Polluted Justice!

HUMAN RIGHTS AGENDA
HURIA

A STUDY REPORT ON THE

Assessment of the Impacts and Risks of ARM Cement Limited activities on the Environment, Health and Safety of Kaloleni and Rabai Communities in Kilifi County

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Abbreviations and **Acronyms**

Al	Aluminum
ARC	Athi River Cement
Ca	Calcium
Ca2+	Calcium ions
cfu/ml	Colony forming units per millilitre
Cl	Chloride
CO2	Carbon Dioxide
Cu	Copper
dB (A)	Decibel on 'A' weighted scale of the sound level meter
DOSHS	Directorate of Occupational Safety and Health Services
EIA	Environmental Impact Assessment
EMCA	Environmental Management and Coordination Act
EMP	Environmental Management Plan
Fe	Iron
HCs	Hydrocarbons
H2S	Hydrogen Sulphide
HURIA	Human Rights Agenda
IGAs	Income Generating Activities
K	Potassium
K+	Potassium Ions
KEBS	Kenya Bureau of Standards
KENAS	Kenya National Accreditation Service
KFS	Kenya Forest Service
Mg	Magnesium
Mg2+	Magnesium ions
mg/Kg	Milligrams per Kilogram
mg/l	Milligrams per litre
mg/m3	Micrograms per cubic meter
mg/Nm3	Milligrams per cubic meter (at normal conditions)
Mn	Manganese
Na	Sodium
NEC	National Environment Council
NEMA	National Environment Management Authority
NET	National Environment Tribunal
NGO	Non-Governmental Organization
NOX	Nitrogen Oxides
PCC	Public Complaints Committee
pH	-log 10 [H+] (Measure of acidity or alkalinity)
PM	Particulate Matter
ppm	Parts per million
SoE	State of the Environment
SOX	Sulphur Oxides
TVC	Total Viable Counts
µg/m3	Micrograms per cubic meter
US	United States
Zn	Zinc

Executive Summary

This study was commissioned by HURIA and entailed carrying out an assessment of the impacts and risks of the activities of Athi River Cement factory on the Environment and on the Health and Safety of the communities neighboring the cement company's factory and quarry. The geographical scope of this study was the villages neighbouring the Athi River Cement plant and quarries in Kaloleni and Rabai Districts. The technical scope of the study was an assessment of the potential environmental, health and safety impacts and risks of the activities of Athi River Cement Company on the surrounding physical, biological and socio-economic environment.

The methodology used for the study entailed physical observation, photography, ambient air quality analysis, noise level measurement, soil sampling and analysis, water sampling and analysis and foliar sampling and analysis. The other methods used were household surveys using questionnaires, interviews with key informants, medical examinations and a stakeholders sensitization and consultation workshop. Review of relevant literature including past reports and books was also done as part of the study.

The study identified some significant adverse Environmental, Health and Safety impacts and risks arising from the activities of Athi River Cement Company including dust generation by the factory and quarry, noise and vibrations from blasting, damage to property from vibrations, flying rock debris and corrosion, safety and health issues including respiratory diseases and open pits. The other significant negative impacts identified were effect on vegetation and crop physiology, impact on hydrology including disappearance of a stream called Bekadzinga due to quarrying activity at Chauringo, destruction of habitat, land degradation, water pollution, displacement of people, and psychological impacts (stress).

The challenges faced during the study were misinterpretation of study objectives and purpose (misinformation that the study was targeting Athi River Cement company for closure), inaccurate reporting by the mass media and apathy among villagers who thought that nothing would be done after the study.

The limitations of the study were small sample sizes selected for medical examination and for household survey that were relatively small with respect to the area population; lack of experimental (or study controls) especially medical examinations and analysis of environmental parameters in areas far from the operation of ARC to find out if there was any significant difference in the findings; effect of other causal factors other than the study findings, inability to conduct real time measurement of blasting noise and vibrations and lack of consultation with the Athi River Cement company itself.

The key recommendations of the study are the need for further studies targeting a larger population and a larger geographical area and even replicating similar studies elsewhere; use of the study findings by relevant authorities to compel Athi River Cement company to undertake sufficient impact mitigation measures; the need by Athi River Cement company to undertake sufficient measures including investment in better technology for pollution prevention; the need by Athi River Cement company to borrow and implement best practices from companies that are managing their environmental aspects better; the need for a control audit of the Athi River Cement Company by NEMA and an independent health and safety audit by DOSHS.

Other key recommendations include compensation of affected people; establishment of an all-inclusive committee to monitor the implementation of the ARC's EMP; close monitoring of adherence of the Athi River Cement company to the conditions of the mining licence issued by the Department of Mines and Geology;

development and implementation of a County-wide land use plan; regular consultative meetings between the ARC and the with the neighbouring community; investment by Athi River Cement company in corporate social responsibility programmes for the surrounding community; creation of a buffer zone between the company and the neighbours; comprehensive restoration of the affected environment by the ARC and full implementation of the polluter pays principle by NEMA on all polluting entities.

This report is divided into seven chapters. Chapter one gives an introduction of key actors in the study as well as its purpose. Chapter two discusses the methodology of the research and background information of the study area while chapters three and four provide an analysis of literature review and the legal environmental, institutional and policy framework regulating environmental management in the country. Chapters five and six account for the study findings, challenges encountered and limitations of study. The final chapter concludes the report by suggesting recommendations on what needs to be done to address the pertinent issues.

HURIA believes that this report will not only go a long way into providing the missing scientific facts on the health and environmental hazards posed by the Athi River Cement Company's operations but more importantly, ensure that the target communities ultimately enjoy their right to a healthy and clean environment as well as the benefits accruing from the company as part of its corporate social responsibility.

It is our hope that this report will not only serve to address the perennial issue currently afflicting the Kaloleni and Rabai communities but act as an important frontier in our unrelenting struggles to promote corporate accountability and environmental justice at the Coast, and by extension in Kenya.

Sincerely,

Yusuf Lule Mwatsefu
Executive Director

About HURIA

HURIA is a not-for-profit, non-partisan, local NGO based at the Coast of Kenya founded immediately after the 2010 referendum as a response to the dictates of the new Constitutional order. Currently based in Mombasa County, the organization is committed to advancing a culture of human rights and promoting capabilities with a view to enhancing the greater realization and equal enjoyment of fundamental rights and freedoms as enshrined in the Constitution of Kenya 2010, other laws and the international human rights instruments.

The organization is legally mandated to undertake its work in all the six counties in the coast region, and has currently entrenched a strong outreach base in three counties which include Mombasa, Kilifi and Kwale.

About ARM Cement Limited

ARM Cement Ltd, formerly Athi River Mining Ltd, is a Kenya-based company engaged in the manufacture and sale of cement, mining and processing of industrial minerals and chemicals, as well as trading in other building products and the sale of fertilizers. It was established in 1974 by Mr. H.J Paunrana as a mineral, extraction and processing company and is now a public limited company quoted on the Nairobi Stock Exchange since 1997.

ARM Cement Limited engages in the manufacture and sale of cement in Kenya, South Africa, Tanzania, and Rwanda. The Company sells cement under the brand name of Rhino; and fertilizers under the Mavuno brand name. It serves agriculture and food, manufacturing and mining, construction and roads, and environment and miscellaneous industries. On July 24, 2012 during an Annual General Meeting of Shareholders of the Company, Athi River Mining Company limited changed its name from Athi River Mining Ltd to ARM CEMENT LTD to reflect the growing importance of the cement business in the Company's activity.

CHAPTER 1 ONE

1.0 Introduction

1.1 Background

Studies have shown that limestone mining and manufacture of cement have potentially significant adverse impacts on the environment and on the health and safety of individuals and communities. Mining scars the landscape, destroys vegetation, causes soil erosion and has health and safety impacts such as noise, vibrations and dust generation. Cement manufacturing generates dust that is harmful to the environment and to human health.

The Athi River Cement Company has been mining limestone for cement making over the years in Kaloleni and Rabai areas of Kilifi County. According to various sources of information, including media reports, local community interviews and past reports, the activities of Athi River Cement Company have been impacting on the environment and on the communities living in the neighbourhood of the company's quarries and cement manufacturing plant.

Although Athi River Cement Company has been undertaking some measures to mitigate the negative impacts of its operations on the neighbouring environment, the measures have not been satisfactory, at least from the perspective of the local community. They key issues of concern to the environment and the community include dust from the cement manufacturing and from transportation of raw materials to the factory, noise and vibration from blasting (quarrying) operations.

The local communities feel that Athi River Cement company is not doing enough with regard to managing the environmental, health and safety aspects of its operations and has partnered with HURIA, a local NGO working on environmental justice and human rights issues in the coastal area of Kenya to exert pressure on Athi River Cement company to undertake adequate measures to mitigate the adverse environmental impacts of the company's activities to them.

As part of this initiative, HURIA engaged the services of an environmental, health and safety consultant to carry out a study on the environmental, health and safety impacts of Athi River Cement Company on the surrounding communities of Kaloleni and Rabai and on the environment.

In this study, the consultant worked closely with HURIA staff and members of the local communities in collecting the relevant data and information about the environmental, health and safety impacts of the operations of Athi River Cement Company on the environment and on the communities. This study

used an array of methodology including physical observation, literature review, interviews and questionnaires, environmental quality analysis and medical examinations on randomly selected members of the community neighbouring the Athi River Cement Company.

In addition to commissioning this study, HURIA requested NEMA to conduct a control environmental audit of the activities of Athi River Cement Company in Kaloleni and Rabai districts in accordance with the provisions of the Environmental Impact (Assessment and Audit) Regulations, 2003. HURIA's intention was that the findings of this study would complement the findings of the NEMA's control audit, all of which would be geared towards compelling Athi River Cement Company to satisfactorily comply with the applicable environmental, health and safety regulations.

1.2 Purpose of the Study

The purpose of this study was to conduct a comprehensive assessment of the impacts of Athi River Cement company's activities on the communities of Rabai and Kaloleni districts of Kilifi County living within the neighbourhood of the company's plant and mining quarries. Specifically the study would seek to measure the possible health hazards related to the company's mining activities in general and the factory emissions in particular to the Rabai and Kaloleni communities, with a view to collecting sufficient scientific evidence that would build a case to compel Athi River Cement company to comply with applicable environmental, health and safety laws/regulations to the satisfaction of all stakeholders including members of the local community.

1.3 Study Objectives

The objectives of this study were to:

a) Determine the ambient air quality from the emissions generated by Athi River Cement Company to the immediate neighboring physical environment;

b) To determine community health status attributable from emissions, possible health, safety and occupational hazards as well as the clinical manifestations and pathogenesis associated with the emissions;

c) To assess Athi River Cement company's compliance to all environmental regulations as stipulated in EMCA 1999, the Constitution of Kenya (2010) and any existing environmental regulations;

d) To evaluate level of community awareness on ARC company activities or general mining activities, their environmental and health rights as enshrined in existing regulations and possible dangers posed by exposure to the factories' activities;

e) To assess the factories' existing reclamation measures to the open quarries, their risks and suggest workable measures in line with existing regulations;

f) To recommend ways to ensure that dust from transporting lorries eventually affecting households and water sources is controlled; and

g) To identify level of community involvement in the company's activities with the aim of creating a beneficial co-existence between the community and ARC Company in line with existing regulations.

1.4 Scope of the Study

The geographical scope of this study was the villages neighbouring the Athi River Cement plant and quarries in Kaloleni and Rabai Districts. The scope of the study did not entail entry into the premises of Athi River Cement Company's manufacturing plant and quarrying sites.

The technical scope of the study was an assessment of the potential environmental, health and safety impacts of the activities of Athi River Cement Company on the surrounding physical, biological and socio-economic environment.

CHAPTER TWO

2.0 Methodology and Study Area

2.1 Methodology

2.1.1 Data Collection Methods

2.1.1.1 Primary Data Collection

The methods of collecting primary data were:

a) Physical observation

This entailed physically visiting the villages in the immediate neighbourhood of Athi River Cement Company and making observations on air, vegetation, water resources, soil (land) and infrastructure including roads, farms and houses in the area.

b) Photography

A digital camera was used in taking photographs of various items of relevance to the study including vegetation, farms, houses, roads and others.

c) Ambient air quality analysis

This entailed sampling and analysis of ambient air using appropriate equipment to determine levels of various parameters of relevance to the study including PM, SO_X, HCs, H_2S and NO_X.

d) Noise level measurement

Noise levels measurement was done behind the Athi River Cement Company's perimeter wall and at a distance of one hundred (100) metres from the cement manufacturing plant. The measurement was done using a precision sound level meter (Type 7078) with an omni-directional microphone.

e) Soil sampling and analysis

A sample of soil was taken from Mr. Bidii's farm neighbouring Athi River Cement Company and taken to Agriq-Quest laboratory for chemical analysis of anions, cations and trace elements.

f) Water sampling and analysis

A sample of water was taken from a wetland outside the northern perimeter wall of the Athi River Cement Company (at Kwa muiyemi) as shown in the photograph below. The wetland is used as a source of water for domestic use and for watering animals. Another sample was taken from the nearby Jongani stream in Kaya Kambe as a control. The samples were taken for analysis at the KENAS and NEMA certified Agriq-Quest laboratory.

g) Foliar sampling and analysis

A sample of a maize leaf was taken from one of the farms neighbouring ARC and taken to the lab for analysis.

The photographs below show experts from Agriq-Quest laboratories conducting sampling in the neighbourhood of Athi River Cement Company.

Fig (2.1): ***Environmental experts conducting sampling.***

h) Questionnaires and interviews

Interviews were held with randomly selected members of the communities neighbouring Athi River Cement Company. Questionnaires were also administered to randomly selected villagers in the neighbourhood of Athi River Cement Company and to stakeholders including National Government and County Government officers in Kilifi County. Thirty five (35) questionnaires were completed. Copies of questionnaires used to collect primary data are appended to this report.

i) Medical examinations

Medical examinations were conducted on twenty one (21) randomly selected villagers from the communities neighbouring Athi River Cement Company. The medical examinations involved clinical examination, chest X-rays at the Mariakani District Hospital and Spirometry. The examinations were conducted by a team led by a specialist in occupational medicine.

j) Stakeholders workshop

Before commencement of the study, the client organized a stakeholders workshop at Amani Tiwi hotel to generally sensitize the participants on environmental issues and legislation and to prepare the participants for the study. During the workshop, preliminary information on the impacts of the ARC operations on the environment and on the community was shared with the consultants. In the workshop, the elected political leaders from the constituencies in Kilifi committed to fully support the study and also gave support to HURIA's environmental justice project.

2.1.2 Data Analysis and presentation

Data analysis was conducted using both quantitative and qualitative methods and presented in form of tables and narrative.

2.2 Study Area

2.2.1 Physical Environment

2.2.1.1 Climate

Kilifi has typical East African coastal climate. Rainfall in the county ranges from a minimum mean average annual precipitation of 400 mm to a maximum mean average annual precipitation of 1300 mm. The pattern of rainfall in Kilifi is bimodal. The long monsoon rains fall from April to June with a peak in May. The short rains, on the other hand fall from October to December.

The average temperature in the county is 30^{0}C. The temperature ranges from a high of 26.5^{0}C - 34^{0}C to a low of 22.5^{0}C – 24.5^{0}C.

The average relative humidity in the county is 60%.

2.2.1.2 Topography, soils and geology

Kilifi has four major topographical features. These are the Coastal plain, the Foot Plateau, the Coastal Range and the Nyika Plateau.

The Coastal Plain is a narrow belt, varying in width between 3 km. and 20 km. It lies below 30m above sea level except for occasional prominent peaks on the western boundary. The rest of the area is broken by creeks and estuaries giving rise to excellent marine and estuarine swamps, with mangrove forests and untapped potential for marine culture, Kilifi lies in this strip.

The soil in the neighbourhood of Athi River Cement Company is alluvial, fertile coastal soil. In general, however, the lithology of Kilifi County is composed of sedimentary rocks of the Mesozoic and Cenozoic eras. The sedimentary rocks consist of a variety of sandstones, siltstones, shales and limestone.

2.2.1.3 Drainage

Kilifi County is not well endowed with water resources. The water resources in the county are rivers, streams and the Indian Ocean. Sabaki, Rare and Kafuloni are the main rivers in the county.

There are drainage features include the Jongani stream in Kaya Kambe and a wetland at Kwa Muyemi that stretches along the northern perimeter wall of the Athi River Cement plant.

2.2.2 Biological Environment

2.2.2.1 Vegetation

Human interference and particularly agriculture have greatly modified the original floral and faunal status of the Kilifi County. Several vegetation types including coastal dunes, woodlands, bush lands and savannas are encountered from the shoreline inland. The vegetation type in the Kaloleni and Rabai areas is mainly coastal ***Kaya*** communal forests and on farm plantations. Coconut trees are dominant in the farms.

The photograph below show some of the vegetation species in the area.

Fig (2.2): ***Vegetation type in the project area (Kaya forest).***

2.2.2.2 Fauna

The Kaya forests that predominate the project area provide habitat to hundreds of animal species including monkeys, apes, bush babies as well as hundreds of bird and insect species.

2.2.3 Socio-economic environment

2.2.3.1 Economy of Kilifi County

The two primary forms of economic activities in the Kilifi County are agriculture and tourism. Tourism is concentrated along the areas fronting the ocean with the revenue earned effecting only a small proportion of the population.

Agriculture, employing 85% of the population remains the backbone of the local economy and since the population density is high in relation to the agricultural potential, the county is one of the poorest in Kenya in terms of per capita income. 68% of the population in the Kilifi County live below the poverty line. Waged employment only absorbs 4% of the population. Athi River Cement Company has employed a number of people from the local communities.

The county is also well endowed with mineral resources including titanium, Iron and Manganese. There is also mining of corals and limestone along the coastal strip.

Fishing is also an important economic activity in the county.

2.2.3.2 Population and demography

The population of the Kilifi County stands at 1.1 Million with the male to female ratio at 48:52%. The population density in the county is 450 people per Km^2. The population growth rate stands at 3.05%.

Over 80% of the population in the county is drawn from the Mijikenda group. The Mijikenda (nine ethnic communities), are a loose grouping whose Bantu languages are to a large extent mutually intelligible and closely related to Swahili. They are believed to have arrived in their present homelands in the seventeenth century from a quasi-historical state called Shungwaya. This centre was probably located in south-west corner of present day Somalia. The group is comprised of the Giriama, Digo, Rabai, Ribe, Duruma, Chonyi, Jibana, Kauma and Kambe. Kilifi is an endemic area for Malaria and is one of the major causes of infant mortality in the region. The other major problem is malnutrition affecting children in the county.

2.2.3.3 Infrastructure

Kilifi is one of the least developed counties in terms of infrastructure. The Mazeras-Kaloleni road is the main all weather road with feeder roads being in a poor state.

There is poor development of water resources in the area. The people in the project area rely on river water as the main source of water. A few homes however have piped water.

With regard to telecommunication, the area relies on mobile telephone with weak signal in many areas.

The area has a number of primary schools. Kilifi has 160 primary schools, 23 secondary schools and tertiary institutions including the Pwani University Collegeand the Kilifi Medical Training College.

With respect to nature of housing, many houses in the area are made of mud or brick walls with makuti (thatch) roofs.

2.2.3.4 Energy supply

The source of energy supply in the county are mains electricity, kerosene, firewood and solar. Most people depend on firewood as the main source of energy.

CHAPTER 3 THREE

3.0 Literature Review

Cement manufacturing involves three essential steps, namely: limestone mining, transport of raw materials to the factory and actual manufacturing of cement in the factory, which involves various other steps as illustrated below:

Each of the steps in cement production impacts on the environment and on the health and safety of people in many ways with most impacts being adverse. A study conducted by Afolabi et al in 2012 on the Health and Environmental Challenges of a Cement Factory on Ewekoro Community Residents in Ogun State, Nigeria, which was published in the American Journal of Human Ecology confirms extensive incidence of land, air, and noise pollution over and above recommended minimum limits from cement factories.

According to the Saudi Medical Journal (2004), cement dust causes lung function impairment, chronic obstructive lung disease, restrictive lung disease, pneumoconiosis and carcinoma of the lungs, stomach and colon. Other studies have shown that cement dust may enter into the systemic circulation and thereby reach essentially all the organs of body and affect the different tissues including heart, liver, spleen, bone, muscles and

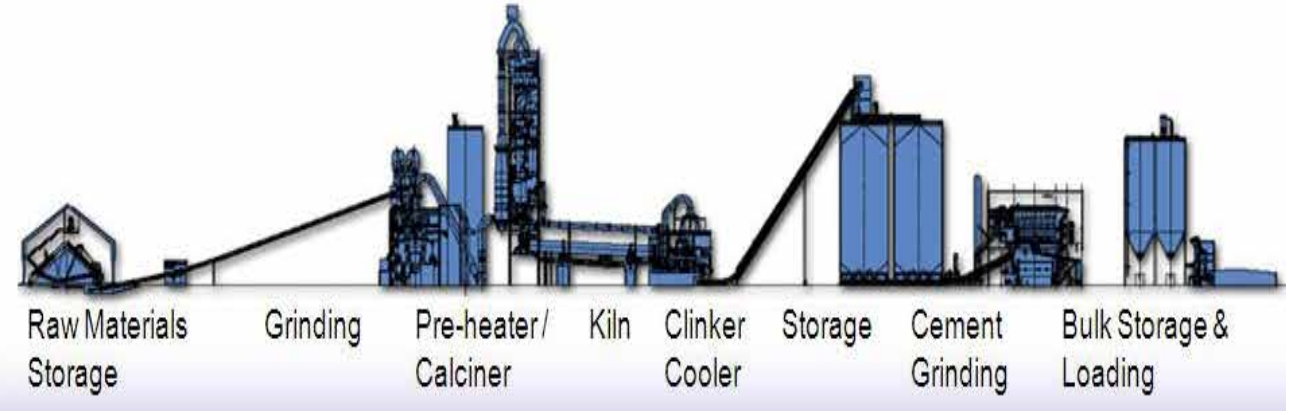

Fig (3.1): ***Cement Manufacturing Process.***

hairs and ultimately affecting their micro-structure and physiological performance.

Cement manufacturing involves significant consumption of natural resources, especially water and energy. According to Van Oss and Padovani (2003), about 1.7 tonnes of nonfuel raw materials are consumed to make 1 tonne of cement; the bulk (about 85%) of the raw materials is limestone or similar rocks, to which is added clay or shale and other materials to achieve the correct chemical proportions. A cement plant consumes 3–6 Giga Joule of fuel per tonne of clinker produced, depending on the raw materials and the process used (Foundations, Ambuja Knowledge Initiative, 2013).

Cement manufacturing also releases gaseous emissions to the atmosphere. Clinker manufacture has signicant emissions of particulates and gases, of which one in particular (CO_2) has garnered international attention and is routinely singled out in national and international emissions data compendia. In general, fugitive emissions of coarse particulates (particularly of particle diameters 10 micrometers), if not controlled, are considered to be more of a local nuisance than a health hazard. Fine particulates (those < 10 micrometres and especially < 2.5 micrometres diameter, known in U.S. regulatory parlance as “PM10” and “PM2.5,” respectively) in contrast, are of greater concern, because of their respirable nature and because, both for cement raw materials and manufactured products, they may contain potentially harmful concentrations of toxic metals and compounds (Van Oss and Padovani, 2003). The cement industry produces about 5% of global man-made CO_2 emissions, of which 50% is from the chemical process, and 40% from burning fuel (www.foundationsakc.org, 2013).

Clinker manufacturing releases anthropogenic Sulphur oxides (SOx) which play a key role in the formation of acid rain. Acid rain corrodes roofs and other metallic materials and has a bearing on vegetation and aquatic life.

Dust from cement manufacturing affects vegetation. Cement dust covers surfaces of plant leaves, flowers, fruits and even bark, thereby affecting the physiology of the plants as well as the quality of products. Cement dust will affect the functions of leaves, namely photosynthesis and respiration by covering (clogging) stomata. Dust will lower the quality of vegetables and fruits in the market.

At the local level, negative impacts of cement manufacturing include disturbance to the landscape, dust and noise and disruption to local biodiversity from quarrying limestone (the raw material for cement).

Quarrying of limestone for cement manufacturing has perhaps the most significant impacts on the environment. Part from destruction of the landscape, it can lead to change of water courses, pollution of ground water, receding of water table, loss of vegetation and soil erosion among others. Quarrying has also numerous safety and health impacts including creation of deep dangerous gullies, exposure of workers to hazardous materials, generation of noise and vibration and other adverse effects. According to Afolabi et al (2012), limestone mining for cement manufacturing results in conversion of farmlands into quarry sites, which impacts on food security. These authors also add that one very important impact of the quarry is deforestation and displacement of settlements.

Cement factories also affect water sources negatively. A study conducted by Akeem, A.O. (2008), at Ewekoro Cement Factory in Nigeria found that there were two major sources of water pollution from the cement factory. These were disposal of chemical waste from the factory on the surface of the water and the constant settling of dust from the factory on the surface of the water. According to Mishra (1991), as the cement dust comes in contact with water, hydroxides are formed that impair natural water alkalinity. A fine layer of cement covers the surface of wells and ponds while the addition of salts of Ca, Na,K, Mg and Al as hydroxides, sulfates and silicates affect the hardness of the water that subsequently are responsible for the respiratory and gastro-intestinal diseases.

CHAPTER 4 FOUR

4.0 Policy, Institutional and Environmental Regulatory Framework

4.1 Introduction

Kenya has had a poor Environmental Legislation background. Environmental law was fragmented into sectional laws (up to 77 statutes) resulting to poor management of the environment and hence its deterioration. In the year 1999, Environmental Management and Coordination Act (EMCA) 1999 was enacted by parliament. The Act aimed to provide for the establishment of an appropriate legal and institutional framework for the management of the environment. The EMCA of 1999 created various environmental management institutions including NEMA, which is the principal organ of government in matters of environmental management.

4.2 Policy Framework

Kenya has not had an environmental policy for many years. The closest documents that have been formulated have been the National Environmental Action Plan (1994) and the Sessional Paper No. 6 on Environment and Development (1999). Recently, the Ministry of Environment and Mineral Resources spearheaded the formulation of the country's Environmental Policy.

4.2.1 The Constitution of Kenya, 2010

The constitution of Kenya was promulgated on the 27th of August 2010. According to Section 42 of the Constitution, every person has the right to a clean and healthy environment, which includes the right to have the environment protected for the benefit of

present and future generations through legislative and other measures, particularly those contemplated in Article 69.

In accordance with Section 69 (1) of the constitution, the state shall (a) ensure sustainable exploitation, utilization, management and conservation of the environment and natural resources, and ensure the equitable sharing of the accruing benefits. The state shall also establish systems of environmental impact assessment, environmental audit and monitoring of the environment.

According to section 70 (1), if a person alleges that a right to a clean and healthy environment recognized and protected under Article 42 has been, is being or is likely to be, denied, violated, infringed or threatened, the person may apply to a court for redress in addition to any other legal remedies that are available in respect to the same matter.

4.2.2 The National Environmental Action Plan (NEAP) of 1994

NEAP laid down very clear strategies in order to integrate environmental issues in development programs and projects. NEAP also outlined strategies that can be adopted to realize the objectives.

Some of the broad objectives of NEAP include:

a) facilitating the optimal use of national land and water resources in improving environmental quality;

b) promoting sustainable use of natural resources to meet the needs of present generations while preserving the ability of future generations to meet their needs;

c) treating environmental conservation and economic development as integral parts of the same process of sustainable development; and

d) Generating income to meet national goals and international obligations by conserving biodiversity, reducing desertification and maintaining ecological balance of the earth.

Among others, strategies for realizing these objectives include:

a) the need to enhance the harmonization and implementation of laws concerning the sustainable use of resources;

b) the need to institutionalize EIA for monitoring and assessment of both public and private projects;

c) the need to enhance the involvement of local communities in natural resources management;

d) provision of strong environmental coordination and monitoring;

e) the need to formulate a comprehensive land use and settlement policy to regulate human activity and minimize negative effects;

f) the need to provide economic incentives and penalties to encourage the sustainable use of natural resources and to minimize pollution

4.2.3 Sessional Paper No 6 of 1999 on Environment and Development

According to this Sessional Paper, Kenya's fundamental principles with respect

To environmental conservation include:

a) Environmental protection is an integral part of sustainable development.

b) The environment and its natural resources can meet the needs of present as well as those of future generations if used sustainably.

c) All the people have the right to benefit equally from the use of natural resources as well as an equal entitlement to a clean and healthy environment.

d) Poverty reduction is an indispensable requirement for sustainable development.

e) Sustainable development and higher quality of life can be achieved by reducing or eliminating

unsustainable practices of production and consumption; and by promoting appropriate demographic policies.

f) Endogenous capacity building is essential for development, adaptation, diffusion, and transfer of technologies for sustainable development.

g) Indigenous/traditional knowledge and skills are vital in environmental management and sustainable development.

h) Effective public participation is enhanced by access to information concerning the environment and the opportunity to participate in decision-making processes.

i) Public participation including women and youths is essential in proper environmental management.

j) For sustainable management, the polluter pays principle should apply.

k) Access to judicial and administrative proceedings, including redress and remedy, is essential to environmental conservation and management.

l) Private sector participation in environmental management is essential for sustainable development.

m) Effective measures should be taken to prevent any threats of damage to the environment, notwithstanding lack of full scientific certainty.

n) Peace, security, development, and environmental protection are interdependent and indivisible.

o) International co-operation and collaboration is essential in the management of environmental resources shared by two or more states.

The overall goal of the Sessional paper was to integrate environmental concerns into the national planning and management processes and provide guidelines for environmentally sustainable development.

According to the Sessional paper, the Government will endeavor to:

a) Formulate comprehensive EIA guidelines, procedures, and legislation;

b) Strengthen and develop environmental standards;

c) Establish a system of EIA audits, monitoring, evaluation, and appeal;

d) Subject new and existing projects and programmes to environmental monitoring and auditing;

e) Strengthen capacities in institutions and local communities with regard to EIA; and

g) Incorporate social and cultural values in EIA.

The Sessional paper on environment and development was thus the starting point in using EIA as a tool for appraising the suitability and sustainability of developments.

4.2.4 Draft National Environment Policy, 2012

There has never been a national environmental policy in Kenya. However the government through the Ministry of Environment and Mineral Resources recently spearheaded the processes of formulating a new national environmental policy.

4.2.5 The Draft National Minerals and Mining Policy, 2010

The overall goal of the National Minerals and Mining Policy is to sustain mineral resources development so as to maximize on accruing benefits while maintaining Kenya as an attractive investment destination.

According to this policy, among the minerals that are found in Kenya in significant quantities are soda ash (trona) in Lake Magadi area, fluorspar at Kimwarer in Kerio Valley as well as titanium in Kwale, Malindi and Lamu areas. There is also significant potential for gold in Kakamega, Vihiga, Migori, Transmara, Bondo, Siaya, Pokot and Turkana as well as minor indications of the

mineral in Nandi area. Coal occurs in Mwingi and Mutitu areas while iron ore occurs in parts of Taita, Meru, Kitui, Kilifi and Samia Hills. Manganese ore occurs in Ganze, Kilifi and Mrima Hill areas in the Coastal region.

Objective 5 of this policy is to mitigate the adverse social and environmental impacts of mineral development. The policy acknowledges that mining operations involve land disturbances, which may lead to environmental degradation. The strategies of achieving this objective as outlined in the policy therefore include:

(i) Ensuring a socially acceptable balance between the positive and negative impacts of mining on the physical and human environment;

(ii) Ensuring compliance of mineral sector activities with relevant environment, health and safety legislation;

(iii) Promoting best mining practices;

(iv) Ensuring that mine closure plans and post-mining phases form integral parts of the planning stage; and

(iv) Developing in liaison with relevant institutions specific regulations for mining operations in environmentally sensitive areas such as forest reserves, nature reserves and national parks.

4.3 Institutional Framework

At present there are over twenty (20) institutions and departments which deal with environmental issues in Kenya. Some of the key institutions include the National Environmental Council (NEC), National Environment Management Authority (NEMA), the Kenya Bureau of Standards, the Motor Vehicle Inspection Unit (MVIU) and the Kenya Wildlife Services (KWS) among others.

4.3.1 The National Environment Management Authority (NEMA)

This is the government authority charged with the general supervision and coordination of all environmental matters in the Kenya. NEMA is the principal instrument of the government in the implementation of all policies relating to the environment. The authority is a creature of the Environmental Management and Coordination Act (EMCA) that came into effect on the 14th of January, year 2000.

Among others, the functions of NEMA are:

a) to coordinate various environmental management activities undertaken by lead agencies;

b) to promote the integration of environmental considerations into development actions with a view to ensuring proper management and rational utilization of environmental resources on a sustainable yield basis for the improvement of quality of life;

c) to advise the government on legislative and other measures for the management of the environment or the implementation of various international conventions, treaties and agreements in the field of environment;

d) to identify development actions for which environmental audit and monitoring must be conducted under the Act;

e) to assess and monitor activities to ensure that the environment is not degraded by such activities, that environmental management objectives are adhered to and adequate early warning on impending environmental emergencies is given;

f) to cooperate with relevant lead agencies on environmental education and enhancement of public awareness on environmental protection;

g) to prepare and issue an annual report on the state of the environment in Kenya

Under EMCA, NEMA may delegate any of its powers on the performance of any of its functions to Provincial and District Environment Committees; NEMA officers (such as the District Environment Officers); its employees or agents. NEMA is headed by a Director General (DG) who is appointed by the president.

4.3.2 The National Environment Council (NEC)

The National Environment Council is the highest organ in matters relating to the environment in Kenya. NEC is chaired by the Cabinet secretary for Environment, Water and Natural Resources.

The functions of NEC are:

a) Environmental policy formulation and directions;

b) Setting national goals and objectives and determining policies and priorities for the protection of the environment;

c) Promoting co-operation among public departments, local authorities, private sector, NGOs and such other organizations engaged in environmental protection programmes; and

d) Performing such other functions as are assigned under EMCA

4.3.3 The Public Complaints Committee (PCC)

The Public Complaints Committee is created under Section 31 of EMCA, 1999. The PCC is chaired by a person qualified for appointment as a Judge of the High Court of Kenya, who is appointed by the Cabinet secretary for Environment, Water and Natural Resources.

The function of the PCC are:

(a) to investigate –

(i) any allegations or complaints against any person or against NEMA in relation to the condition of the environment in Kenya;

(ii) on its own motion, any suspected case of environmental degradation, and to make a report of its findings together with its recommendation thereon to the NEC.

(b) to prepare and submit to NEC, periodic reports of its activities which form part of the SoE annual report

(c) to perform such other functions and exercise such powers as may be assigned to it by the National Environment Council.

4.3.4 The National Environment Tribunal (NET)

The National Environment Tribunal is created by Section 125 of EMCA, 1999. NET is chaired by a person nominated by the Judicial Service Commission, qualified for appointment as a judge of the High Court of Kenya;

The NET hears appeals against:

(a) Refusal to grant a licence or to the transfer of a licence under EMCA or regulations made thereunder;

(b) The imposition of any condition, limitation or restriction on a licence issued under EMCA or regulations made thereunder;

(c) The revocation, suspension or variation of a licence under EMCA or regulations made thereunder;

(d) The amount of money required to be paid as fees under EMCA or regulations made thereunder;

(e) The imposition against an environmental restoration order or environmental improvement order by NEMA under EMCA or regulations made thereunder.

4.3.5 The Mines and Geology Department

This is a department under the Ministry of Environment, Water and Natural Resources. The Department is headed by the Commissioner of Mines and Geology. It is divided into Mining and Geology Divisions.

The Mandate of the department includes:

- Carrying out geological survey and research
- Maintenance of Geo-scientific database and information
- Administration of legislation relating to mineral resources development
- Mining and mining policy formulation

- Advising the Government on mineral policy matters
- Supervision of quarry and mine safety
- Security of commercial explosives

4.3.6 The Kilifi County Government

This is the county in which the Athi River Cement Company operates. Athi River Cement Company is expected to comply with the applicable county regulations.

4.3.7 The Directorate of Occupational Safety and Health Services (DOSHS)

This is the Government directorate tasked with enforcing the Occupational Safety and Health Act, 2007, which is an Act of Parliament to provide for the safety, health and welfare of workers and all persons lawfully present at workplaces, to provide for the establishment of the National Council for Occupational Safety and Health and for connected purposes.

4.4 Regulatory Framework

A number of legislations and regulations address the environment and motor vehicle sector in Kenya. These among others include:

4.4.1 The Mining Act, CAP 306 of 1940

This is Act of Parliament to consolidate the law relating to mining. According to this Act, "minerals" means all minerals and mineral substances, other than mineral oil as defined in the Mineral Oil Act, and may be precious metals, precious stones or non-precious minerals, but save for the purposes of Part V of this Act and of the Mining (Safety) Regulations, does not include clay, murram, limestone, sandstone or other stone or such other common mineral substances as the Minister may by notice in the Gazette declare not to be minerals for the purposes of this Act always provided these do not contain any precious metal or precious stone in economically workable quantities.

Under Section 4 of the Mining Act, all unextracted minerals (other than common minerals) under or upon any land are vested in the Government, subject to any rights in respect thereof which, by or under this Act or any other written law, have been or are granted, or recognized as being vested, in any other person.

According to section 6 (1) of this Act, except as in this Act provided, any person who prospects or mines on any land in Kenya shall be guilty of an offence and liable to a fine of two thousand shillings or to imprisonment for a term not exceeding six months and to the forfeiture of all minerals obtained in the course of such unauthorized prospecting or mining, or, if such minerals cannot be forfeited, to the payment to the Government of such sum as the court assesses as the value of such minerals.

Under Section 7 (1), the following classes of land are (save where otherwise in this Act provided) excluded from prospecting and mining -

(a) land dedicated or set apart as a place of burial or for any public purpose other than mining, except with the consent of the Minister in the case of Government land or, in the case of other land, the person or authority in whom the land is vested;

(b) any area situated within any municipality or township or trading center, except with the consent of the owner or holder of the surface rights and of the municipal or other authority exercising control thereof;

(c) land held under grant or lease giving the holder rights of working the minerals, non-precious minerals, precious metals and precious stones, save by the holder thereof:

Provided that any prospecting or mining operations carried on by such holder shall be subject to the provisions of Part V in so far as

they are applicable and to the provisions of the Mining (Safety) Regulations;

(d) any area over which exclusive prospecting or mining rights have previously been granted by or on behalf of the Government and are still subsisting and any area in respect of which an application for such rights in the prescribed form has been accepted for consideration and has not been subsequently rejected or withdrawn;

(e) land reserved for the purpose of any railway or situated within one hundred metres of any railway, except with the consent of the Kenya Railways Corporation;

(f) any area which is the site of or is within one hundred metres of any dam, canal, reservoir or building belonging to the Government or a county council, except with the consent of the Minister or of the county council, as the case may be;

(g) the site of any public street, road or highway and any land which is gazetted as a road reserve or otherwise reserved for the purposes of any public street, road or highway, except with the consent of the Minister or of the local authority or other public body having the control thereof,

(h) salt licks;

(i) Trust land, except with the consent in writing of the county council within whose area of jurisdiction the land is situated;

(j) land which the Commissioner may by notice in the Gazette declare to be excluded from prospecting and mining;

(k) any area which is the site of or is within five hundred metres of the nearest boundary of any public aerodrome or landing ground, except with the permission of the Minister;

(l) any land in or within one hundred metres of any monument or protected area declared or deemed to have been declared as such by the Minister under the National Museums and Heritage Act.

(m) lands which are within the boundaries of an area over which an exclusive prospecting licence has been granted, and

  (i) which at the time when such exclusive prospecting licence was granted were either areas over which exclusive prospecting or mining rights had been previously granted and were still subsisting, but which have since the grant of such exclusive prospecting licence been abandoned, cancelled, forfeited or otherwise lapsed, or were areas in respect of which an application in the prescribed form for any such rights had been accepted for consideration and have since the grant of such exclusive prospecting licence been abandoned, cancelled, forfeited or otherwise lapsed; or

  (ii) over which the holder of such exclusive prospecting licence has during the existence of such licence obtained location, lease or other mining rights and which rights have also during the existence of such licence been abandoned, cancelled, forfeited or otherwise allowed to lapse, save in each case by the holder of such exclusive prospecting licence;

(n) private lands, except with the consent of the owner thereof.

According to section 7 (2) should any question arise as to whether any particular land is excluded under this section, it shall be referred to the Minister, whose decision shall be final and conclusive.

Under 7 (3) of the Act, where any consent required under subsection (1) is unreasonably withheld or the Minister considers that any withholding of consent is contrary to the national interest, the Minister may take such steps as are necessary under the law relating to the compulsory acquisition of land or rights or interests in land to vest the land or area in question, or rights or interests in such land or area, in the Government or on behalf of the Government; and thereafter such land or area shall cease to be land excluded from prospecting and mining under subsection (l).

According to Section 25 of the Act, when the holder of any exclusive prospecting licence or location granted under this Act discovers on any land comprised in such licence or location any minerals of economic value other than those for which the licence was granted or location was registered, he shall immediately report the discovery thereof to the Commissioner of Mines and Geology.

Under section 28. (1), when any holder of a prospecting right or exclusive prospecting licence pegs a location in the manner prescribed, on land not excluded from prospecting or mining in accordance with the provisions of this Act and of the regulations, he shall within thirty days thereafter apply in the manner prescribed for registration, and shall state the class of the location pegged:

Provided that the Commissioner may in writing for good and sufficient cause extend such period.

Under 28 (2) if, the application is in accordance with the provisions of this Act and of the regulations, the Commissioner or officer authorized by him shall register the location.

According to section 28 (3) any person failing to apply for the registration of a location within the period authorized shall forfeit all rights in respect thereof and shall, if he works or mines on such a location, incur the penalty prescribed by section 6.

According to section 35 (1) (a) of the Mining Act, the holder of a registered location or exclusive prospecting licence may abandon the whole or any part of abandonment the area comprised therein by notification to the Commissioner in writing, and on receipt of such notification the Commissioner shall publish in the Gazette notice of such abandonment, and such notice shall be deemed to be valid and sufficient proof of such abandonment. Under 35 (1) (b) in the event of the abandonment of a portion only of the area comprised in a location or in an exclusive prospecting licence, the remainder thereof shall be re-beaconed in accordance with the directions of the Commissioner.

Under Section 35 (2) (a) any person who abandons his location or any part thereof, or his exclusive prospecting licence area or any part thereof, and any person whose location or any part thereof, or exclusive prospecting licence area or any part thereof, has been forfeited, shall, in such a manner as to prevent persons or stock other than dogs or poultry inadvertently entering them, forthwith fill up, or secure to the satisfaction of the Commissioner, all shafts, pits, holes and excavations and remove all notices, beacons and boundary posts thereon, and in default of so doing shall be guilty of an offence and liable to a fine of one thousand shillings or to imprisonment for a term not exceeding three months, and in addition shall be liable to pay such sum as the Commissioner may certify the cost of doing so will be.

According to Section 73 of the Act, every person in charge of prospecting or mining operations shall, as soon as practicable after the occurrence of any accident in connection with prospecting or mining operations which either causes loss of life to any person or causes any fracture, dislocation or other serious personal injury, or other personal injury likely to have serious effects to any person, report in writing the facts of the matter so far as they be, or ought to be known to him to the District Commissioner of the district in which the accident occurred and to the nearest officer of the Mines and Geological Department; any person who fails to comply with the provisions of this section shall be guilty of an offence.

4.4.2 The Environmental Management and Coordination Act (EMCA), 1999

EMCA is an Act of parliament to provide for the establishment of an appropriate legal and institutional framework for the management of the environment. EMCA provides every person in Kenya with the right to a clean and healthy environment. The Act states that every person has the responsibility to protect and manage the environment.

EMCA defines the role of Environmental Impact Assessment (EIA) as a tool to maintain environmental integrity. Under the Act, projects likely to impact negatively on the environment must be subjected to EIA.

Section 58 (1) of the Act states that *"Notwithstanding any approval, permit or licence granted under this Act or any other law in force in Kenya, any person, being a proponent of the project, shall, before financing, commencing, proceeding with, carrying out, executing or conducting or causing to be financed, commenced, proceeded with, carried out, executed or conducted by another person any undertaking specified in the second schedule to this Act, submit a project report to the Authority [NEMA) in the prescribed form, giving the prescribed information and which shall be accompanied by the prescribed fee".*

Part (2) of section 58 states *"the proponent of a project shall undertake or cause to be undertaken at his own expense an Environmental Impact Assessment study and prepare a report thereof where the authority, being satisfied after studying the project report submitted under subsection (1) that the intended project is likely to have or will have a significant impact on the environment, so directs".* The second schedule of the Act details the types of projects for which an EIA must be carried out.

4.4.3 The Environmental (Impact Assessment and Audit) Regulations 2003

These regulations were made by the Minister for Environment and Natural Resources in June 2003 in exercise of the powers conferred by section 147 of the Environmental Management and Coordination Act. The regulations apply to all policies, plans, programmes, projects and activities in Part IV, V and the Second Schedule of the Act. According to section 4 (1) of these regulations, no proponent shall implement a project likely to have a negative environmental impact or for which an Environmental Impact Assessment is required under the Act or under these Regulations unless an EIA has been concluded and approved in accordance with these regulations. According to these regulations, no licensing authority under any law in force in Kenya shall issue a trading, commercial or development permit or licence for any project for which an environmental impact assessment is required under the Act unless the applicant produces to the licensing authority a licence of environmental impact assessment issued by the Authority (NEMA) under these regulations.

Section 6 of these regulations state that an application for an EIA license shall be in the form of a project report in Form 1 set out in the First Schedule to these regulations, and the applicant shall submit the application together with the prescribed fee to the Authority or the Authority's appointed agent in the District where the project is to be undertaken.

Section 7 (2) states that in preparing a project report under this regulation, the proponent shall pay particular attention to the issues specified in the Second schedule to these regulations. Section (11) states that an environmental Impact Assessment study shall be conducted in accordance with the terms of reference developed during the scoping exercise by the proponent and approved by the Authority (NEMA). Section 13 requires that an environmental impact assessment shall be carried out by a lead expert qualified in accordance with the criteria of listing experts specified in the second schedule of the Act.

Section 17 (1) of the regulations state that during the process of conducting an environmental impact assessment study under these regulations, the proponent shall, in consultation with the Authority, seek views of persons who may be affected by the project. According to section 23 of these regulations, NEMA shall give its decision on an EIA study report within three months of receiving the report. Section (24) follows that where the Authority approves an EIA study report under regulation (23), it shall issue an EIA licence in Form 3 set out in the First schedule to these regulations on such terms and conditions as it may deem necessary.

Regulation (31) states that an environmental audit shall be undertaken for the following development activities which are likely to have adverse environmental impacts:

(a) ongoing projects commenced prior to coming into force of these regulations; or

(b) new projects undertaken after completion of an environmental impact assessment study report

Section 2 of regulation 31 states that an environmental audit shall, unless if it is a self auditing study under regulation 34, be conducted by a qualified and authorized environmental auditor or environmental inspector who shall be an expert or a Lead Expert registered in accordance with regulation 14.

4.4.4 The Environmental Management and Coordination (Waste Management) Regulations, 2006

These regulations were made by the Minister for Environment and Natural Resources on the 4th of September 2006 in exercise of the powers conferred by sections 92 and 147 of the Environmental Management and Coordination Act of 1999, and in consultation with relevant lead agencies.

Under Regulation 4 (1), no person shall dispose of any waste on a public highway, street, road, recreational area or in any public place except in a designated public receptacle.

Under Regulation 6, a waste generator shall segregate waste by separating hazardous waste from non-hazardous waste and shall dispose of such wastes in such facility as shall be provided by the relevant local authority.

Under Regulation 14 (1), every trade or industrial undertaking shall install at its premises anti pollution equipment for the treatment of waste emanating from such trade or industrial undertaking.

Under Regulation 18, every generator of hazardous waste shall ensure that every container or package for storing such waste is labeled in easily legible characters, written in both English and Kiswahili. The label shall contain the following information:

(a) the identity of hazardous waste;

(b) the name and address of the generator of waste;

(c) the net contents;

(d) the normal storage stability and methods of storage;

(e) the name and percentage of weight of active ingredients or half-life of radioactive material;

(f) warning of or caution statements which may include any of the following as appropriate –

  (i) the words “WARNING” or “CAUTION”;

  (ii) the word “POISON” (marked indelibly in red on a contrasting background); and

  (iii) the words “DANGER! KEEP AWAY FROM UNAUTHORIZED PERSONS”; and

  (iv) a pictogram of a skull and crossbones

(g) a statement of first aid measures, including the antidote when waste is inhaled, ingested or dermal contact and a direction that a physician must be contacted immediately;

The 4th schedule of these regulations lists categories of wastes that are considered hazardous.

The 3rd schedule gives the standard for the treatment and disposal of wastes including classification for incinerators and the standards, guidelines, criteria and procedure for installing and operating incinerators.

Under Regulation (5) (1), a waste generator shall minimize waste generated by adopting the following cleaner production methods:

(a) improvement of the production processes through;

  (i) conserving raw materials and energy;

  (ii) eliminating the use of toxic raw materials; and

  (iii) reducing toxic emissions and wastes

(b) monitoring the product cycle from beginning to the end by:

  (i) identifying and eliminating potential negative impacts of the product;

  (ii) enabling the recovery and re-use of the product where possible; and

  (iii) reclamation and recycling; and

(b) Incorporating environmental concerns into the design and disposal of the product.

4.4.5 The Environmental Management and Coordination (Water Quality) Regulations, 2006

These regulations were made by the Minister for Environment and Natural Resources on the 4th of September 2006 in exercise of the powers conferred by section 147 of the Environmental Management and Coordination Act of 1999, on the recommendation of NEMA and upon consultation with relevant lead agencies.

These regulations apply to drinking water, water used for industrial purposes, water used for agricultural purposes, water used for recreational purposes, water used for fisheries and wildlife and water used for any other purpose.

Under Regulation 4 (1), every person shall refrain from any act which directly or indirectly causes, or may cause immediate or subsequent water pollution, and shall be immaterial whether or not the water resource was polluted before the enactment of these Regulations.

Regulation 4 (2) states that no person shall throw or cause to flow into or near a resource any liquid, solid or gaseous substance or deposit any such substance in or near it, as tom cause pollution.

In Regulation (5), all sources of domestic water shall comply with the standards set out in the First schedule to these Regulations.

According to Regulation (6), no person shall -

(a) discharge any effluent from sewage treatment works, industry or any other point sources without a valid effluent discharge licence issued in accordance with the provisions of this Act;

(b) abstract ground water or carry out any activity near any lakes, rivers, streams, springs and wells that is likely to have any adverse impact on the quantity and quality of the water, without an EIA licence issued in accordance with the provisions of this Act; or

(c) Cultivate or undertake any development activity within full width of a river or a stream to a minimum of 6 meters and a maximum of 30 metres on either side based on the highest recorded flood level.

Under Regulation (11), no person shall discharge or apply any poison, toxic, noxious or obstructing matter, radioactive waste or other pollutants or permit any person to dump or discharge such matter into the aquatic environment unless such discharge, poison, toxic, noxious or obstructing matter, radioactive waste or pollutant complies with the standards set out in the Third Schedule to these Regulations.

Under Regulation 24, no person shall discharge or apply any poison, toxic, noxious or obstructing matter, radioactive wastes or other pollutants or permit any person to dump or discharge any such matter into water meant for fisheries, wildlife, recreational purposes or any other uses.

According to Regulations 25, no person shall use or allow to be used any natural water body for recreational purposes unless the water body meets the quality standards for recreational standards set out in the 10th Schedule to these regulations.

According to Regulation 27, any person who contravenes any of these Regulations commits an offence and shall be liable to a fine not exceeding five hundred thousand shillings.

The 1st Schedule of the Water Quality Regulations gives the quality standards for domestic water while the 3rd Schedule gives the standards for effluent discharge into the environment. The 5th Schedule gives the standards for effluent discharge into public sewers. The 9th and 10th Schedules give the quality standards for irrigation and recreation waters respectively.

4.4.6 The Environmental Management and Coordination (Noise and Excessive Vibration Pollution Control) Regulations, 2009

According to Regulation 3.(1), except as otherwise provided in these Regulations, no person shall make or cause to be made any loud, unreasonable, unnecessary or unusual noise that annoys, disturbs,

injures or endangers the comfort, repose, health or safety of others and the environment.

According to regulation 3 (2), in determining whether noise is loud, unreasonable, unnecessary or unusual, the following factors may be considered:

(a) Time of the day;

(b) Proximity to residential area;

(c) Whether the noise is recurrent, intermittent or constant;

(d) The level and intensity of the noise;

(e) Whether the noise has been enhanced in level or range by any type of electronic or mechanical means; and,

(f) Whether the noise can be controlled without much effort or expense to the person making the noise.

Under Regulation 4. (1) except as otherwise provided in these Regulations, no person shall-

(a) Make or cause to be made excessive vibrations that annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment;

(b) Cause to be made excessive vibrations that exceed 0.5 centimetres per second beyond any source, property boundary or 30 metres from any moving source**.**

Under Regulation (5), no person shall make, continue or cause to be made or continued any noise in excess of the noise levels set in the First Schedule to these regulations, unless such noise is reasonably necessary to the preservation of life, health, safety or property.

In line with Regulation 11 (1) any person wishing to-

(a) Operate or repair any machinery, motor vehicle, construction equipment or other equipment, pump, fan, air-conditioning apparatus or similar mechanical device; or (b) engage in any commercial or industrial activity, that is likely to emit noise or excessive vibrations shall carry out the activity or activities within the relevant levels prescribed in the First Schedule to these Regulations.

In accordance with Regulation 12 (1) no person shall operate a motor vehicle that (a) produces any loud and unusual sound; and (b) exceeds 84 dB (A) when accelerating. In addition, sub-Regulation (2) states that no person shall at any time sound the horn or other warning of a vehicle except when necessary to prevent an accident or an incident.

Under Regulation 13 (1) except for the purposes specified in sub-Regulation (2) there under, during night time hours, no person shall operate construction equipment (including but not limited to any pile driver, steam shovel, pneumatic hammer, derrick or steam or electric hoist) or perform any outside construction or repair work so as to emit noise in excess of the permissible levels as set out in the Second Schedule to these Regulations.

According to Regulation 16. (1) where a sound source is planned, installed or intended to be installed or modified by any person in a manner that such source will create or is likely to emit noise, or excessive vibrations, or otherwise fail to comply with the provisions of these Regulations, such person shall apply for a license to the Authority. In accordance with Regulation 19 (1), no person shall carry out activities such as fireworks, demolitions, firing ranges and specific heavy industry without a valid permit issued by the Authority.

Under Regulation (26), where there is continuous emission of noise or excessive vibration after the Environmental Inspector has issued an improvement notice, the Environmental Inspector may, with the approval of the Director General, and in consultation with the relevant lead agency, order the closure of an establishment or undertaking emitting such noise or excessive vibrations. According to Regulation (28), any person who contravenes any of the provisions of these Regulations, for which no penalty is stipulated, commits an offence and is liable, upon conviction, to a fine of not more than three hundred and fifty thousand shillings or to imprisonment for a term of not more than eighteen months or to both such fine and imprisonment.

The tables below show the maximum permissible noise limits for various areas.

Table (4.1): **First Schedule (Maximum permissible Intrusive Noise Levels)**

Zone		Sound Level Limits dB(A) (Leq,14 h)		Noise Rating Level (NR) (Leq,14 h)	
		Day	Night	Day	Night
A	Silent Zone	40	35	30	25
B	Places of worship	40	35	30	25
C	Residential (indoor)	45	35	35	25
	Residential (indoor)	50	35	40	25
D	Mixed residential (with some commercial and places of entertainment)	55	35	50	25
E	Commercial, 60 35 55 25	60	35	55	25

Time Frame: Day: 6.01 a.m. – 8.00 p.m. (Leq, 14 h) **Night:** 8.01 p.m. – 6.00 a.m. (Leq, 10h)

Table (4.2): **Second Schedule (Maximum permissible Noise Levels for construction sites)**

Facility		Maximum Noise Level Permitted (Leq) in dB(A)	
		Day	Night
(i)	Health facilities, educational institutions, homes for disabled etc.	60	35
(ii)	Residential	60	35
(iii)	Areas other than those prescribed in (i) and (ii)	75	65

Time Frame: Day: 6.01 a.m. – 6.00 p.m. (Leq, 14 h) Night: 6.01 p.m. – 6.00 a.m. (Leq, 14 h)

4.4.7 The Occupational Safety and Health Act, 2007

This is an Act of parliament to provide for the safety, health and welfare of workers and all persons lawfully present at workplaces, to provide for the establishment of the National Council for Occupational Safety and Health and for connected purposes. According to Section 3 (1), this legislation shall apply to all workplaces where any person is employed, whether permanently or temporarily.

Under Section 3 (2), the purpose of this Act is to:

a) secure the safety, health and welfare of persons at work; and

b) protect persons other than persons at work against risks to safety and health arising out of, or in connection with, the activities of persons at work.

Under Section 6 (1), every occupier shall ensure the safety, health and welfare at work of all persons working in his workplace. Under section 6 (3), every occupier shall carry out appropriate risk assessments in relation to the safety and health of persons employed, and on the basis of these results, adopt preventive and protective measures to ensure that under all conditions of their intended use, all chemicals, machinery, equipment, tools, and process under the control of the occupier are safe and without risk to health and comply with the

requirements of the safety and health provisions in this Act. Under 6 (4), every occupier shall send a copy of a report of risk assessment carried out under this section to the area occupational safety and health officer.

According to Section 6 (6), it is the duty of every occupier to register his workplace unless such workplace is exempted from registration under this Act.

Under section 7 (1) except in such cases as may be prescribed, it is the duty of every occupier to:

a) prepare and, as often as may be appropriate, revise a written statement of his general policy with respect to the safety and health at work of his employees and the organization and arrangements for the time being in force for carrying out that policy; and

b) to bring the statement and any revision of it to the notice of all his employees.

According to Section 13 (1) (c), every employee shall at all times wear or use any protective equipment or clothing provided by the employer for the purpose of preventing risks to his safety and health. Under Section 16 (1), no person shall engage in any improper activity or behavior at the workplace which might create or constitute a hazard to that person or any other person.

In accordance with Section 21, an employer or self employed person shall notify the area occupational safety and health officer of any accident, dangerous occurrence or occupational poisoning which has occurred at the workplace. Where an accident in a workplace causes the death of a person therein, the employer or self employed person shall –

a) inform the area occupational safety and health officer within 24 hours of the occurrence of the accident; and

b) send a written notice of the accident in the prescribed form to the area occupational safety and health officer within 7 days of occurrence of the accident.

Under Section 47 (1), every workplace shall be kept in a clean state, and free from effluvia arising from any drain, sanitary convenience or nuisance. In accordance with section 52 (1), sufficient and suitable sanitary conveniences for the persons employed in the workplace shall be provided, maintained and kept clean, and effective provision shall be made for lighting the conveniences; and where persons of both sexes are or are intended to be employed (except in the case of workplaces where the only persons employed are members of the same family dwelling there), such conveniences shall afford proper separate accommodation for persons of each sex.

Under section 78 (1), all stocks of highly inflammable substances shall be kept either in a fire resisting store or in a safe place outside any occupied building, provided that no such store shall be so situated as to endanger the means of escape from the workplace or from any other part thereof in the event of fire occurring in the store.

Under Section 81 (1), in every workplace or workroom, there shall be –

a) provided and maintained, and conspicuously displayed and free from any obstruction so as to be readily accessible, means for extinguishing fire, which shall be adequate and suitable having regard to the circumstances of each case; and

b) present, persons trained in the correct use of such means of extinguishing fire during all working hours.

Under 81 (2), every workplace shall be provided with adequate means of escape, in case of fire, for persons employed therein, having regard to the circumstances of each case. Under 82 (1), every occupier of a workplace shall design evacuation procedures to be used during any emergency and have the procedures tested at regular intervals.

CHAPTER 5 FIVE

5.0 Study Findings

5.1 Results of Public and Stakeholders Consultation

5.1.1 Results of household survey

a) Negative impacts of the activities of Athi River Cement Company

From the household survey conducted on the environmental, health and safety impacts of Athi River Cement Company on the community neighbouring the company, 100% (29) of the respondents said that the activities of Athi River Cement Ltd were affecting the environment and the people negatively.

The respondents cited numerous negative impacts arising from the quarrying, raw material transport and cement manufacturing activities at Athi River Cement Company. 68.97% of the respondents said that the company's activities were generating noise that had resulted in hearing problems, sleep disturbance, caused fear and panic and also affected learning in nearby schools. 41.38% of the respondents cited excessive vibrations from explosives used in quarrying, which had caused damages to houses and other structures such as pit latrines. Some houses and structures had collapsed due to these vibrations. Nearly all respondents (93.1%) said that the company's quarrying and cement manufacturing activities were generating dust which was had caused respiratory problems, allergic reactions on body (itching) as well as air pollution. 20.69% of the respondents said that flying rocks from blasting activity at the quarry had effected safety of people and destroyed structures such as roofs.

Some of the respondents (20.69%) said that the cement factory was generating obnoxious emissions including smoke that were causing air pollution.

The activities of Athi River Cement Company were negatively affecting water through destruction of rivers and springs, change of water courses and pollution of water from discharge of effluent and settling of dust on water bodies. Dust from the cement company was also causing contamination of rainwater, hence making it unsafe for people and animals. This is according to responses from 82.76% of the respondents. According to two of the respondents, quarrying activities at Chauringo had completely stopped a stream called Bekadzinga, which the local community has been dependent on over the years.

According to 41.38% of the respondents, the activities of Athi River Cement Company has also negatively impacted on animal health and safety. The respondents cited death of animals due to consumption of

contaminated vegetation and inhalation of harmful pollutants. In fact one of the respondents from Kikomani village in Mwandodo village of Kambe location said that he had lost three of his goats after they consumed vegetation covered with cement dust.

Vegetation, including trees and crops, was also being negatively affected by the activities of the Athi River Cement Company according to 55.17% of the respondents. One of the negative impacts on vegetation cited was lowering of quality of farm produce (vegetables and coconuts), to the extent of rendering some of the produce not edible due to deposition of dust on surface of parts consumed. Some coconut plants had been rendered unproductive due to dust deposition according to some of the respondents.

Some of the activities at the Athi River Cement quarries had caused displacement of people either from their homes or disrupted their activities during blasting according to 10.34% of the respondents. According to a villager from M'Buyuni village of Maereni location, flying stones from quarrying often cause people to leave their residences and run for their safety.

Transportation of raw material from the quarrying to the cement factory using trucks has caused damage to local roads according to 20.69% of the respondents. In the words of one of the villagers from Maereni Village, the haul road connecting the cement factory and quarry is poor because of 24-hour use by Athi River Cement company's trucks.

Activities of Athi River Cement Company, particularly quarrying, had affected biodiversity and habitats according to 31.03% of the respondents. A villager from Mwandodo cited disturbances of the ecosystem while another villager from Pagane (Maereni) said that hideouts for snakes were being continuously destroyed, forcing the creatures to scatter into human residences.

Safety issues including open quarry pits, falling rocks from lorries and exposure of factory and quarry workers to various hazards were also cited by 20.69% of the respondents as some of negative effects from the activities of Athi River Cement Company. A village elder from Maereni village said that along the road from the quarry to the factory, pieces of stone regularly fall off transport trucks due to overloading.

Some activities of Athi River Cement company had resulted in destruction of traditional cultural sites according to 6.9% of the respondents. According to two villagers from Maereni, traditional cultural and ritual sites such as Bekadzinga and Ditsoni had been destroyed by quarrying activities of Athi River Cement Company.

The other negative impacts of the activities of Athi River Cement company cited by the villagers were increase in immorality or prostitution according to 3.45% of the respondents, increased in petty crime (theft) according to 3.45% of the respondents, contamination of the soil and soil infertility (13.79%), increase in road accidents (10.34%) and corrosion of iron sheet roofs (6. 9%).

b) Mitigation of negative impacts by Athi River Cement Company

As to whether Athi River Cement Company was doing anything to mitigate the negative impacts of its operations on the environment and on the safety and health of the communities living in its neighbourhood, the household survey found that the company was not doing much to mitigate the negative impacts. 93% of the respondents said that Athi River Cement Company was not doing anything to mitigate the negative impacts of its operations while a minority 7% said that the company had installed dust arrestors in the factory and was sprinkling water on dusty road surfaces.

c) Further measures that ARC Athi River Cement Company should undertake for mitigation of negative Impacts

The respondents (villagers) gave various recommendations on the measures that Athi River Cement Company ought to undertake to further mitigate the negative environmental, health and safety impacts of its operations. The recommendations were:

- The company should stop quarrying completely (by 10.34% of the respondents)

- The company should close down the factory completely owing to pollution arising from it (by 7% of the respondents)
- Quarrying should not be done near the streams and cultural sites (7% of the respondents)
- No new quarries should be opened in the area after the current ones are decommissioned (3.4% of the respondents)
- Athi River Cement Company should invest in better, less polluting equipment and technology including modern safer blasting technology (34.48% of the respondents)
- Company should ensure that equipment used at the factory are well maintained (3.4% of the respondents)
- The company should invest in water sprinklers to settle dust coming from its operations (7% of the respondents)
- Athi River Cement Company ought to compensate people that are affected by its operations, including those who have lost crops and livestock (17.24% of the respondents)
- The company should make arrangements to ensure that persons whose health has been affected by its operations are treated (17.24% of the respondents).

In order to mitigate the impacts of transportation of raw materials from the quarries to the factory, 13.79% of the respondents recommended that company should tarmac the road linking quarries and factory. To ensure safety of people and animals in the area, 3.4% of the respondents recommended that the company should erect a perimeter fence around open quarries while 7% of the respondents recommended that the company should cover open pits. 3.4% of the respondents recommended that the company should not overload trucks transporting raw materials to the factories. 10.34% of the respondents recommended that the company should erect high walls around its properties to contain adverse impacts.

The other recommendations given by respondents were installation of dust arrestors (41.38%), full compliance with applicable legislation (10.34%) and safe storage of coal in a closed area as opposed to open yard (3.4%). The company should borrow and implement best practices from other cement companies such as Bamburi cement according to 3.4% of the respondents.

d) Positive contributions being made by Athi River Cement Company

From the household survey, most of the respondents (89.66%) said that Athi River Cement Company had not made any positive contribution to the local community. However, 10.34% of the respondents said that the company had made some positive contributions including:

- Planting of trees and compensation of affected people (almost six years ago)
- Providing assistance to educational institutions by building class rooms and fences
- Provision of clean water to communities in Ndolwa area.

e) General comments about Athi River Cement Company's operations with regard to environmental, health and safety impacts

The matrix below summarizes the general comments given by respondents during the household survey on the environmental, health and safety impacts of the activities of Athi River Cement Company.

Table (5.1): **General comments from villagers**

Comment	% of respondents
Company must be compelled to comply with all applicable environmental, health and safety legislation	55.17
Company should be closed down in case of failure to comply with relevant legislation	24.13
Company should examine and treat affected persons	37.93
Company should compensate affected people	48.28
Company should acquire proper equipment e.g. dust arrestors	13.79
Company should improve local roads including tarmacking	13.79
Standard of living in the area has been lowered though interference with economic activities by company activities	3.45
Company should pay workers well	3.45
Company should provide transport to workers	3.45
Company should employ casual workers who have worked for many permanently	3.45
Company should ensure continued consultation with the community	3.45
Company should give periodic allowances to local community to cater for illnesses caused by its operations	3.45
Company should provide free clinical services to residents around its factory	3.45
Company should stop dubious purchase of land from local community members	3.45
Company has created employment in the area	3.45
Company should improve working conditions and pay for the workers	7
Company should assist community groups to start IGAs	3.45
Company should employ more youth from the area	3.45
Company should provide crossing points for children along roads to prevent accidents	3.45
Company should pay workers who started with the company their dues that remain unpaid	3.45

5.1.2 Results of key informants' consultation

As part of this study, other stakeholders (key informants) including National Government and County Government officers in Kilifi County were consulted through questionnaires. This section summarizes findings from consultation of these stakeholders

a) Familiarity with operations of Athi River Cement Company

All the key informants (stakeholders) consulted from the Kilifi County Public Health Office, NEMA, KFS, Ministry of Agriculture, Livestock and Fisheries, Kilifi County Government Environment Department and the Department of Mines and Geology said that were familiar with the operations at Athi River Cement Company.

b) On negative effects of the operations of Athi River Cement Company on the environment and local community

All the six key informants said that the operations of Athi River Cement Company were affecting the environment and local community negatively. Five (83.33%) of the key informants said that the company was generating dust from the factory, quarry and from road transport, which was causing pollution and diseases. Half of the informants cited noise from blasting (quarrying) and from machines used at the company while 50% of the informants said that damages had occurred to houses due to vibrations and dust on roofs. The dust from the company operations has led to increase of respiratory diseases such as asthma according to three out of the six respondents. One of the key informants (the County Ecosystem Conservator) said that the company's operations had led to partial loss of vegetation.

Two of the key informants said that the company operations had negatively impacted on farm (crops and livestock) productivity in the area while one of the informants said that the company transportation activity had resulted in damage to roads.

The other negative impacts cited by the key informants were water pollution (16.67%) and air pollution from processing and fugitive emissions (33.33%).

c) On specific regulatory requirements that Athi River Cement Company is required to comply with and status of compliance

The following were the regulatory requirements were cited as applicable to the operations of Athi River Cement Company. The table below also shows status of compliance by the company according to feedback from the respective key informants.

Table (5.2): **Regulatory requirements and status of compliance**

Regulation	Requirement	Status of compliance
Occupational Safety and Health Act (2007)	Safe and healthy workplace	No fully compliant as factory is not doing enough to contain dust
Public Health Act (Chapter 242)	Ensure that operations do not negatively affect public health	No fully compliant as factory is not doing enough to contain dust
Environmental Management and Coordination Act (1999) and its subsidiary legislations	• Annual environmental audit • Rehabilitation of degraded working sites	• Company conducts annual environmental audits, but has not fully implemented improvement orders from NEMA • There is nothing to show that company has been rehabilitating degraded sites
County Government of Kilifi by-laws	Single business permit and payment of quarry cess	Company has been complying
Farm forestry rules	Afforestation	Company has large tree nurseries and has been partnering with KFS on tree planting in the whole of Kaloleni/Rabai sub-county.

d) On whether Athi River Cement Company was doing enough to mitigate the negative impacts of its activities

Five out of six key informants said that Athi River Cement Company was not doing enough to mitigate the negative impacts of its activities on the environment and on the people in the affected area.

e) On further measures that Athi River Cement Company should undertake to mitigate negative impacts of its activities on the people and the environment

The following further measures were suggested by the key informants:

i) Compensation to affected residents for damaged property

ii) Creation of a buffer zone between the residences and the factory

iii) Support to students from county who excel in education

iv) Improvement of health related infrastructure

v) Planting of more trees

vi) Sprinkling of water before excavation

vii) Installation of effective dust arrestors

viii) Undertaking of appropriate measures to reduce noise further

ix) Payment of more cess to the county government

f) On whether Athi River Cement Company is making any positive contribution to the protection of the environment and/or improvement of livelihoods of local community members

Three out of the six key informants said that Athi River Cement Company was not making any positive contribution to the protection of the environment or improvement of livelihoods of the local community. One of the key informants said that he was not sure if the company was making any positive contribution. However, two of the key informants said that the company had made positive contributions including.

The positive contributions cited by the key informants were:

i) Tree planting and donation of seedlings to local institutions

ii) Creation of jobs

iii) Generation of revenue to the Kilifi County Government

iv) Provision of cheap building materials

v) Provision of scholarships to area residents

vi) Exploitation of natural resources (development of the mining sector)

g) General comments about Athi River Cement Company's operations with regard to environmental, health and safety impacts

The table below summarizes general comments given by the key informants about the environmental, health and safety impacts of Athi River Cement Company.

Table (5.3): **General comments by the key informants**

Key informant (Office)	Comments
County Director of Environment (County Environment Officer)	• It would be prudent for the company to invest in relocation of thee residents adjacent to it in order to create a buffer zone that can absorb the impacts related to their operations
County Director of Agriculture	• The company should visit other cement companies to see/copy what they do to minimize dust emission to the environment
District Public Health Office	• The company should consider remedies for damaged property • It should also improve educational performance by supporting students from the county to excel in their examinations • Company should also improve health related infrastructure
Ecosystem Conservator, Kilifi County (Kenya Forest Service)	• Where there is development, you expect some negative impacts on the environment and health, but with time these issues will be addressed • The gains the company has made to the community socio-economy outstrips the negative impacts

Key informant (Office)	Comments
Mines and Geology Department	• Any mining activities come with consequences and the people should have been moved further away before initial mining started (i.e. zoning of mining areas)
Kilifi County Government (Environment Department)	• More consultations involving all stakeholders should be done • Assessment of the damage done to the environment should be done and those affected compensated • More needs to be done by Athi River Cement company to reduce dust

5.2 Results of Environmental Analysis

5.2.1 Results of Air Quality Analysis

The table below summarizes results of air quality analysis from air analyzed from a few metres outside the perimeter wall of the Athi River Cement Company.

Table (5.4): **Results of air quality analysis**

Parameter	Unit	Results	Tolerant values (mg/Nm^3)	Limit level
Hydrogen Sulphide (H_2S)	mg/Nm^3	1.04	No tolerant limit values provided	
Sulphur dioxide (SO_2)	mg/Nm^3	3.08	125	Annual average value of 80 µg/m^3
Sulphur Trioxide (SO3)	mg/Nm^3	0.22	125	Annual average value of 80 µg/m^3
Nitrogen dioxide (NO_2)	µg/Nm^3	<0.01	100	Annual average value of 150 µg/m^3
Nitrogen Trioxide (NO_3)	mg/Nm^3	<0.01	50	
Hydrocarbons (HC's)	mg/Nm^3	108	700	
Particulate Matter	mg/m^3	103	70	

The above results show that the levels of Hydrogen Sulphide (H_2S), Sulphur dioxide (SO_2), Sulphur Trioxide (SO_3), Nitrogen dioxide (NO_2), Nitrogen Trioxide (NO_3), Hydrocarbons (HC's) from the air samples taken from the neighbourhood of Athi River Cement factory were within the limits (tolerant values) specified in the Environmental Management and Coordination Act (Draft Air Quality) Regulations 2009. However, the level of Particulate Matter was above the tolerant limit values. Although the levels of H_2S, SO_2, SO_3, NO_2, NO_3 and HC's were found to be within the tolerant values, on a precautionary note, these gases could build up over time and cumulatively pose potential adverse effects.

5.2.2 Results of Noise Level Measurements

a) Noise levels from factory to the surrounding

The table below summarizes results of noise level measurement conducted outside the perimeter wall of the Athi River Cement Company factory.

The results show that the noise levels were above the maximum permissible noise levels for residential areas with reference to the First Schedule to the Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009.

b) Noise levels from quarrying activity

Although quarrying was taking place at the ARC's Chauringo quarry at the time of the study, no noise level measurements were conducted since the study team was not able to access the quarry site. Moreover, there was no blasting conducted by the company in the period that the study team was on the ground; hence it was not possible to capture noise levels from blasting at the quarries.

However, in order to obtain data on noise levels associated with quarrying activity at the ARC quarry, reference was made to the annual (self) environmental audit of the Athi River Cement Company that was conducted in December 2012.

The results of noise level measurements from the environmental audit report ranged from 100 dB to 114 dB with measurements taken at least 300 metres from the point of blasting (quarry). These results show that the noise levels from blasting activity at the Athi River Cement quarry were above the maximum permissible noise levels (of 109 dB) for mines and quarries with measurements taken within the facility (source of noise), with reference to the Second Schedule to the Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations,2009.

Results of noise level measurements taken from Environmental Audit report are annexed .

Table (5.5): **Results of noise level measurement**

Area/Point/Position	Results		Sound Level Limits dB(A)		Remarks
	Low dB(A)	High dB(A)	Day	Night	
Point 1: Behind the factory (perimeter wall) - Western boundary	51.1	65.5	50	35	Reference made to LN 61 of 8th April, 2009 (1st Schedule)
Point 2: North western boundary of perimeter fence (construction activity going on)	80.2	63.4	60	35	Reference made to LN 61 of 8th April, 2009 (2nd Schedule)

5.2.3 Results of Water Quality Analysis

Two samples of water were taken for analysis in a NEMA-registered laboratory. One sample was taken from a stream called Jongani in Kaya Kambe forest, about 400 metres from the Chauringo Quarry. Another sample was taken from a wetland (actually a spring) outside the northwestern boundary of Athi River Cement company plant.

a) Jongani stream water sample analysis results

At the time of sampling the water in the Jongani stream appeared turbid and laden with cement dust as shown in the photograph below:

Fig (5.1): Physically turbid Jongani stream.

With regard to aesthetic quality of the water sample, the levels of Total Dissolves Solids (TDS) and Suspended Matter in the sample of water from the Jongani stream were above the limits specified in the KEBS standards for drinking water at 1090mg/l and 22 mg/l respectively.

With regard to inorganic contaminants in the water sample, the levels of Ca, Na, Mn and Cl in the sample of water from the Jongani stream were above the limits specified in the KEBS standards for drinking water at 196.34mg/l; 455.73 mg/l; 2.33 mg/l and 427.67 mg/l respectively.

With regard to microbiological contaminants in the water sample, the level of TVC was higher than that specified in the KEBS standards for drinking water at 5700 cfu/ml. In addition, the sample had total coliforms at 270 cfu/ml and Escherichia coli at 100 cfu/ml.

b) Wetland water sample analysis results

With regard to aesthetic quality of the water sample, the Suspended Matter in the sample of water was above the limit specified in the KEBS standards for drinking water at 12 mg/l.

With regard to inorganic contaminants in the water sample, the level of Ca in the sample of water from the wetland was above the limits specified in the KEBS standards for drinking water at 229.76 mg/l.

With regard to microbiological contaminants in the water sample, the level of TVC was higher than that specified in the KEBS standards for drinking water at 2400 cfu/ml. In addition, the sample had total coliforms at 100 cfu/ml and Escherichia coli at 60 cfu/ml.

5.2.4 Results of Soil Quality Analysis

Results of analysis of a soil sample taken from Mr. Bidii's farm outside the western perimeter wall of Athi River Cement company showed that the soil sample had a slightly high level of Iron with respect to inorganic contaminants. The analysis also showed that the soil sample had high levels of pH and Ca^{2+} at 8.34 ppm and 4270 ppm respectively. The analysis further showed that the soil sample had low levels of K^{+}, $Mg^{2+,}$ Fe, Mn, Zn and Cu at 43.0 ppm, 7.0 ppm, 0.1 ppm, <0.001 ppm, <0.001 ppm and <0.001 ppm respectively. The reference values used in soil analysis were quoted from the University of Connecticut Plant Science Department.

5.2.5 Results of Crop Leaf Tests

A maize plant leaf was taken from Mr. Bidii's farm outside the western perimeter wall of Athi River Cement Company. The results of the maize leaf chemical analysis of foliar at 1:10 volume extract showed that the plant had low levels of K^{+}, $Ca^{2+,}$ $Mg^{2+,}$ Fe, Zn, Cu and Mn at 0.10%, 0.05%, 0.005%, 9.31%, 0.33 mg/kg, <0.001 mg/kg and 0.07 mg/Kg respectively. The reference values used in maize foliar analysis were quoted from Pest Notes, University of California Agriculture and Natural Resources Department.

5.3 Results of Medical Examinations

As part of the study, medical examinations were conducted on 21 randomly selected villagers in the immediate neighbourhood Athi River Cement Company. The villagers were of varying ages and were from either gender. Three types of medical examination were done. These were spirometry, chest x-rays and clinical examination.

From the medical examinations, it was found 17 of the 21 (80.95%) villagers examined had symptoms in the respiratory system and eyes attributable to silica dust according to the examining doctor's report. According to the medical report, the common health problems diagnosed were:

- Restrictive lung disease
- Bilateral conjunctivitis

- Allergic conjunctivitis
- Mild silicosis
- Fibrosis

A full medical examination report is appended.

5.4 Significant Adverse Environmental, Health and Safety Impacts and Risks

This study identified the following significant adverse Environmental, Health and Safety impacts arising from the activities of Athi River Cement Company on the environment and communities neighbouring the company's quarry and factory.

a) Air pollution

From physical observation, air quality analysis, medical examinations, literature review and consultation of local community members and other stakeholders, pollution of air by dust is a significant impact of the operations of the Athi River Cement factory. The sources of dust are quarrying (during blasting), transportation (road dust) and cement factory dust. The dust is impacting adversely on human health as evidenced by medical examination and on animal heath as evidenced by feedback from the local community. Dust is also affecting quality of roofing materials and covering up plant parts, resulting in poor plant health.

b) Noise pollution

From consultation of the local community, key informants and literature review, noise generation is a major problem resulting from blasting activities at the Athi River Cement quarry. This has impacted on people and animals health, including hearing loss, sleep disturbance and adverse impact on learning in schools neaighbouring the company's quarries.

c) Vibrations

The company's blasting activity at the quarries generates excessive vibration to the order of 3.81 mm/sec measured from at least 300 metres from the point of blasting. These excessive vibrations are impacting negatively on people in terms of destruction of property including cracks of even complete collapse of buildings. Blasting also instills fear among residents and has been cited as a potential source of heart-related illnesses among children and the elderly.

Fig (5.2): Cracks on walls of two buildings near Chauringo quarry.

The photograph above shows cracks on a wall and floor of two different buildings near Chauringo Quarry. According to the affected property owners, the cracks were caused by vibrations from blasting activity at the ARC's Chauringo quarry.

d) Flying rock debris - Property and safety

Public consultation and physical observation revealed that blasting operations at the ARC's Chauringo quarry generates flying rocks that present physical hazards to people and also destroy property. During the field visit, the study team took the following photograph of the roof of one of the houses that had been damaged by flying rocks from the Chauringo quarry.

Fig (5.3): Roof of one of the affected houses.

e) Landscape degradation

Quarrying, like other forms of mining generally causes destruction of the landscape by removal of trees, digging of the soil and creation of gullies. The study team observed from a road near Chauringo quarry the impacts of the quarrying on the landscape. Excavation exposes the land to agents of erosion. Creation of gulleys also results in water logging that could provide a breeding ground for mosquitoes.

The photograph below provides evidence of land degradation at the Chauringo quarry.

Fig (5.4): Land degradation at the ARC's Chauringo quarry.

f) Impacts on hydrology

Quarrying, like other forms of mining can also result in change of course or disappearance of rivers and lakes. Quarrying also results in exposure of soil moisture to evaporation, which in turn leads to lowering of the water table. The canyons or depressions created from quarrying can form artificial ponds or dams, which also impact on the area hydrology. The study found that a stream called Bekadzinga had completely disappeared as a result of quarrying activity at the ARC's Chauringo quarry.

c) Water pollution

Although the ARC's quarrying and cement factory's operations were not identified as point sources of water pollution in the area, physical observation and laboratory analysis of water from the Jongani stream in Kaya Kambe forest showed high a gold-grey colouration and high levels of TDS and SPM, which can be attributed to settling of cement or limestone dust on the stream.

g) Impacts on vegetation and crops

The study found that operations of Athi River Cement Company were affecting vegetation and crops negatively. First, there was direct removal of vegetation to pave way for quarrying resulting in vegetation loss. Secondly, dust from the quarrying activity and cement factory was settling on vegetation, thus affecting the plant's physiological functions including respiration and photosynthesis.

Fig (5.5): Coconuts and maize plants covered in dust.

For crops, apart from loss of farmland to quarrying, dust from the factory and quarry was affecting the crops productivity through ways described above. Moreover, the dust from the company's operations has also negatively affected the quality of farm produce, namely coconuts, maize, fruits (mangoes) and vegetables from the farms neighbouring the company's cement manufacturing company.

The photographs below show coconut and maize plants clogged in dust from the ARC's cement factory in Kaloleni.

h) Destruction of habitat

Quarrying removes vegetation and disturbs soil that provides habitat to hundreds of species of macro and micro flora and fauna. Local community members who were consulted during the study told the study team that quarrying at Chauringo had driven away snakes from their habitat, pushing them to homesteads and farms.

i) Destruction of roads by lorries

The study found that the roads linking the quarries and the factory had been affected by heavy trucks that ferry the raw materials to the factory.

j) Displacement of people

The land on which the ARC company factory and quarry are located was purchased from local land owners, who had to leave to pave way for quarrying and cement manufacturing. Besides the voluntary sale of land by original landowners to the company, hence vacating their pieces of land, some of the people adjacent to quarry have to vacate due to impacts of

Fig (5.6): Foundation of an abandoned development near Chauringo Quarry.

the quarry. The photograph below shows a foundation of a brick house abandoned by the owner who could no longer put up with noise, dust and vibrations from the Chauringo quarry.

k) Corrosion and discolouration of roofs

Physical observation of the roofs of houses in the area neighbouring Athi River Cement Company showed that most of the roofs were brownish grey in colour, so that it was difficult to tell the original colours of the roofs. In addition, roofs of many houses made of iron sheets showed evidence of corrosion, which is in keeping with the detection of Sulphur oxide which ordinarily reacts with rainwater to cause acid rain. Deposition of dust on roofs and corrosion by acid rain not only affects the aesthetic features of the building, but also significantly reduces the life of the roofs. The dust and corrosion also renders roof catchment unsafe and/or impractical.

The photographs below show roofs of two houses in the area neighbouring Athi River Cement company factory and quarry.

l) Psychological impacts

Dust, noise and vibrations have adverse psychological impacts as people, especially those immediately neighbouring the cement factory and quarry feel bothered by these issues. Those with homes neighbouring the quarry live in perpetual fear of flying rocks, vibrations, dust and noise from blasts.

m) Health and safety impacts

The health and safety impacts arising from the activities of Athi River Cement company quarry and factory are:

- Increased risk of road accidents from trucks
- Noise, dust and vibrations to workers and the public
- Falling rocks from moving lorries
- Flying rock pieces from the quarry blasting
- Risk of contracting dust related diseases including asthma, silicosis and restrictive lung disease
- Open quarry (not fenced) posing risks to people (especially children) and livestock
- Eating of fruits and vegetables contaminated by cement/limestone dust

Fig (5.7): Roofs affected by cement dust.

CHAPTER 6 SIX

6.0 Challenges and Limitations of The Study

6.1 Challenges

The challenges faced during the study were:

a) Misinterpretation of study objectives and purpose

During the study, some of the people that the study team came across did not understand the objective and purpose of the study. There was a lot of misinformation that the study was targeting Athi River Cement Company for closure by the authorities. This challenge was overcome through explanatory community meetings organized by the client (HURIA). The respondents were also explicitly briefed on the study purpose prior to providing responses to the questions posed during the interviews and administration of questionnaires. The study team also comprised of representatives of the local community.

b) Misreporting in mass media

The journalist from one of the media houses in Kenya covering the field study component misreported that the study team was from NEMA by writing that they were "NEMA experts". This brought problems to the team leader whose practicing licence was suspended by NEMA after the activity was covered by the media. Attempt to overcome this challenge was made by meeting senior NEMA officers in Nairobi by the team leader to put across the issues to NEMA. The client also appealed to the media house to write a clarification/correction in the media. However, the media house had not done the correction as at the time of writing this report.

c) Apathy among villagers

The villagers who were consulted had general apathy, stating the study would most likely be an exercise in futility as there had been numerous studies and investigations on the impacts of ARC before, yet nothing much had changed. The client held awareness meetings with the community to sensitize them on the importance of the environmental justice project and the various options that the community had in compelling ARC to adequately mitigate the impacts of their operations.

6.2 Limitations

The limitations of this study were:

a) Small sample sizes

The sample sizes selected for medical examination and for household survey were relatively small with respect to the area population. The small sample sizes were however due to limited budgetary resources for the study. The problem with small sample size is the likelihood of exaggeration in extrapolation of the findings to represent the larger population.

b) Lack of experimental (or study controls)

This study did not have controls for comparison purpose. It would have been useful to carry out similar studies, especially medical examinations and analysis of environmental parameters in areas far from the operation of ARC to find out if there was any significant difference in the findings.

c) Effect of other causal factors

This study presumably held other factors constant that would lead to the same effects as those of Athi River Cement Company. For instance, acid rain could be a global issue owing to increased emissions from industries and transport all over the world and not necessarily a local problem confined to the neighbourhood of Athi River Cement. Some of the medical problems diagnosed could also be attributed to other causal factors.

d) Real time measurement of blasting noise and vibrations

Blasting activity at the ARC's Chauringo quarry is done periodically. During the study period, there was no blasting done, hence it was not possible to capture levels of dust, noise and vibrations arising from blasting activity. The study therefore had to rely on figures from previous measurement by the company itself which could not be independently verified.

e) Consultation with the company itself

The scope of the study did not entail entry into the ARC premises to determine levels of impacts at presumed point sources of pollution. This would have provided comparative information. However, the measurements were done in the immediate neighbourhood; hence the error of omission here is not significant.

CHAPTER 7 SEVEN

7.0 Conclusion and Recommendations

7.1 Conclusion

This study found that the activities of Athi River Cement Company were impacting significantly on the environment and on the health and safety of the communities living in the neighbourhood of the company quarry and factory. The most significant aspects include generation of dust, noise, vibrations, flying rocks from blasting, removal of vegetation at the quarry and land degradation. The key impacts include air pollution, health concerns including hearing loss and dust-related respiratory diseases, loss of productive value of crops and damage to property. The complaints from the neighbours on the adverse effects of the ARC operation were therefore vindicated by the study. The impacts are real and not vendetta against the company.

Fig (7.1) *A HURIA official conducting a community sensitisation meeting in Kambe, Kaloleni.*

7.2 Recommendations

On the background of the study findings, the following recommendations are made:

a) Further studies be made especially on the health impacts of the activities of the cement company by examining a larger sample of the affected population, especially those living farther away from the factory to enable comparison of impacts. The studies should also entail measurement of environmental parameters in areas farther away from the factory and quarry to enable comparison of impacts. The studies should also entail analysis of impacts within the ARC factory and quarry sites.

b) The findings of the study be shared with relevant authorities to compel the company to undertake sufficient impact mitigation measures.

c) The Athi River Cement company undertakes sufficient measures to mitigate the impacts of its operations on the environment and the people, including but not limited to investment in modern eco-friendly technology, planting of vegetation (trees) to provide a buffer between the factory and quarry and the community.

d) The Athi River Cement company borrows and implements best practices from companies that are managing their environmental aspects better including the Bamburi Cement Company in Mombasa.

e) NEMA conducts a control environmental audit of the Athi River Cement Company to verify the information contained in the company's annual environmental audits, including the extent of impacts and the adequate/efficacy of the company's environmental management plan. DOSHS should also conduct an independent health and safety survey (audit) of the company's operations whose scope should also include the company's immediate neighbourhood.

f) The affected population be compensated through medical treatment, monetary compensation and other satisfactory forms of compensation

g) An all inclusive committee comprising of Athi River Cement Company, community representatives, relevant county and national government departments and NGOs such as HURIA be constituted with a mandate of monitoring the implementation of the ARC's EMP.

h) The department of Mines and Geology closely monitors adherence of the Athi River Cement company to the conditions of the mining license issued for the company's quarries to ensure that negative impacts are adequately mitigated.

i) That a County-wide land use plan be developed and implemented to clearly delineate areas for mining, industry, commerce, urban development and other land uses to ensure that project undertaken in each area are in line with the land use plan.

j) Athi River Cement company carries our regular consultative meetings with the neighbouring community to ensure that there is harmonious co-existence between the company and the community.

k) Athi River Cement company invests in corporate social responsibility in the affected community by supporting the development of schools and hospitals, provision of clean water and improvement of roads among others.

l) Athi River Cement considers purchase of land adjacent to the quarries and factory in order to create a buffer zone between the company and the neighbours. The prices of land should be based on independent valuation reports and should be done in consultation with the National Land Commission. The company should also assist people who sell their land to the company to settle down elsewhere and to live a better life.

m) The Athi River Cement Company undertakes comprehensive restoration of the affected environment, including but not limited to rehabilitation of the quarry areas.

n) NEMA fully implements the polluter pays principle with respect to generation of effluent, dust, noise and vibrations.

8.0 References

Afolabi, A. et al (2012), Assessment of Health and Environmental Challenges of Cement Factory on Ewekoro Community Residents, Ogun State, Nigeria. American Journal of Human Ecology. Vol. 1, No. 2, 2012, 51-57

Akeem, A.O. (2008), Impact of Ewekoro Cement Factory on the surrounding water resources. A Project Report submitted to the Department of Water Resources Management and Agro meteorology. College of Environmental Resources Management, University of Agriculture, Abeokuta, Ogun State, Nigeria

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Policy-Brief. Climate Change and CDM Cell Rajasthan State Pollution Control Board Jaipur.

Appendices

Appendix 1: Results of Air Quality Analysis

AIR QUALITY MONITORING REPORT For Athi River Mining Ltd Neighbourhood

Report Prepared by: Agriq-Quest Ltd.

Date of Sampling: 12th July 2013 Date of Report: 29th July 2013

1.0 INTRODUCTION

The assessment of air quality at the neighbourhood near Athi River Mining Ltd located in Kaloleni, Mombasa was carried out on 13th July 2013.

The assessment was carried out at the factory area.

1.1 Aim

The aim of the assessment was to assess the quality of air at the neighbourhood near Athi River Mining Ltd with respect to nitrous oxides (NOx), sulphur oxides (SOx), hydrocarbons (HC), hydrogen sulphide (H2S) gases and particulate matter.

2.0 DEFINITIONS

2.1 Pollution

Introduction by man into the environment of substances or energy liable to cause hazards to human health, harm to living resources and ecological systems, damage to structures or amenity, or interference with legitimate uses of the environment (Holdgate, 1979).

2.2 Health effects

Most industrial emissions contain chemical pollutants that are injurious to human health. Pollutant chemicals are responsible for many human illnesses e.g. chronic bronchitis associated with air pollution especially SO2 and neurological conditions linked to both Hg and Pb pollution. The incidence of asthma and 'sick office syndrome' and other possible respiratory allergies are linked to an ever increasing range of chemicals in the atmosphere especially in urban and industrial areas.

3.0 SCOPE

3.1 Applicability

The method used in the measurement of the air quality at the neighbourhood near Athi River Mining Ltd is suitable for the determination of the concentrations of pollutant substances in the atmosphere (Ref. BSN 481)

3.2 Principle

A volume of air is drawn through a collection substrate such as a filter mounted on a sampler and the amount of pollutants collected is determined by Gas Chromatography.

3.3 Method Performance

The sampling methods for determining level of pollutants has been evaluated in both Laboratory and field based tests to determine their performance with respect to the MDHS 70 ¬Methods for the Determination of Hazardous Substances, Occupational Medicine and Hygiene Laboratory of the United Kingdom.

3.4 Detection Limits

The lower limit of detection of the method is 0.001 µg/Nm3 of air.

4.0 AIR SAMPLING PROCEDURE

4.1 Preparation of Sampling Equipment

The samplers were cleaned before use by disassembling the parts that come into contact with the air, soaked into detergent solution, rinsed with water and allowed to dry.

In a clean dust free environment, the sampler was loaded with pre¬-weighed micro fibre filter papers and cassettes and covered to prevent contamination.

4.2 Volumetric Flow Rate

The volumetric flow rate was set at 2.0 liters per min.

4.3 Sampling Location

The sampler was set at each sampling site, about 15 cm from the discharge point.

4.4 Sampling

Before sampling, the protective cover was removed from the sampler. The time and volumetric flow rate at the beginning of the sampling period was recorded

At the end of the sampling period, the equipment was dismounted without subjecting it to mechanical shocks. The duration of the sampling period was calculated.

5.0 ANALYTICAL METHOD

5.1 Description of Method

Persistent organic pollutants (POPs) are captured on glass¬fibre and/or polyurethan filters using high¬volume pump sampling. Exposed filters are eluted with dichloromethane. After purification and preconcentration the selected POPs are measured by gas chromatography (ISO Method No. 7934).

6.0 RESULTS

Reference Standard limits cited from Environmental Management and Coordination Act (Air Quality) Regulations 2009. Ppb – Parts per billion np – No tolerant limit values provided

7.0 DISCUSSION OF RESULTS

Air samples taken from the factory neighbourhood exhibited levels above the tolerant limit values in Particulate Matter.

8.0 LIST OF REFERENCES

Hazardous Substances Rules Act, 2007 – Occupational Exposure Limits – Control Limits for Hazardous Chemical Substances

British Standards and Institution Workplace Atmospheres ¬Size fraction definitions for measurement of airborne particles BS EN 481 1993 ISBN 0 580 22140 7

International standards Organization Air Quality ¬Particle size fraction definitions for health¬related sampling ISO standard 7708 1995

BS6069 Section 4.4:1993 (ISO 7935) ¬Stationary source emissions determination of mass concentrations of persistent air pollutants (POP).

Appendix 2: Results of Noise Level Measurements

Noise Level Measurement Report For Athi River Mining Ltd. Neighbourhood

Report Prepared by: Agriq-Quest Ltd.

Date of Sampling: 12th July 2013 Date of Report: 29th July 2013

1.0 EXECUTIVE SUMMARY

The noise level determinations for Athi River Mining Ltd neighbourhood were carried out on 12th July 2013.

The determinations were carried out at the following sites:
- Behind the factory (perimeter wall)
- 100m from the factory

Following the assessment, it was found that the sites behind the factory and the site 100m from the factory are not exposed to high noise levels beyond the recommended limits of 85dB.

This report presents the details of the measurements.

1.1 About Athi River Mining Ltd Neighbourhood

Athi River Mining Ltd neighbourhood is located in Kaloleni, Mombasa.

2.0 INTRODUCTION

Noise level assessment was carried out at the neighbourhood of Athi River Mining Ltd on the 12th July 2013.The purpose of the noise level assessment was to enable the concerned parties (Human Rights Agenda) obtain baseline data on noise levels arising from the operations of Athi River Mining Ltd. and to mitigate any ill effects on the health of the people living near the company and the environment in general.

2.1 The aim of the assessment

The aim of the assessment was to establish the noise exposure levels in the working environment and to obtain data that can be used to form basis for planning the control measures to eliminate or minimize peoples' exposure and the general environment.

The results obtained after analysis were compared with the standards [Threshold Limit Values (TLV)] adopted by The Environmental Management and Coordination (Noise and Excessive Vibration Control) Regulations, 2007, International Labour Organization (ILO), World Health Organization (WHO) and American Conference of Industrial Hygienist (ACGIH) 1989 Guideline documents.

2.2 Health Effects of Noise

Noise can be defined as unwanted or undesirable sound derived from sources such as industrial set up and operations, road traffic or construction works that interferes with normal activities such as conversation, sleep or recreation. The vibration, which is related to noise, results from the transmission of low frequency energy through the medium of ground or buildings that can cause discomfort if the movements are large enough.

The most significant effects of noise are:

Noise induced hearing loss
Interference with communication
Sleep disturbance
General work performance
Annoyance relaxation
Thought
Concentration.

2.3 Recommended Threshold Limit Values (TLV)

The recommended noise limits to reduce hearing loss (occupational deafness) by International Labour Organization (ILO) and World Health Organization is:

- 90 dB (A) for 8 hours daily as the occupational exposure level (OEL), which most workers can continually be exposed to noise without developing occupational hearing loss in industries.
- For workshops and plant areas where occasional communication is required, the recommended limit is 65 ¬85 dB (A)
- In offices where the nature of work requires higher mental concentration, the accepted noise level is below 50 dB (A)
- For workshop offices, control rooms, laboratories and workshops where easy communication is required, the recommended limit is 50 ¬55 dB (A)
- For offices, mess¬rooms, canteens ¬the limits recommended is 40 ¬50 dB (A)
- For prestige offices, conference rooms, the noise level limits recommended are 30 ¬35 dB (A).
- 45 dB (A) during the day and 35 dB (A) during the night for indoor residential zones.

3.0 NOISE ASSESSMENT

3.1 Instrumentation

A precision sound level meter type 7078, with Omni¬directional microphone was used set at a slow response. To get dB (A) sound level reading, the instrument was calibrated using Bruel and Kjaer sound level calibrator type 4230 for sound level meter at 94 dB (A) and 1000 Hz. Using A ¬weighted scale, the noise level measurements were taken at various points within and nearby the construction site.

The A ¬weighting network is most commonly used in the measurement of industrial and environmental noise because it causes the sensitivity of the meter to vary with the frequency and intensity of the sound like the sensitivity of the human ear.

The results of the assessment are presented in the Table below

3.2 Results

Reference Standards limit values cited from International Labour Organisation (ILO), World Health Organisation (WHO).

American Conference of Industrial Hygienist (ACGIH) 1989 Environmental Management and Coordination (Noise and Excessive Vibration) Regulation, 2009 – 2nd schedule.

dB (A) = deciBels of sound measured with an A-weighted filter.

3.3 Discussion of the Results

Higher noise levels were not recorded within the following areas/points; behind the factory (perimeter wall) and 100m from the factory.

3 RECOMMENDATIONS

It is advised that the company continues maintaining low noise levels of less than 85dB.

4 REFERENCES

ILO encyclopaedia of Occupational Health and Safety Vol. II, Geneva 1983.

ILO Occupational Safety and Health Services No. 33 Noise and vibration in working environment, ILO office, 1976.

Environmental Management and Coordination (Noise and Excessive Vibration Pollution Control) Regulations, 2007.

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Fredrick Muthuri July 2013.

Appendix 3: Results of Water Quality Analysis

agriQ Quest
Member of the Bigg Group

KENAS/TL/14

AgriQ Quest Limited
: P.O. Box 3097 - 00506, Nairobi, Kenya
: +254 (20) 551988 / 3593140/43
: www.agriq-quest.com

CERTIFICATE OF ANALYSIS

Client: Human Rights Agenda. **Sample Id:** Water

Batch Ref: Water - River Water - Jogani Kaya Kambi **Batch No.:** 13/0837 **Lab. Ref.:** AQ 36707

Date Received: 15/07/2013 **Date Analysis Started** : 16/07/2013 **Date Completed:** 25/07/2013

PARAMETER	Method	Results	[1]Standard (Max Limits)
Aesthetic Quality Requirements			
pH	KS 05 - 459	6.92	**6.5 - 8.5**
Turbidity, in NTU	KS 05 - 459	0.66	**5**
Total Dissolved Solids (TDS) mg/l	KS 05 - 459	**1090**	**1000**
Suspended Matter, mg/l	KS 05 - 459	**22**	**NIL**
Inorganic contaminants			
Fluoride as F, mg/l	KS 05 - 459	0.35	**1.5**
Nitrate as NO_3, mg/l	KS 05 - 459	0.96	**50**
Nitrites as NO_2^-, mg/l	KS 05 - 459	<0.001	**0.003**
Sulphates as SO_4^{2-}, mg/l	KS 05 - 459	25.92	**400**
Calcium as Ca, mg/l	KS 05 - 459	**196.34**	**150**
Sodium as Na, mg/l	KS 05 - 459	**455.73**	**200**
Iron as Fe, mg/l	KS 05 - 459	0.07	**0.3**
Manganese as Mn, mg/l	KS 05 - 459	**2.33**	**0.5**
Zinc as Zn, mg/l	KS 05 - 459	4.33	**5.0**
Magnesium as Mg, mg/l	KS 05 - 459	7.64	**100**
Chloride as Cl^-, mg/l	KS 05 - 459	**427.67**	**250**
Potassium as K, mg/l	KS 05 - 459	21.80	[2]
Copper as Cu, mg/l	KS 05 - 459	<0.001	**1.00**
Lead as Pb, mg/l	KS 05 - 459	<0.001	**0.01**
Microbiological			
Total Viable Counts at 37°C, cfu per ml	ISO 4833	**5700**	**100**
Total Coliforms, cfu per ml	ISO 4832	**270**	**NIL**
E. Coli, cfu per ml.	ISO 6391	**100**	**NIL**
Salmonella, cfu per ml.	ISO 6579	**DETECTED**	**NIL**

< = Less than; below detection level of 0.001 mg/l.

[1]Standard values quoted are taken from the Kenya Bureau of Standards KS 459-1 : 2007

[2] No standard guidelines from WHO drinking water Guidelines 2000 or Kenya Bureau of Standards KS 459-1 : 2007

Comment(s) on Analysis

High TDS, TSS and levels of Ca, Na, Mg, Cl, Total Viable Counts, Total Coliforms, E. *coli.* Salmonella was detected.

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Walter Ogara
Head of Laboratory Services.

agriQ Quest
Member of the Bigg Group

KENAS/TL/14

AgriQ Quest Limited
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: www.agriq-quest.com

CERTIFICATE OF ANALYSIS

Client: Human Rights Agenda. **Sample Id:** Water

Batch Ref: Water - From Wetland **Batch No.:** 13/0837 **Lab. Ref.:** AQ 36706

Date Received: 15/07/2013 **Date Analysis Started** : 16/07/2013 **Date Completed:** 25/07/2013

PARAMETER	Method	Results	[1]Standard (Max Limits)
Aesthetic Quality Requirements			
pH	KS 05 - 459	7.69	**6.5 - 8.5**
Turbidity, in NTU	KS 05 - 459	0.44	**5**
Total Dissolved Solids (TDS) mg/l	KS 05 - 459	560	**1000**
Suspended Matter, mg/l	KS 05 - 459	**12**	**NIL**
Inorganic contaminants			
Fluoride as F, mg/l	KS 05 - 459	0.35	**1.5**
Nitrate as NO_3, mg/l	KS 05 - 459	0.68	**50**
Nitrites as NO_{2-}^{-}, mg/l	KS 05 - 459	<0.001	**0.003**
Sulphates as SO_4^{2-}, mg/l	KS 05 - 459	35.84	**400**
Calcium as Ca, mg/l	KS 05 - 459	**111.05**	**150**
Sodium as Na, mg/l	KS 05 - 459	**229.76**	**200**
Iron as Fe, mg/l	KS 05 - 459	0.11	**0.3**
Manganese as Mn, mg/l	KS 05 - 459	<0.001	**0.5**
Zinc as Zn, mg/l	KS 05 - 459	<0.001	**5.0**
Magnesium as Mg, mg/l	KS 05 - 459	7.01	**100**
Chloride as Cl^-, mg/l	KS 05 - 459	97.33	**250**
Potassium as K, mg/l	KS 05 - 459	27.90	[2]
Copper as Cu, mg/l	KS 05 - 459	<0.001	**1.00**
Lead as Pb, mg/l	KS 05 - 459	<0.001	**0.01**
Microbiological			
Total Viable Counts at 37°C, cfu per ml	ISO 4833	**2400**	**100**
Total Coliforms, cfu per ml	ISO 4832	**100**	**NIL**
E. Coli, cfu per ml.	ISO 6391	**60**	**NIL**
Salmonella, cfu per ml.	ISO 6579	**DETECTED**	**NIL**

< = Less than; below detection level of 0.001 mg/l.

[1]Standard values quoted are taken from the Kenya Bureau of Standards KS 459-1 : 2007

[2] No standard guidelines from WHO drinking water Guidelines 2000 or Kenya Bureau of Standards KS 459-1 : 2007

Comment(s) on Analysis

High TSS and levels of Ca, Na, Total Viable Counts, Total Coliforms, E. *coli. Salmonella* was detected.

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Walter Ogara
Head of Laboratory Services.

Appendix 4: Results of Soil Analysis

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Analysis Report

M/s
Human Rights Agenda

Date of Report: 22-07-2013
Report No: AQ 36708
Date Received: 15-07-2013
Date of Analysis: 16-07-2013
Sample Identification: Soil - From Kaloleni
Crop Type: N/A
Location: Mombasa
Soil Type: nm

Chemical Analysis of: Soil, 1:2 volume-extract

			Cations: Parts Per Million (ppm)						Anions: Parts Per Million (ppm)					Trace elements: Parts Per Million (ppm)						
Analysis	**pH** Water	**EC** mS/cm	**NH_4^+** Ammonium	**K^+** Potassium	**Na^+** Sodium	**Ca^{2+}** Calcium	**Mg^{2+}** Magnesium	**Si** Silicon	**NO_3^-** Nitrate	**Cl^-** Chlorine	**SO_4^{2-}** Sulphate	**HCO_3^-** Bicarbonate	**$H_2PO_4^-$** Phosphate	**Fe** Iron	**Mn** Manganese	**Zn** Zinc	**Pb** Lead	**B** Boron	**Cu** Copper	**Mo** Molybdenum
Results	**8.34**	0.22	nm	**43.0**	6	**4270**	**7.0**	nm	**nm**	nm	**nm**	nm	**nm**	**0.1**	**<0.001**	**<0.001**	<0.001	nm	<0.001	nm
Low	5.5			<59		<79	<30		<40		16		<80	<2.5	<5	<0.5			<0.75	
Target	6.8	>0.9		>72		>200	>60		>100				>140	>4.5	>9	>1			>0.75	
High	>8	>1.5		>250		>1200	>100		>199		28		>210	>25	-	>3			-	

< less than; nm = not measured

Reference Values quoted from University of Connecticut, Plant Science Department

INTERPRETATION OF ANALYTICAL RESULTS

Low levels of Potassium, Magnesium, Iron, Manganese, Zinc and Copper.

High pH and levels of Calcium.

Last Test Results

Date	**pH**	**EC** mS/cm	**NH_4^+** Ammonium	**K^+** Potassium	**Na^+** Sodium	**Ca^{2+}** Calcium	**Mg^{2+}** Magnesium	**Si** Silicon	**NO_3^-** Nitrate	**Cl^-** Chlorine	**SO_4^{2-}** Sulphate	**HCO_3^-** Bicarbonate	**$H_2PO_4^-$** Phosphate	**Fe** Iron	**Mn** Manganese	**Zn** Zinc	**Pb** Lead	**B** Boron	**Cu** Copper	**Mo** Molybdenum
Not sampled																				
Not sampled																				

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Walter Ogara
Head of Laboratory Services

Appendix 5: Results of Crop Leaf Test

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Analysis Report

M/s
Human Rights Agenda

Date of Report: 22-07-2013
Report No: AQ 36709
Date Received: 15-07-2013
Date of Analysis: 15-07-2013
Sample Identification: Foliar: Maize Crop
Crop Type: Maize
Location: Mombasa

Chemical Analysis of: Foliar 1:10 volume-extract

Analysis	Macro-elements: Percent (%)						Trace elements: mg/kg				
	N	P	K^+	Ca^{2+}	Mg^{2+}	Na^+	Fe	Zn	Cu	Mn	B
Results	nm	nm	0.10	0.05	0.005	0.02	9.31	0.33	<0.001	0.07	nm
Low	3	0.2	2	1	0.25		50	15	5	30	30
Target											
High	5	0.3	3	1.5	0.35		150	50	15	250	60

< less than; nm = not measured

Reference values quoted from Pest Notes, University of California, Agriculture and Natural Resources

INTERPRETATION OF ANALYTICAL RESULTS

Low levels of K^+, Ca^{2+}, Mg^{2+}, Fe, Zn, Cu and Mn

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Walter Ogara
Head of Laboratory Services

Appendix 6: Medical Examinations Report

Report compiled by an Occupational Health Medical Doctor

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15th July 2013

MEDICAL EXAMINATION REPORT FOR 21 PEOPLE LIVING WITHIN THE VICINITY OF ATHI RIVER MINING COMPANY- KILIFI COUNTY TO FIND OUT IF THEY ARE SUFFERING FROM THE EFFECTS OF SILICA DUST

Silica dust is harmful to health and mainly affects the respiratory system but can also cause irritation of the eyes. In the lungs it can cause a condition called silicosis which is irreversible and has no treatment. Silicosis is due to deposition of the silica dust in the lung tissue resulting in nodules forming in the lungs and this can result into fibrosed stiff lungs. The effect of this is that people develop chronic cough, difficulty in breathing and chronic fatigue as the lungs are unable to absorb and transport enough oxygen into the body. Stiffening of the lungs of the lungs can result in the function of the right side of the heart being compromised and it can lead to heart failure and death. The fibrosed lungs also have increased chances of developing tuberculosis. Silica dust is also known to cause cancer of the lungs. Silica dust can also affect the eyes due to irritation and can cause conjunctivitis. The only way to prevent silicosis is to prevent inhalation of silica dust.

Since the people living in the surrounding areas of the cement factory are farmers who depend on manual labor to work in their farms the compromised lung function results in poor productivity since they get easily exhausted as they cannot get enough oxygen from their fibrosed lungs.

I examined 21 people who were picked at random on 12/7/2013 and 17 of them had symptoms in the respiratory system and eyes attributable to silica dust. This is a significant finding bearing in mind that this people were chosen at random and from this I suggest the following.

It is important for ATHI RIVER MINING COMPANY to put in place measures to eliminate pollution of the surrounding areas with silica dust.

There is need to have all the people living within the vicinity of ATHI RIVER MINING COMPANY who are exposed to the silica dust to be examined for silicosis. The examination should include general medical examination, chest x ray and spirometry.

The people living in the vicinity of the company who have silicosis should be compensated by the company depending on the severity of their conditions.

There is need to educate the people living in the areas surrounding the company to be taught on the effects of silicosis and how to protect themselves e.g use of appropriate dust masks.

Frequent hygienic environmental studies should be done to determine the level of contamination of the surrounding environment by the silica dust.

SUMMARY OF MEDICAL EXAMINATION FOR VILLAGERS LIVING WITHIN THE VICINITY OF ATHI RIVER MINING COMPANY – KILIFI COUNTY

Examinations carried out by an Occupational Health Medical Doctor

(Real identity of villagers changed due to privacy reasons)

Name	General Examination	Chest X-Ray	Spirometry	Conclusion
A	1. Clawing of right hand 2. Muscle wasting right hand 3. Conjunctivitis both eyes 4. Reduced air entry both sides and creps both lung fields.	Extensive fibrosis and modules bong lung fields	Restrictive lung disease	He has median nerve /radial nerve neuropathy(damage) due to the work he was doing at the cement factory resulting in the clawing of his right hand which has been rendered functionless. He has conjunctivitis (inflammation) of both eyes due to the dust. He has pulmonary tuberculosis and silicosis. Avoid further exposure to silica dust. Continue with T.B treatment.
B	Pain on movement of right hand and shoulder	Few bilateral nodules	Restrictive lung disease	Has arthralgia most likely due to repeated use of shoulder in her farming activities. Has mild silicosis as shown by the few modules on chest x ray. Avoid further exposure to silica dust
C	Trachea shifted to the right. Has bilateral rhonchi with reduced air entry bilaterally.	Fibrosis both right and left lung field. Few modules on right sides trachea shifted to the right.	Severe restrictive lung disease.	Has both restrictive and obstructive lung disease. Old tuberculosis scars and features of silicosis on chest x ray

D	Reduced air entry both lungs fields, dullness on percussion mid lung zones	Opacities on left mid /lower zones Few modules on left mid zone.	Restrictive Lung disease	Has features of silicosis and old tuberculosis scars Avoid further exposure to silica dust.
E	Bilateral rhonchi	Increased pulmonary vascular markings Few modules.	Restrictive lung disease	Features of obstructive and restrictive lung disease. Has features of silicosis Avoid further exposure to silica dust.
F	Displaced apex heat High blood pressure	Cardiomegally. Nodules both lung fields.	Restrictive lung disease	High blood pressure. Hypertensive heart disease for ECHOCARDIORAPHY Features of silicosis
G	Straight leg raising test positive, enlarged nasal turbinates	Normal	Restrictive pattern	Lumbago, Allergic rhinitis ,restrictive pattern on spirometry due to blocked nose making blowing difficult.
H	Inability to rotate the neck to the right	Nothing significant	Difficulty following instruction to blow report inconclusive	Torticolis (neck pain-inability to rotate neck) Put on diclofenac
I	Pain on movement of right wrist	Normal	Restrictive pattern	Arthralgia (joint pains)
J	Bilateral Conjunctivitis	Normal	Normal	Conjunctivitis
K	Creps right mid zone bilateral conjunctivitis	Fobrosis right mid /upper zones. Nodules left mid -zone	Restrictive lung disease	Allergic conjunctivitis Silicosis Avoid further exposure to silica dust.
L	Reduced breath sounds bilaterally	Module on both lung fields	Restrictive lung disease	Mild features of silicosis. Avoid further exposure to silica dust.
M	Bilateral conjunctivitis bilateral rhonchi. has pallor. Moderate high blood pressure.	Solitary module right mid-zone Increased pulmonary vascular markings	Restrictive obstructive airway disease	Allergic conjunctivitis obstructive airway disease Anaemia, cause- high blood pressure. Features of silicosis. Avoid further exposure to silica dust. To do haemogram, Peripheral blood film and stool for ova/cyst.
N	Bilateral conjunctivitis Reduced air entry bilaterally crepitations both lung fields	Widespread fibrosis nodules both lung fields	Restrictive lung disease	Features of silicosis Allergic conjunctivitis, healed tuberculosis scars
O	Bilateral conjunctivitis Reduced movements right shoulder and right wrist.	Increased pulmonary vascular markings ,Few modules	Restrictive lung disease	Allergic conjunctivitis, Mild silicosis. Arthritis. To do rheumatoid factor test to rule out rheumatoid arthritis. Avoid further exposure to silica dust.
P	Bilateral conjunctivitis Bilateral rhonchi	Increased pulmonary vascular markings module seen	Restrictive lung disease	Allergic conjunctivitis Mild silicosis Obstructive airway disease. Avoid furtherexposure to silica dust.
Q	Bilateral conjunctivitis ,reduced movements right shoulder, reduced air entry bilaterally	Nodules both left and right lung fields	Restrictive lung disease	Athralgia due to repeated use of shoulder and wrist joints in farming activities. Mild silicosis. Avoid further exposure to silica dust.
R	Conjunctivitis both eyes	Few nodules on left mid zones	Normal	Allergic conjunctivitis, mild silicosis. Avoid further exposure to silica dust
S	Straight leg raising test positive	Few modules	Normal	Mild silicosis. Has lumbago due to repeated bending and carrying heavy load in her farm work.
T	Epigastric Tenderness	Solitary module right upper zone	Restrictive lung disease	Mild silicosis also has peptic ulcer disease. Avoid further exposure to silica dust.
U	Reduced air entry bilaterally. Straight Straight leg raising test positive	Increased pulmonary markings. Solitary nodules	Restrictive lung disease	Mild silicosis,has lumbago. Avoid further exposure to silica dust.

Date: 16/7/2013

Appendix 7: Stakeholder Consultation Questionnaires

ASSESSMENT OF THE ENVIRONMENTAL, HEALTH AND SAFETY IMPACTS OF THE ACTIVITIES OF ATHI RIVER CEMENT LTD FACTORY AND QUARRYING IN KALOLENI AND RABAI ARES OF KILIFI COUNTY

Stakeholders Consultation Questionnaire

Part 1: Introduction

Human Rights Agenda (HURIA) is a Non-Governmental Organization working with local communities on environment and human rights issues in the Coastal region of Kenya. As part of pursuit of environmental justice for its members who include the Kaloleni and Rabai communities whose environment, health and safety is directly affected by activities of Athi River Cement Ltd (particularly quarrying, transport and cement manufacturing), HURIA has contracted a NEMA registered environmental expert to carry out an assessment of the environmental, health and safety impacts of the above mentioned activities of Athi River Cement Ltd in Kaloleni and Rabai communities in Kilifi county.

HURIA hopes that the findings and recommendations of this assessment will be useful in ensuring a clean and healthy environment for the affected communities, which is their constitutional right.

As part of the assessment, the environmental consultant is seeking the views, opinions and inputs of the affected communities and other stakeholders including government departments. This questionnaire requests for your views or opinions on the environmental, health and safety impacts of the activities of Athi River Cement Ltd in Kaloleni and Rabai areas of Kilifi County.

Your views and inputs will be highly appreciated and will go a long way in helping to promote a clean and healthy environment in Kilifi County.

Part 2: Questions

Q 1: Are you familiar with Athi River Cement Ltd's (previously Athi River Mining) operations in the Kaloleni and Rabai areas of Kilifi County?

_____

Q 2 (a): If your answer is yes above, are the activities of Athi River Cement Ltd affecting the environment and the people in the company's neighbourhood negatively?

Q 2 (b): If your answer is yes above, how are the activities of Athi River Cement Ltd affecting the environment and the people in the company's neighbourhood negatively?

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_____

Q3 (a): As a Government Department in Kilifi County, are there any specific regulatory requirements that Athi River Cement Ltd is supposed to comply with that fall under your jurisdiction?

_____

Q3 (b): If yes above, please specify the requirements and give an opinion on whether Athi River Cement Company Ltd has been complying with the requirements.

_____

_____

Q 4(a) To the best of your knowledge, is Athi River Cement Ltd doing enough to mitigate to negative impacts of its activities on the environment and on the people in the affected area?

Q 4(b) If the answer is no above, what further measures should Athi River Cement Ltd undertake to mitigate the negative impacts of its activities on the environment and on the people in the Kaloleni area?

_____

Q 5(a) To the best of your knowledge, is Athi River Cement Ltd making any positive contribution to the protection of the environment and/or to the improvement of livelihoods in Kilifi County?

Q 5(b) If the answer is yes above, what positive contribution is Athi River Cement Ltd making for the protection of the environment and/or for the improvement of livelihoods in Kilifi County?

_____

_____

Q 6: What other comments would you like to make on the environmental, health and safety impacts of the activities of Athi River Cement Ltd or about the operations of the company in general in Kilifi County?

Part 3: Respondent's Details

Name:

Signature: Date:

ID No.:

Designation/Position:

Department:

Address:

Telephone number

Official stamp:

Thank you very much for your views and inputs

Appendix 8: Local Community Consultation Questionnaires

ASSESSMENT OF THE ENVIRONMENTAL, HEALTH AND SAFETY IMPACTS OF THE ACTIVITIES OF ATHI RIVER CEMENT LTD FACTORY AND QUARRYING IN KALOLENI AND RABAI COMMUNITIES IN KILIFI COUNTY

Community and Stakeholders Consultation Questionnaire

Part 1: Introduction

Human Rights Agenda (HURIA) is a Non-Governmental Organization working with local communities on environment and human rights issues in the Coastal region of Kenya. As part of pursuit of environmental justice for its members who include the Kaloleni and Rabai communities whose environment, health and safety is directly affected by activities of Athi River Cement Ltd (particularly quarrying, transport and cement manufacturing), HURIA has contracted a NEMA registered environmental expert to carry out an assessment of the environmental, health and safety impacts of the above mentioned activities of Athi River Cement Ltd in Kaloleni and Rabai communities in Kilifi county.

HURIA hopes that the findings and recommendations of this assessment will be useful in ensuring a clean and healthy environment for the affected communities, which is their constitutional right.

As part of the assessment, the environmental consultant is seeking the views, opinions and inputs of the affected communities and other stakeholders. This questionnaire requests for your input, views or opinions on the environmental, health and safety impacts of the activities of Athi River Cement Ltd in Kaloleni and Rabai communities in Kilifi County.

Your views and inputs will be highly appreciated and will go a long way in helping to promote a clean and healthy environment in Kaloleni and Rabai areas.

Part 2: Questions

Q 1(a) In your opinion, are the activities of Athi River Cement Ltd (particularly quarrying, transport and cement manufacturing) affecting the environment and the people in the company's neighbourhood negatively?

Q 1(b) If your answer is yes above, how are the activities of Athi River Cement Ltd affecting the environment and the people in the company's neighbourhood negatively?

Q 2(a) To the best of your knowledge, is Athi River Cement Ltd undertaking any measures to mitigate the negative impacts of its activities on the environment and on the people in the affected area?

Q 2(b) If the answer is yes above, what measures is Athi River Cement Ltd undertaking to mitigate the negative impacts of its activities on the environment and on the people in the affected area?

_____

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3(a). In your opinion, if Athi River Cement Ltd is undertaking some measures to mitigate the negative impacts of its activities on the environment and on the people in the affected area, are these measures satisfactory?
Q 3 (b). If no above, what further mitigation measures would you like Athi River Cement Ltd to undertake with regard to the company's negative impacts on the environment and on the affected people?

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Q 4(a) To the best of your knowledge, is Athi River Cement Ltd making any positive contribution to the protection of the environment and/or to the improvement of livelihoods of the local communities?

Q 4(b) If the answer is yes above, what positive contribution is Athi River Cement Ltd making for the protection of the environment and/or for the improvement of livelihoods of the local communities?

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Q 5: What other comments would you like to make on the environmental, health and safety impacts of the activities of Athi River Cement Ltd or about the operations of the company in general in the Kaloleni and Rabai areas?

_____

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_____

_____

Part 3: Respondent's Details

Name:

Signature: Date:

ID No.:

Village (as applicable):

Location: County:

Occupation/designation:

Name of organization (as applicable):

Approximate distance from Athi River Cement Factory/Quarry:

Address:

Telephone number

Official stamp (where applicable):

Thank you very much for your views and inputs

HUMAN RIGHTS AGENDA (HURIA),

P.O. BOX 98077 – 80100 MOMBASA

Email: info@humanrightsagenda.org