposed off by Epsilon (contractor).
Consultant's comments	The spillage response at the two sites was satisfactorily, however the City drainage system where the company discharge effluent needs to be improved to prevent flooding during storm events.

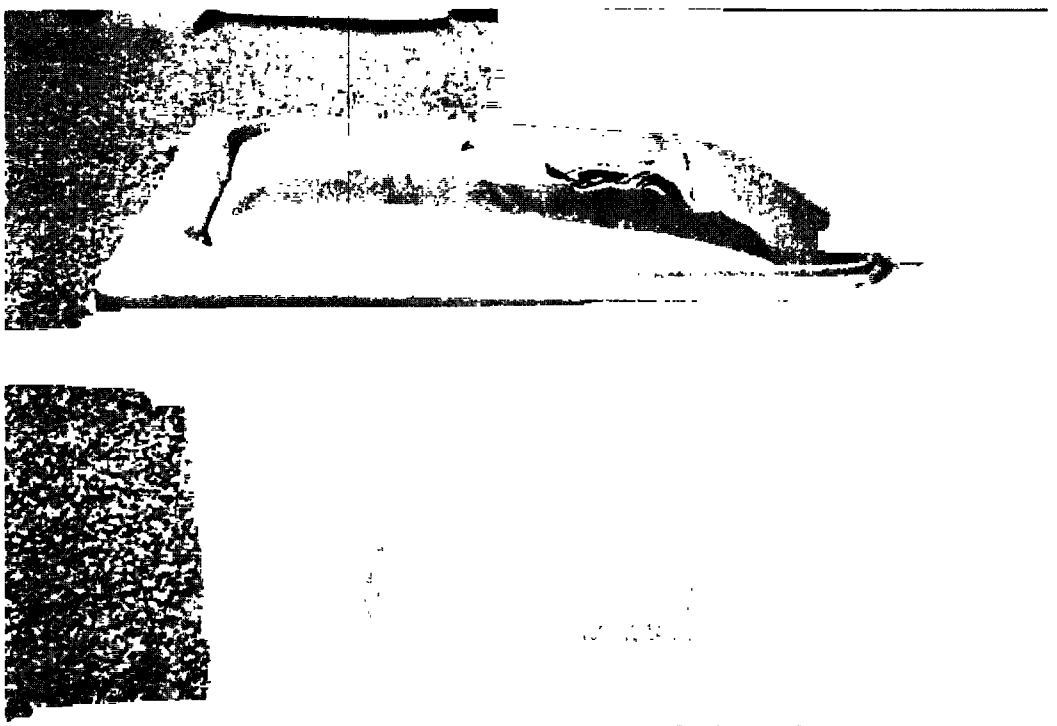

Plate 7: Oil spill emergency spill kit

BOP38 – Waste disposal/Recycle	
Policy Statement	Aggreko will first ensure waste prevention then the minimization of waste. If materials cannot be recycled, they should be segregated and disposed in accordance with regulatory requirements.

Evidence based on BOP	The BOP 38 covers all waste generated at the plant. Contradictory to the BOP 38 that mentions the labelling of solid waste containers, metallic solid waste bins are distinguished by colour. White is for non- oil contaminated solid waste, blue for oil contaminated solid waste and green for liquid oil waste. All oil non-contaminated waste is collected at the waste bank before it is transported for disposal. All solid waste is collected by a contractor (Epsilon Limited) licensed by the National Environment Management Authority Appendix No.8 Liquid oil waste drains into a 9,000 litre under ground storage tank. However, storm drainage likely to be contaminated with oil from the plant if not adequately handled. Oil interceptors have been installed at the thermal power plant. The latrine facilities at Aggreko are water borne systems emptying into the septic tanks. Measurement of oil effluent in wastewater revealed that only 0.08 mg/litre was present.
Consultant comment	Kampala City Council has neglected the drainage channels draining the area neighbouring Aggreko. This always leads to uncontrolled storm water, which cannot be handled through Aggreko oil water interceptors after heavy down pour. Therefore the City drainage system where the company discharge effluent needs to be improved to prevent flooding during storm events. Measurement of effluent in wastewater revealed only traces of oil (0.08 mg/l) indicating that Aggreko's interceptors are effective.

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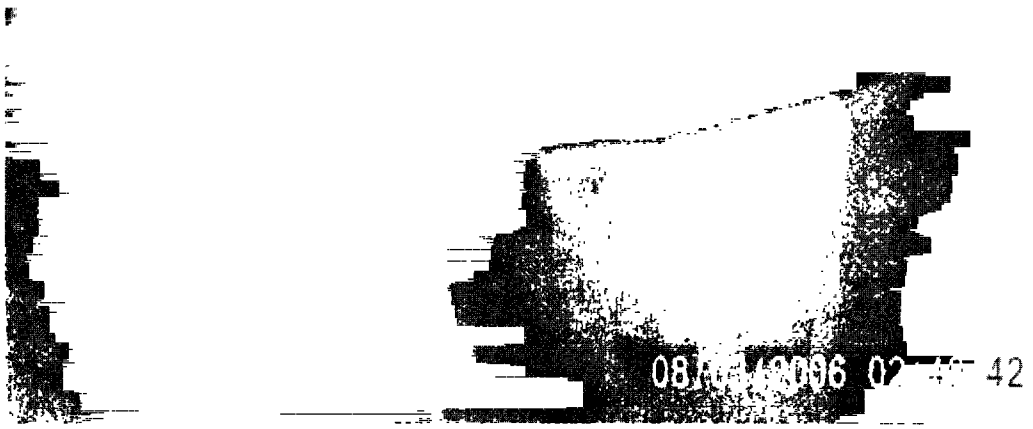

Plate 8: Use up metallic parts stored waiting recycling.

OP 39- Emissions/ Refrigerant Recovery	
Policy Statement	No Aggreko employee shall intentionally discharge Refrigerant into the environment. Only technicians/ engineers certified through an approved training program will do any work on refrigerant circuit
Evidence based on BOP	The policy is very clear on refrigerant discharge but does not mention what to do in case an employee intentionally discharges Refrigerant into the environment. The policy and the BOP do not explain the other emissions such as hydrocarbons, oxides of carbon, nitrogen oxides and sulphur dioxides and their control and management.

Consultant's comment	A well appreciated policy on air emissions needs to be developed because it is a well known fact that thermal electric plants are one of the largest contributors to greenhouse gas emissions and its associated risks.

4.2 Noise, air and water quality results.

4.2.1 Noise

The Aggreko 50 MW thermal power plant has been constructed in an area classified as industrial although commercial premises also exist. The World Bank recommended standard noise levels for noise receptors located outside the project property boundary for such premises is 70 dB (A) and 70 dB (A) for day and night respectively. The average noise level measurements at Aggreko is below the WorldBank limits as detailed in appendix II.

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4.2.2 Ambient Air Quality

Table 4.1 shows air quality measurements taken at Aggreko site and the world Bank standards.

Aggreko power plant Baseline Air Quality in comparison to World Bank and National standards.

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	Pollutant	Baseline at Sites	Averaging Time for Ambient Air	World Bank Standard for Ambient Air in thermal plants (Microgram per cubic meter)	National Ambient Air [illegible]
Greenhouse gases	Carbon dioxide	617.5 ppm	8hr		[illegible]
	Nitrogen oxides (NO_X)	ND	24hr 1 year Arithmetic mean	150	0.10 ppm
	Carbon monoxide		8hr		[illegible]
	Suphur dioxide	0.55 ppm	24hr	150	0.15 ppm

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Note: NA = Not Available
ND = Not Detected

4.2.3 Liquid effluent

Water quality measurements were taken from water sources in the neighbourhood and an effluent sample from Aggreko drainage system before emptying into Lugogo stream. Physical and chemical analysis [illegible] on these samples and the test results [illegible] in the table below.

Water quality measurements for water sources, effluent and World Bank and National standards

Parameters	Units	Hand dug well	Lugogo stream	Site effluent	WorldBank effluent standards	National Standards For potable water
WS sample Nr	--	C-340	C-341			
pH	--	6.80	7.04	6.88	6-9	6.5-8.5
Temperature	^0C	23.6	25.8			NS*
Total Suspended Solids	mg/L	9	98	40	50	0
Iron (Total)	mg/L	0.60	4.00	-	-	0.30
Chromium	mg/L	0.00	0.01	-	-	0.05
Copper	mg/L	1.58	0.60	-	-	1.00
Oil and Grease	mg/L	1.04	3.12	0.08	10	0.00
[illegible]	mg/l	-	-	23	-	-

3.2 Public consultation

During the audit exercise, public opinion/views on the environmental and social impacts of the existing thermal-power plant at Lugogo were sought. The methods of consultation [illegible] which included a Focus Group Discussion and Key informant [illegible]. The people targeted for the consultation were those [illegible] within the [illegible] from the Aggreko thermal plant. Specifically participants were those [illegible] and/or engaging in sport at the Kampala Rugby Club, those working at [illegible] Uganda Electricity Distribution Company [illegible] and those working at the Shopping Mall [illegible] and Shoprite.

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4.3 . PUBLIC CONSULTATION¶
Throughout all the stages of the EIA, the study team sought public opinion/views on environmental and social aspects of the thermal-power plant at Lugogo. The methods used included Focus Group Discussions and Key Informant Interviews using structured questions.¶
¶
10.1 CONSULTATION WITH COMMUNITY AND STAKE HOLDERS¶
¶
Public consultation with the affected people living within 100 m radius of the project site has been carried out. This included FGDs and Key Informant Interviews. Community views and opinion of the key informants on the proposed power project were noted. Further, a total of 6 public and private business premises including the Lugogo Rugby Club located within less than 100 m radius from the project site were also consulted by the use of questionnaires. Areas of discussion and interviews included socio-economic and environmental issues of the project. A brief discussion of some of the issues is highlighted below.¶

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¶
Apart from the Lugogo Rugby Club that is a sporting premise, the remaining 5 premises surrounding the proposed site for the construction of power plant have a variety of business transactions that include selling water, garage services, car sales and cleaning; floriculture; transportation; electric poles treatment; and electricity distribution. The surrounding premises, in all, have a total of 184 employees including the management personnel. Employees get wages or salaries depending on the nature of their work. For instance, people working at the flower nursery get UGX 3000/= each per day.¶ ... [1]

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Apart from the Lugogo Rugby Club which is a sporting club, the [illegible] including, selling of water, vehicle repair, car [illegible] and [illegible] flowers [illegible] electric poles. Therefore, an estimated 184 [illegible] UGX 3000/= each per day [illegible]

However, [illegible] aggreko has put in [illegible]

[illegible] the [illegible]

Deleted: persons consulted especially the potentially affected people working within 100 m zone of the Aggreko thermal plant is presented in appendix 1 The methodology used for public consultation included Focus Group Discussions, (FGDs) and Key Informant Interviews. Community views and opinions of the key informants on the site were noted. Further, a total of 6 public and private business premises including the Lugogo Rugby Club located within less than 100 m zone from the project site were also consulted by the study team using questionnaires

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5.0 ENVIRONMENTAL AUDIT COMPLIANCE ASSESSMENT

This section presents a review on Aggreko's compliance to national laws and regulations.

The National Environment Act 1995				
No	**Ref**	**Description**	**Compliance**	**Comment /Remark**
1	Reg. 20-3	A EIA must be undertaken for a development in relation to 20 .(1) where NEMA deems it necessary due to possible effects of development	C	An EIA /project brief was undertaken prior to the establishment of the plant and it was approved by NEMA
2	Reg. 35- 1	(e) No person shall deposit any substance in a lake or river or under its bed. if that substance would or is likely to have adverse effects on the environment	C	Aggreko power plant discharges wastewater to KCC drainage system, through an oil interceptor. The results of the oil in water meet the standard.
3	Reg. 53-1	Every person is responsible for any wastes generated by his activities or the activities of those working under his direction in ensuring that their handing does not result in ill health or damage to the environment	C	Aggreko generates wastes and is collected, and managed by a NEMA approved firm.
4	Reg.53-3	Every person whose activities generate wastes shall employ	NC	Non compliant with stack

		measures for minimization of waste through treatment reclamation and recycling		emissions only
6	Reg. 55-2	No person shall import into Uganda any waste not determined in the Act except under a licensee issued by the Authority	NA	Aggreko does not import any waste
7	Reg. 57-1	No person shall discharge any hazardous substance, chemical, oil or mixture containing oil in any waters or any other segments of the environment except in accordance with guidelines prescribed by NEMA	C	Aggreko power plant discharges wastewater to KCC drainage system, through an oil interceptor. The results of the oil water mean the standard.
8	Reg. 59-6	If a polluter license is issued, compensation to the victims of the pollution and cleaning of the environment in accordance with the polluter pays principal must be followed	NA	
9	Reg. 69-6	A person served with an environmental restoration order shall subject to the provision of the Act, comply will all terms and conditions of the order that has been served on him /her	NA	
11	Reg.78- 1	Record in 78.(1) Are to be submitted to NEMA annually	C	Aggreko conducts annual environmental internal audits and results are submitted to NEMA for approval

The Water Act 1995				
No	**Ref**	**Description**	**Compliance**	**Comment /Remark**
12	Sec 6(1)	No person shall use water, construct or operate works, or cause any waste to come in contract with any water, other than under the provision of Part 11 of Act	C	Aggreko power plant discharges wastewater to KCC drainage system, through an oil interceptor. The results of the oil water mean the standard.
13	Sec.6.(2)	At the commencement of this Act, no person shall sink any well without a permit	NA	
14	Sec 8 (2)	No person shall extract water unless authorized under this part of the Act	NA	
15	Sec.28 (2 &31)	Waste shall not be discharged directly or indirectly into water except in accordance with a waste discharge permit	CN	Aggreko does not have a discharge permit from DWD
16	Sec. 68 (2)	No waste shall be directly discharge into any sewer	NA	All water run off is discharged into municipal drainage channel.

				While sewage discharged into septic tanks.

The Public Health Act 1965				
No	**Ref**	**Description**	**Compliance**	**Comment /Remark**
17	Sec. 56& 59	Nuisance conditions are prohibited example include ▪ Dwelling or premise of such a construction or so ill-kept (dirty verminous, damp) that it is likely to be injuries to health /spread disease ▪ Any street etc stream, ditch etc, water closest, cesspool etc garbage pit, ash –pit etc in such a state or so situated to cause danger to health ▪ Any noxious matter, or waste water flowing from premises into public area (street, ditch, stream) that may cause ill health ▪ Any collection of refuse which may facilitate breeding or multiplication of insects, parasites, dangerous animals,	C	Aggreko is compliant. It maintains clean compound and working environment.

		etc ▪ Any standing water/wastewater which may result in mosquitoes breeding habitants ▪ Any building which is so overcrowded it may result in ill health (lack of enough latrines etc) ▪ Any occupied dwelling for which proper, sufficient and wholesome water supply is not available within a reasonable distance ▪ Any factory not kept in a clean state and free from offensive or injurious odours.		
18	Sec. 81	Prohibition from sewer ▪ Any matter likely to injure the sewer or drain, interfere with its free flow or to affect prejudicially the treatment and disposal of content ▪ Any chemical refuse or waste stream or liquid of temp higher than 110 F which may cause a danger to health ▪ Any petroleum sprit or carbide of calcium	NA	Aggreko is not connected to the public sewer.

The Land Act, The Republic of Uganda, 1998

No	Ref	Description	Compliance	Comment /Remark
19	Reg. 46	Any use of land shall conform to the provisions of the law relating to the Town and Country Planning Act and any other law	C	

The National Environment (The Environment Impact Regulations), 1998				
No	**Ref**	**Description**	**Compliance**	**Comment /Remark**
20	Reg. 3(2)	Must complete an EIA prior to development where an EIA is required according to third schedule	C	
21	Reg. 3(3)	Must obtain a certificate of approval with respect to EIA prior to obtaining a license	C	
22	Reg.5(1)	Must prepare a project brief in accordance with first Schedule prior to development	C	
23	Reg. 9(1)	Where the project brief does not adequately address the concerns relating to the project an Environmental Impact Study must be undertaken (as directed by NEMA)	C	
24	Reg. 10(2)	The Environmental Impact Statement (Assessment) shall be prepared in accordance with details outlined in the Regulations	C	

		14		
25	Reg. 12(1)	Developers shall incorporate views of stakeholders in the EIA	C	
26	Reg.13(1)	An Environment Impact Statement (Assessment) must result out of the Environment Impact Study	C	
27	Reg. 13(2)	The EIS must adhere to the guidelines in the first Schedule	C	
28	Reg.26©	A certificate of approval must be issued as per Second Schedule	C	
29	Reg. 31(2)	Within 12 to 36 months after completion of project or commencement of its operations, the developer shall undertake an initial environmental audit of the project	C	
30	Reg. 31 (5)	An Environment Audit shall be submitted to NEMA	C	

The National Environment (Wetlands, River Banks and Lake Shores Management Regulations) 2000				
No	**Ref**	**Description**	**Compliance**	**Comment /Remark**
31	Reg. 5(a)	Wetlands resources shall be utilized in a sustainable manner	NA	
32	Reg.5(b) & 43(1)	EIA required for all activities likely to have an adverse impact on a wetland	NA	
33	Reg. 17(1)	Anyone (owner or occupier of land) adjacent to a wetland has a responsibility to prevent its degradation.	NA	

34	Reg. 34 (2) in relation to 34 (1)	Developer must undertake annual audits/monitoring on activities and submit reports to NEMA		Aggreko conducts annual environmental internal audits and results are submitted to NEMA for approval
35	Reg. 37	Anyone who deposits a substance that is likely to have an adverse effect on a wetland, or destroys or damage a wetland, removes soil or burn any wetland resource, or fail to protect a lake shore or river bank from environmental degradation committees an offence		

The National Environment (Standard for discharge of effluent into water or on land Regulation. 1999				
No	**Ref**	**Description**	**Compliance**	**Comment /Remark**
36	Reg.3(1)	Standards for effluent or wastewater before its discharged into water or onto land are prescribed in the Schedule	C	
37	Reg. 4	Every industry shall install anti- pollution equipment for the treatment of effluent and waste discharge based on the best	C	Has an oil interceptor.

		practicable means and environmentally sound practices		

The National Environment (Waste Management) Regulations 1999				
No	**Ref**	**Description**	**Compliance**	**Comment /Remark**
38	Reg. 4 (4)	Domestic wastes are sorted by separating hazardous from non-hazardous wastes	C	Wastes are sorted by separation at source
39	Reg. Reg. 4(5)	Non- hazardous domestic waste can be disposed in an environmentally sound- manner, without a license, providing the amount of waste does not exceed a certain quantity as defined by NEMA	C	
40	Reg. 5(1)	Waste generations must minimize the waste generated by adopting the following cleaner production methods (a) improvement of production processes through (i) conserving raw materials and energy (ii) eliminating the use of toxic materials (iii) reducing toxic emissions and wastes (b) monitoring the product cycle from beginning to end by (i) identifying and eliminating potential negative impacts of the product (ii) enabling the recovery and	C	

		reuse of the product where possible (iii) reclamation and recycling (c) incorporating environmental concerns in the designs and disposal of the product		
41	Reg. 5(3)	The Executive Director may give written direction requiring generators to apply specific methods for cleaner production	C	
42	Reg. 6(1)	A person intending to transport waste shall apply for a license and pay required fee " Waste is defined as any matter prescribed to be waste, whether liquid, solid, gaseous or radioactive which is discharged, emitted or deposited into the environment in such a volume, composition or manner as to cause an alternation of the environment".	C	Aggreko contacted a licensed firm to collect and dispose it off waste
43	Reg. 6(2) and 6(7)	A person intending to store waste shall apply for a license and pay required fee Application is Form 111	NC	Aggreko stores used batteries on site without a license
44	Reg. 6(6)	A person who was carrying out business of transporting waste shall ensure that (a) collection and transportation of waste is done in a	NC	Aggreko contacted a licensed firm to collect , manage and dispose it off waste

		manner that does not cause scattering (b) vehicles, pipelines and equipment for transporting waste do not scattering or, flowing out waste or emit noxious smells (c) vehicles follows approved scheduled routes from points of collection to disposal site or plant (d) personnel involved in transportation or storage of waste are provided with adequate protective clothing, equipment for loading, safe sitting facilities in the vehicles and proper training and information		
45	Reg. 7(3)	A person licensed to transport or store waste shall ensure that all employers involved in collection, transportation or storage of waste undergo medical check ups	C	Aggreko contacted a licensed firm to collect , manage and dispose it off waste
46	Reg. 7(5)	Waste transportation vehicles must be labeled as directed by the Authority	C	Aggreko contacted a licensed firm to collect , manage and dispose it off waste
47	Reg. 8(3) &(5)	A license for transportation of waste must be in Form 11 set out in the First Schedule and fees set out in the Sixth schedules	C	
48	Reg. (4) &(5)	A license for the storage of waste shall be in Form IV set out	C	

		in the first schedule and the fee set out in the sixth schedule		
49	Reg. 10 (1) & (2)	Upon application for a license for storage of waste under Regulation 6, the applicant shall provide a sample of the containers of packaging materials in which the waste is to be stored packaging materials shall be suitable for storage of the waste.	C	
50	Reg. 10(2)	Hazardous waste shall be labeled in accordance with. 11 and shall be disposed of in accordance with Reg. 16	C	
51	Reg. 10 (4)	It is an offence to sell or offer for sale, containers that have been used for hazardous waste	C	
52	Reg. 11 (1) & (2)	Each container or package of hazardous waste shall have a legible label in English and any other relevant local language. The label shall include the following minimum information (a) the identity of waste (b) name and address of waste generator (c) net content (d) methods for safe storage (e) name and percentage by weight of active ingredients (f) warning or caution statements as appropriate (g) first aid measure (h) adequate handling direction (i) direction for disposal of containers.	C	

53	Reg. 11(2)	Vehicles carrying hazardous waste shall be labeled as per Reg. (2f)	C	
54	Reg. 12(1)	An industry shall not discharge or dispose of waste in any state into the environment unless the waste has been treated and in a manner approved by the lead agency	C	
55	Reg. 12(2)	A person intending to operate a waste treatment plant or disposal site or plant, which is not approved or licensed, commits an offence.	NA	
56	Reg. 13(1),(2), (3)	A person intending to operate a treatment plant or a disposal site must apply fro a license and pay required fee. Those operating before December 1999, have 90 days to apply. operating without a license is an offence	NA	
57	Reg. 14(3)	A person licensed to own or operate a waste treatment plant shall ensure that : waste disposal sites are (a) 1000m from a residential or commercial are and from a water source (b) enclosed from scavengers (c) hazard and safety signs are displayed (d) operated such that it avoids polluting surface or ground water, emitting noxious smells and prevents breeding of rats, mosquitoes or other vermin	NA	
82	Reg. 14(3e)	Non hazardous waste must be compacted to a thickness of	C	

		approximately 3m or less for each layer of waste and that each layer is covered with 30 centimeters of soil		
83	Reg. 14(3f)	Hazardous waste is disposed of or treated in accordance with guidelines issued by the Authority in consultation with lead agency		
84	Reg. 14 (3g)	Means of ventilation are provided at the disposal site or plant to allow escape of bio-gas generated from the site or plant and that any noxious smell from the disposal site or plant is controlled	C	
85	Reg. 14 (3 h &i)	Personnel working at the disposal site are provided with adequate protective clothing, equipment and adequate water for operating the facility, first aid and training and undergo medical checkups	C	
86	Reg. 14(3j)	Human waste or sewerage is treated at a waste treatment plant or disposal site before disposal	C	
87	Reg.14 (4)	A waste disposal site license is valid for one year		
93	Reg.22(2)	A generator of hazardous waste, upon written notification from Executive Director, subscribes to an insurance policy covering risks likely to arise out of the activity for which the license is	NC	

		required		
95	Reg. 24(1)	The holders of a license shall (a) keep records of the licensed activity and all transportations (b) submit the records to the Authority every 6 months	C	

The Water (Waste Discharge) Regulations, 1998				
No	**Ref**	**Description**	**Compliance**	**Comment /Remark**
96	Reg. 4(1)	May not discharge of a standard other than those established by the National Environment Act unless a permit has been obtained	C	
97	Reg. 4(2)	A person with a permit must ensure that waste discharged conforms to the maximum permissible limits (i.e. effluent standards)	C	
98	Reg. 5,6& 18	A person who is owner / operator of any industry or trade, which discharge effluent or waste into the aquatic environment or on land may apply for a waste discharge permit. application shall consist of listed items in Reg. 6 and requirement annual fee	NC	
99	Reg. 14	If conditions of permit not observed, the Director may provide	NA	

		written notice		
100	Reg. 15	Every industry shall install anti- pollution equipment for the treatment of effluent and waste discharge based on the best practicable means and environmentally sound practices	C	
101	Reg. 16	In the case of an accidental discharge, owner shall report immediately to the Director and take immediate action to mitigation damage	NA	

The Water Resource Regulation (1998)				
No	**Ref**	**Description**	**Compliance**	**Comment /Remark**
102	Reg. 3(1), 10(1), & 19(2)	Water permit is required for any person who occupies land on which (a) there is a motorized pump that pumps water from a water way or borehole (b) There is a dam, weir capable of diverting or impounding more than Water permit is required for any person who occupies land on which (a) there is a motorized pump that pumps water from a water way or borehole (b) There is a dam, weir capable of diverting or impounding more than 400 m^3 / day.	NA	

103	Reg. 10(3)	The permit application shall be in form specified and shall be accompanied by a fee.	NA	
104	Reg.8	A holder of a permit may , before expiry date of the permit ,apply for renewal.	NA	
105	Reg.16(2)	Construction permit is required to construct a borehole or to impound, or divert surface water	NA	
106	Reg.23(1)	Construction completion report is required	NA	

The Sewerage Regulations 1999				
No	**Ref**	**Description**	**Compliance**	**Comment /Remark**
107	Reg.7	May not erect a building in an NWSC area unless sewer and connections are in accordance with regulations and prior consent of the water Authority.	C	
108	Reg.8(1)& Reg9(1)	Require Permission to Construct a building sewer and/ or connect/ disconnect it to NWSC infrastructure.	C	
109	Reg.10 & 12	Prior to making connection plans must be submitted and approved as per the regulation	C	
110	Reg.17	Before back filling any files, they must be inspected and	NA	

		approved.		
111	Reg. 19 & 20	Prior to constructing a private sewer or connecting to National Water Sewerage Cooperation must make an application.	NA	
112	Reg. 22 (1)	A person wishing to discharge trade waste from any land to nay sewer of a water authority must submit an application and fee in accordance with regulations	NA	
113	Reg.25(1)	Shall not discharge Trade waste that does not meet Schedule 2,prohibited waste that endangers human life or safety or cause damage to the sewer system	C	
114	Reg.25(3)	Storm water is not to be directed into NWSC sewerage lines	C	
115	Reg.23	Obligated to ensure that (a) private sewer works and/ or fittings on a property are maintained in proper working order and that no liquid or material other than domestic sewerage or trade waste as defined in part iv	C	

The Water Supply Regulations				
No	**Ref**	**Description**	**Compliance**	**Comment /Remark**
116	Reg.7	May not erect a building in an NWSC area unless the appropriate water connections are installed as required.	C	
117	Reg.11	Require Permission to connect/ disconnect it to NWSC	C	

		infrastructure		
118	Reg.17	Before backfilling any works they must be inspected and approved.	C	

The National Environment (Delegation Of Water Discharge Functions) Instrument,1999				
No	**Ref**	**Description**	**Compliance**	**Comment /Remark**
125		Regulated under the National Environment(Standards for Discharge of Effluent into water or land) Regulation,1999	C	Refer to the effluent standards

The Factory Act 1964				
No	**Ref**	**Description**	**Compliance**	**Comment /Remark**
126	Sec.13, chapter 198	Every factory/ industry should be kept in a clean state including floors, walls. workrooms, ceiling, or top of rooms	C	
127	Sec.51-55	▪ Provides for the safety and welfare of persons employed in factories. It also requires the provision of protective clothing and appliances for the protection of workers. ▪ It is the duty of the owner of the premises to provide	C	

		safety to the workers from any dangerous aspect of his establishment at the owners cost. ▪ The is Act enforced by the Department of Occupational Safety and Health, Ministry of Gender, labour and social Development. ▪ The law governing factories require that the management should keeps records of all the activities especially handling of chemicals and the accidents and any other complaints made by the community and other environment aspects of the factory. ▪ All organizations that employ human resource are required to train their staff to improve their capability and enhance their ability to handle different assignments		

6.0 ENVIRONMENTAL MANAGEMENT/ ACTION PLAN

This section presents an Environment Management Action Plan arising from the audit findings and actions to be taken / mitigation measures. This is presented in form of a table, the cost for each action item in millions (m) of Ugandan Shillings, and a recommended timescale for implementation. The TOR for this study was to present the areas at Aggreko where improvement is required in order to bring its operations in compliance with the audit criteria. It is important to note that activities that are already in compliance with legislation and BOP are not presented here. In order to implement the mitigation measures recommended in this report, the audit findings will be ranked as High, Medium and Low. The ranking is based on the following.

High priority

A condition or activity that is considered as a substantive breach of environmental or occupational health and safety legislation, or if left uncorrected, is likely to result in such a breach of legislation or Best Operating Practice. Examples:

- Operating without necessary license or permit
- Prolonged or repeated failure to meet Ugandan environmental standards (e.g. wastewater discharge limits, noise and air quality standards)
- Major or repeated release of a hazardous material to the environment
- Essential pollution control equipment out of service for prolonged periods of time or lacking.
- Essential personal protective equipment lacking, the absence of which is likely to cause significant health effects.

Medium Priority

A condition or activity that is considered a breach of legislation, or if left uncorrected, could result in such a breach, or is a breach of internal company guidelines. Examples:

- Nuisance conditions leading to public complaints (e.g. odours, noise, soot)
- Failure to provide sufficient safety training to staff
- Failure to meet internal company guidelines
- Occasional failure of environmental controls or system, leading to an occasional or partial failure to meet environmental standards is conducted).

Low Priority

A condition or activity that could be changed to improve environmental or health and safety management. Example:

- Lack of labelling of equipment or materials.
- Improved access to first aid kits
- Lack of Material Health and Safety Data Sheets

ENVIRONMENTAL MANAGEMENT ACTION PLAN					
Environmental/ OHS Issue		**Ranking**	**Action to be taken/ Mitigation measures**	**Estimated cost**	**Estimated timeframe**
5.1 Environmental Audit findings and Actions to be taken based on BOP for Aggreko					
5.1.1	The EH&S policy should be clearly displayed at sites which can easily be seen by employees, contractors and visitors.	Low	Aggreko should communicate the Policy to external parties by displaying it on notice boards, or in Newspapers or any other way where the public can have access to the policy.	100,000/=	Immediate
5.1.2	No evidence about the appointment of a Management Representative, a requirement for ISO 14001	Low	An appointment letter for the Management Representative for Lugogo should be provided.	25,000/=	Immediate
5.1.3	No evidence on training on issues concerning environment and no records on environmental training plan was provided	Low	Aggreko should carry out a training needs assessment and come up with a training plan to include environmental concerns. The company should provide a BOP on how evaluation of competence on new employees will be done.	5,000,000/=	Immediate
5.1.4	First-Aid equipment for moving	Low	Stretchers should be provided for purposes of	250,000/=	Immediate

ENVIRONMENTAL MANAGEMENT ACTION PLAN					
	causalities was missing		moving causalities as specified in BOP.		
Environmental/ OHS Issue		**Ranking**	**Action to be taken/ Mitigation measures**	**Estimated cost**	**Estimated timeframe**
5.1 Environmental Audit findings and Actions to be taken based on BOP for Aggreko					
5.1.5	Their was no evidence and no records of the company conducting fire drills yet the BOP requires that such drills should be undertaken.	Medium	Aggreko Management should develop a training plan to include fire drills. The company should carry out drills on fire and emergencies following the already developed emergency plans in place. The company has to keep records on any drills results and any non-conformity has to be documented and corrective action be implemented and recorded	3,000,000/=	Immediate
5.1.6	Hearing protectors were provided to all workers except the security personnel although its use is not adequate.	Low	A disciplinary procedure should be developed by the management incorporating the views of workers. Hearing protection should be provided to the security personnel and health education to staff on PPE use	500,000/=	Immediate

ENVIRONMENTAL MANAGEMENT ACTION PLAN					
			should be conducted.		
Environmental/ OHS Issue		**Ranking**	**Action to be taken/ Mitigation measures**	**Estimated cost**	**Estimated timeframe**
5.1 Environmental Audit findings and Actions to be taken based on BOP for Aggreko					
5.1.7	No training was given to workers on house keeping	Low	The company needs to conduct in-house training on house keeping and maintain records as evidence for the next audit. This was to be included in the general Training Plan	2,000,000/=	Immediate
5.1.8	There was evidence of smoking in the general office.	Low	Smoking areas should be designated far away from the offices, generators, work place and near flammable materials.	5,000,000/=	Immediate
5.1.9	Records to prove that the risk assessment was done were missing	Medium	Records should be kept Risk Assessment and any Assessment done.	0/=	Immediate
5.1.10	Routine medical examination was lacking.	Medium	To check the effectiveness of the use of the PPE it is important that Aggreko always	1,000,000/=	Immediate

ENVIRONMENTAL MANAGEMENT ACTION PLAN					
			carries out a routine medical examination and keep records of the results		
5.1.11	Used batteries secondary containment storage was not provided.	Medium	Used batteries secondary containment storage should be provided at battery charging area	500,000/=	Immediate
Environmental/ OHS Issue		**Ranking**	**Action to be taken/ Mitigation measures**	**Estimated cost**	**Estimated timeframe**
5.1 Environmental Audit findings and Actions to be taken based on BOP for Aggreko					
5.1.12	Storm water and discharge of waste water from Aggreko is blocked due to the blockage of the main KCC drainage system and this results into flooding of the area	High	The City drainage system where the company discharges effluent needs to be improved to prevent flooding during storm events.	5,000,000/= This should be done by KCC.	Immediate
5.1.13	A documented vermin and rodent control program lacking	Medium	A rodent and vermin control programme is required at the facility. This is a requirement by the Public Health Act 1964 cap. 269	50,000/=	Immediate

ENVIRONMENTAL MANAGEMENT ACTION PLAN					
Environmental/ OHS Issue		**Ranking**	**Action to be taken/ Mitigation measures**	**Estimated cost**	**Estimated timeframe**
5.2 Air Emissions					
5.2.1	Non-source emissions measurements from areas surrounding the station indicated the following: CO_2 – 617.5 ppm compared to the NEMA standard of 5000 ppm; SO_2 – 0.55 ppm compared to the NEMA standard of 0.15 ppm. NO_2 was not detected.	CO_2 - low and below NEMA standard.	Emission level to be maintained or reduced	-	-
		SO_2 - high and above NEMA standard.	Level to reduced to the NEMA standard		Immediate
		NO_2 – not detected.	-	-	-

ENVIRONMENTAL MANAGEMENT ACTION PLAN					
Environmental/ OHS Issue		**Ranking**	**Action to be taken/ Mitigation measures**	**Estimated cost**	**Estimated timeframe**
5.3 Noise					
5.3.1	Average noise levels during day and night are respectively 80.2 dB (A) and 77.5 dB (A).	High exceeding the acceptable levels	Noise levels need to be reduced to within acceptable levels	-	Immediate

ENVIRONMENTAL MANAGEMENT ACTION PLAN				
Environmental/ OHS Issue	**Ranking**	**Action to be taken/ Mitigation measures**	**Estimated cost**	**Estimated timeframe**

ENVIRONMENTAL MANAGEMENT ACTION PLAN					
5.4 Effluent / Oil spillages					
5.4.1	Oil in water. Only traces of oil were found in water	Low	Effort should be put to improve the oil interceptors in order to eliminate these traces	-	-

ENVIRONMENTAL MANAGEMENT ACTION PLAN					
Environmental/ OHS Issue		**Ranking**	**Action to be taken/ Mitigation measures**	**Estimated cost**	**Estimated timeframe**
5.5 Solid waste					
5.5.1	Contradiction in the BOP 38 that mentions the labelling of solid waste containers, yet metallic solid waste bins are distinguished by colour at the site.	Low	Best operating system 38 should be updated		June 2006

ENVIRONMENTAL MANAGEMENT ACTION PLAN					
Environmental/ OHS Issue		**Ranking**	**Action to be taken/ Mitigation measures**	**Estimated cost**	**Estimated timeframe**
5.6 Occupational Health and Safety					
5.6.1	Routine medical examination of employees not done at the plant.	Medium	To check the effectiveness of the use of the PPE, it is important that Aggreko management always carries out a routine medical examination and keep records of the results	5,000,000/=	

ENVIRONMENTAL MANAGEMENT ACTION PLAN					
Environmental/ OHS Issue		**Ranking**	**Action to be taken/ Mitigation measures**	**Estimated cost**	**Estimated timeframe**
5.7 Socio-Economic					
5.7.1	Complaints about the stack emissions	medium	Cleaner technology to minimise the emissions should be employed for example raising the stack height.		
5.7.2	Neighbourhood community requested	medium	Aggreko should arrange health education		

ENVIRONMENTAL MANAGEMENT ACTION PLAN					
	to be health educated on hazards associated to thermal power plants		sessions for the people neighbouring the plant.		

7.0 ENVIRONMENTAL MONITORING PLAN

The National Environment Management Authority through the District Environment Officer (DEO) of Kampala shall continue to enforce the national environmental quality standards to which the Aggreko is required to maintain. The DEO should ensure close links with UETCL, Aggreko should liaise with relevant agencies like DWD to ensure the monitoring of under ground water quality.

7.1 Environmental monitoring programme

The monitoring programme is aimed at establishing the framework within which Aggreko's environmental activities should proceed in accordance to Environmental, Health and Safety Guidelines for New Thermo Power Plants during the thermal plant operation.

ENVIRONMENTAL HEALTH AND SAFETY MONITORING PROGRAMME			
ISSUE/CONCERN	**MONITORING METHOD**	**MEASURED PARAMETER**	**FREQUENCY OF MEASUREMENT**
Air Quality (Emissions)			
SO_X	Stack Emissions	Calculated from sulphur content in Fuel using ISO/CD 8178-1, or principally similar method.	Annually
	Fuel Quality	Analysis of sulphur content in Fuel provided by independent analysis under the Fuel Supply Agreement (FSA).	Testing of each fuel shipment received and at least 4 random samples per year.
NO_X	Stack Measurements	Measured using EPA Method 7E – Determination of nitrogen oxides from stationary sources. Instrumental analyser method, or principally similar method.	
	Engine Operations	Engine fuel injection timing and charge air-cooling water temperature.	Recorded continuously by Plant data-loggers.
PM	Stack Measurements	Measured using ISO 9096: Stationary source emissions – Determination of particulate material in gas-carrying ducts. Manual gravimetric method, or similar method.	On Commissioning and annually thereafter.

	Fuel Quality	Analysis of ash content in Fuel provided by independent analysis under the Fuel Supply Agreement (FSA).	Testing of each fuel shipment received and at least 4 random samples per year
Ambient Air Quality			
SO_2 and NO_2	Continually analysed at agreed location	24 hour and annual averages	For life of project – transfer of monitoring programme to NEMA
PM	High Volume Sampler at agreed location	24 hr averages	For life of project – transfer of monitoring programme to NEMA
Climatic Conditions	Automatic meteorological recording station or obtained from Kampala	Wind speed and direction, temperature, humidity	For life of project – transfer of monitoring programme to NEMA
Issues/concern			
Plant Noise	Measuring Plant at 100% full load operation using an integrating noise analyser.	Time averaged measurements at receptors outside the Plant boundary	Annually
Social Concerns	Nomination of a Community Liaison Officer for the Plant	Comments from community	For life of project
Occupational Health and Safety	Reporting of accidents, incidents, and safety breaches.	Safety report and statistics	Monthly for life of project
Water Quality	Automatic continual analysis	• PH	Continually
	Grab samples of discharge from oily water treatment unit (Oil/ water interceptor)	Oil and grease	Quarterly

	Grab samples taken for laboratory analysis from oily water treatment unit.	• Total suspended solids Total chromium, copper, iron and zinc	Quarterly for life of project

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WB (World Bank) 1999b. Bank Procedures 4.01; Environmental Assessment. World Bank, Washington D.C.

WB (World Bank) 1999c. Good Practices 4.01: Environmental Assessment. World Bank, Washington, D.C.

APPENDICES

Appendix1: Aggreko International Projects Limited Certificate of Registration

Appendix 2. Aggreko International Projects Limited Licence

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Appendix 3: ISO 9000-2002 Quality Management Systems

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¶
Key stakeholders¶
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Name ... [2]

Appendix 4: Showing evidence for EHS induction training

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Appendix 5: shows meeting evidence; Aggreko International Internal Meeting- 22/11/05

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Appendix 6: Showing copies of EHS of contractors displayed on site particularly on the fuel receiving bays

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Appendix 7: shows a continuous and improvement proposal form completed by Electrician Kajubi Danny Mweebe

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Appendix 8: Showing the license of Epsilon Limited issued by National Environment Management Authority

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Annex 9: The list of items contained in the First-Aid kit

Charcoal tablets

Dettol disinfectant

Triangular bandage

Prednisolone BP

Soft board

Absorbent cotton wool

Absorbent cotton gauze swab

Unisten clotrimale 1% broad spectrum antifungal cream

Mediven ointment/ Betamethasome ointment

Diclofenac Gel BP

Pair of sissors

Absorbent cotton wool. BP

First-Aid plastes

Gloves

A surgical dish

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Appendix 10: Persons consulted

Key stakeholders

Name	Responsibility
Mike Nolan	Project Manager Aggreko
[illegible]	Managing Director Engogo Nursery plant
[illegible]	Manager Poly plant and stores
Camo John	Head department of finance
[illegible]	Logistic Manager Transtrack
Abudul Nasser	Managing Director King [illegible]
Wasswa	[illegible]
Waisana Steven	Store keeper UMEME
Jery Buruy	Rugby committee member

Uganda Electricity Transmission Company Limited (UETCL)

[illegible]

Workers in private water selling

[illegible]
Kabali Becca
Waswa David
Mubiru Bob
[illegible]
Ssozi Hamad
Waiswa Simon
[illegible]
Kiwome Jamada
[illegible]
Ntambo Musa
Semuwemba Livingstone
Linkamanyire Frank

Appendix 11: Results of Measurements of Noise levels at Aggreko thermal power plant, Kampala industrial area, Kampala

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Night noise measurements

Time: 10.00 – 11.00 p.m.

Location	Noise Levels dB (A)		
	Min	Max	Leq
3rd Street			
ICD/Lower Aggreko	55.6	78.6	76.7
Kingstone Gate	58.5	80.8	77.1
ICD/Ottoman	57.9	81.3	77.5
Boundary Wall ICD/Lower Aggreko			
Lamp-post near 3rd Street	56.8	79.4	74.8
Mid-Point	54.8	73.9	70.6
Lamp-post near Rugby Ground	53.2	71.3	70.5
Wall facing Rugby Pitch			
Lamp-post L.H.S	52.8	70.9	70.5
Mid-point	51.9	70.6	68.3
Security House	53.7	71.2	70.4
Wall/Ottoman			
Security House	53.5	71.8	72.4
Mid-Point	51.9	71.0	72.0
Office Compound	57.7	73.3	73.2

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Time: 5.00 – 6.00 a.m.

Location	Noise Levels dB (A)		
	Min	Max	Leq
3rd Street			
ICD/Lower Aggreko	34.5	50.1	42.3
Kingstone Gate	33.9	51.2	40.6
ICD/Ottoman	34.1	58.9	40.4
Boundary Wall ICD/Lower Aggreko			
Lamp-post near 3rd Street	32.1	52.7	40.1
Mid-Point	32.2	53.7	39.7
Lamp-post near Rugby Ground	31.6	48.4	40.2
Wall facing Rugby Ground			
Lamp-post L.H.S	30.8	45.6	38.8
Mid-point	30.3	44.1	37.9
Security House	31.8	45.4	39.4
Wall/Ottoman			
Security House	31.8	45.4	39.4
Mid-Point	30.5	44.9	40.2

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Office Compound	32.5	45.9	41.9

Time: 6.00 -9.00 a.m.

Location	**Noise Levels dB (A)**		
	Min	**Max**	**Leq**
3rd Street			
ICD/Lower Aggreko	56.8	81.6	62.9
Kingstone Gate	47.6	87.3	60.7
ICD/Ottoman	43.6	90.0	64.9
Boundary Wall ICD/Lower Aggreko			
Lamp-post near 3rd Street	45.7	75.9	62.6
Mid-Point	44.9	75.5	63.6
Lamp-post near Rugby Ground	42.1	74.9	61.9
Wall facing Rugby			
Lamp-post L.H.S	52.1	74.9	63.8
Mid-point	53.1	75.7	62.3
Security House	47.8	70.7	60.3
Wall/Ottoman			
Security House	47.8	74.9	63.8
Mid-Point	45.6	69.9	62.1
Office Compound	48.8	75.9	70.1

Time: 9.00 – 12.00 noon

Location	**Noise Levels dB (A)**		
	Min	**Max**	**Leq**
3rd Street			
ICD/Lower Aggreko	56.8	89.8	70.2
Kingstone Gate	53.9	91.7	74.8
ICD/Ottoman	56.6	90.2	73.5
Boundary Wall ICD/Lower Aggreko			
Lamp-post near 3rd Street	47.9	81.9	67.9
Mid-Point	44.7	76.6	63.7
Lamp-post near Rugby Ground	42.9	75.9	63.8
Wall facing Rugby			
Lamp-post L.H.S	42.9	75.8	62.9
Mid-point	40.7	73.3	62.6
Security House	45.1	74.1	61.9
Wall/Ottoman			
Security House	45.1	75.8	62.8
Mid-Point	43.4	72.0	60.4
Office Compound	47.8	74.9	62.5

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Time: 12.00 – 3.00 p.m.

Location	Noise Levels dB (A)		
	Min	Max	Leq
3rd Street			
ICD/Lower Aggreko	56.6	92.0	75.7
Kingstone Gate	58.9	91.8	74.8
ICD/Ottoman	59.6	89.8	76.6
Boundary Wall ICD/Lower Aggreko			
Lamp-post near 3rd Street	51.9	82.9	71.7
Mid-Point	51.5	79.8	69.8
Lamp-post near Rugby Ground	49.5	78.8	69.1
Wall facing Rugby			
Lamp-post L.H.S	49.5	78.6	69.3
Mid-point	46.9	76.5	66.9
Security House	44.8	75.9	65.6
Wall/Ottoman			
Security House	45.3	76.4	65.6
Mid-Point	44.8	74.7	64.9
Office Compound	49.3	78.3	65.4

Time: 3.00 – 6.00p.m

Location	Noise Levels dB (A)		
	Min	Max	Leq
3rd Street			
ICD/Lower Aggreko	55.8	92.2	78.6
Kingstone Gate	56.9	91.8	80.2
ICD/Ottoman	56.5	90.7	80.2
Boundary Wall ICD/Lower Aggreko			
Lamp-post near 3rd Street	54.8	80.6	76.7
Mid-Point	53.7	78.8	76.4
Lamp-post near Rugby Ground	51.0	74.7	74.8
Wall facing Rugby			
Lamp-post L.H.S	49.5	74.6	72.2
Mid-point	47.3	74.0	70.8
Security House	47.6	74.8	71.6
Wall/Ottoman			
Security House	47.8	75.1	69.8
Mid-Point	45.7	74.6	68.9
Office Compound	54.8	77.1	70.2

Time: 6.00 – 10.00 p.m.

Location	Noise Levels dB (A)		
	Min	**Max**	**Leq**
3rd Street			
ICD/Lower Aggreko	57.1	88.7	72.2
Kingstone Gate	55.8	88.6	73.4
ICD/Ottoman	56.6	89.0	74.1
Boundary Wall ICD/Lower Aggreko			
Lamp-post near 3rd Street	55.9	81.6	73.4
Mid-Point	53.3	79.3	71.8
Lamp-post near Rugby Ground	50.9	76.5	71.6
Wall facing Rugby			
Lamp-post L.H.S	52.1	75.9	70.8
Mid-point	50.7	73.3	70.4
Security House	51.3	73.0	69.8
Wall/Ottoman			
Security House	52.4	72.7	71.3
Mid-Point	52.1	73.1	70.9
Office Compound	54.9	73.9	72.1

Appendix 12: Certificate of Approval of Environmental Impact Assessment

Socio-economic

Apart from the Lugogo Rugby Club that is a sporting premise, the remaining 5 premises surrounding the proposed site for the construction of power plant have a variety of business transactions that include selling water, garage services, car sales and cleaning; floriculture; transportation; electric poles treatment; and electricity distribution. The surrounding premises, in all, have a total of 184 employees including the management personnel. Employees get wages or salaries depending on the nature of their work. For instance, people working at the flower nursery get UGX 3000/= each per day.

Expectation of the people

Apart from the car sales premise that will be taken for the construction of the power plant, there is no evidence of possible lost of services by the remaining premises surrounding the proposed project area. However, based on their experience with the current Aggreko thermal power plant, both the management and workers talked to expressed their concern about the possibility of increased heat, noise and further deterioration of air quality due to increased emissions unless appropiate mitigation measures are implemented. However, the overall expectation is positive as they viewed the project to be another additional source of employment, expanded market for their produce and services and increased electricity supply of electricity that could reduce load shedding.

10.1.1 The Focused Group Discussions

A Focused Group Discussion was held at Lugogo in which discussion the private water suppliers constituted the majority of the people who attended.

Venue: Lugogo at the Water Suppliers/Car sales and cleaners premises

Date: 10/02/2006

Agenda:

1. Briefing from the EIA study Team Leader
Issues of Environmental and social concern arising from the briefing
3. A.O.B
4. Conclusion

Minute 1. Briefing from the Team leader: The Team Leader Ms. Aisu Elizabeth started by welcoming all the participants to the consultative meeting. She informed members on the purpose of the meeting.

She further highlighted to the participants issues to be discussed during the meeting that included the following:
creation of awareness about the project in the area;
identification of potential impacts of the project; and
obtaining recommendations.

Minute 2. Identification of potential impacts: During the meeting the following potential impacts of the project were identified. These included both positive and negative impacts.

Positive impacts
increase of electricity supply in the area;
creation of jobs in the area;
providing market for the water when needed.

Negative impacts
increase of noise in the area; and
possibility of increased emissions polluting the air with its associated adverse health effects.
The participants agreed upon the following recommendations.

provision of adequate devices to control noise within acceptable national standards; and
utilization of appropriate technology to limit or control emissions to acceptable levels.

Minute 3. A.O.B: The community members promised to corporate with the developer. They showed willingness to work with the developer.

Minute 4 Conclusions: The Team Leader thanked the participants and assured them that their concerns would be put under consideration during the project development.

Present at the consultaive meeting were the following participants:

This was section 3.2 in the Audit report

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Appendix 1: Persons consulted

Key stakeholders

Name	**Responsibility**
Mike Nolan	Project Manager Aggreko
Muwanga Joseph	Managing Director Lugogo Nursery plant
Othieno	Manager Pole plant and stores
Camo John	Head department of stores
Julius Kagoda-Isanga	Logistic Manager Transtrac

Abudul Nasser	Managing Director Kingsway
Wasswa	EIA NEMA Coordinator
Waisana Steven	Store keeper UMEME
Jery Buruy	Rugby committee member

Uganda Electricity Transmission Company Limited (UETCL)

William Nkemba
Andrew Omalla Geno
John Othieno
Okot Denis

Workers in private water selling

Mpalanyi Moses
Kabali Becca
Waswa David
Mubiru Bob
Senteza Sowedi
Ssozi Hamad
Waiswa Simon
Ndawula Frank
Kiwome Jamada
Muwonge Joseph
Ntambo Musa
Semuwemba Livingstone
Tinkamanyire Frank

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