

# ENVIRONMENTAL IMPACT ASSESSMENT

(FINAL REPORT)

## OBAJANA CEMENT COMPLEX

OBAJANA, KOGI STATE



**SUBMITTED BY**

**OBAJANA CEMENT PLC**

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## EXECUTIVE SUMMARY

### Introduction

The subject of this EIA is the Obajana Cement Plant and the associated Captive Power Plant project (OCP/ CPP project). The proponent of the proposed project is Obajana Cement Plc (OC Plc), which is member of Dangote Group of companies, whose headquarters is at 1 Alfred Rewane Road, Falomo, Ikoyi, Lagos. The main aim of the OCP/ CPP project is to produce cement using limestone deposits in the adjacent areas.

At the on-set of the present democratic dispensation in Nigeria, there was an increase in the call for the development of the solid minerals sector of the Nigerian economy and government started discouraging the importation of cement in any form. Presently, the Federal Government of Nigeria has banned the importation of packaged cement and plans a total ban on cement importation by the year 2006. In order to rise to the challenge of helping to diversify the Nigerian economy and achieve a 100% domestic production of Nigeria's cement needs, OC Plc has decided to invest in the Obajana cement development project, which consists of limestone quarry, water supply dam, cement plant, captive power plant, gas transmission pipeline, housing estate, limestone conveyor belt, and truck yard. The other components of the project have been assessed in separate EIA reports.

### Legal / Administrative Framework

In Nigeria, there are Federal and State statutory regulations that have been enacted to regulate the activities of industries with the aim of protecting the environment in the interest of all stakeholders. Several regulations, in the form acts, edits, byelaws, ratification of conventions, etc. have been put in place to cater for environmental and social compliance by industries.

### EIA Terms of Reference/Objectives

The EIA Terms of Reference included, but not limited to characterization of the socio-economic, health and biophysical status of the project environment; and analysis of potential environmental and social concerns/ mitigations/amelioration measure that would guide the execution of the OCP/ CPP project in the most environment-friendly manner. The scope of this EIA includes:

- Cement processing plant,
- Captive power plant,
- Housing colony, and
- Communities impacted by the cement plant, housing complex and transportation corridor.

Activities carried out during the execution of this EIA study include the acquisition of biophysical and socio-economics/health data. Sources of information included field survey, government/non-governmental agencies, existing database, professionals, and other relevant sources. The study was carried out in accordance with Nigeria's EIA procedures, using appropriate guidelines and standards.

**Project Area/Site**

The OCP/ CPP project shall be sited in Obajana village, on 4.4 hectare of land allocated to Obajana Cement Plc by the government of Kogi state. The site is a relatively flat terrain, originally bearing a Guinea Savannah vegetation type. The housing colony is sited about a kilometer away from the OCP/ CPP site on a land originally belonging to Oyo-Iwa community.

**Need for the Project**

The need for the project lies in the need to satisfy the cement demand of Nigeria, 85% of which is currently being imported. In addition, Nigeria losses huge amounts of foreign exchange in the importation of cement despite the fact that raw material deposits abound in the country. Furthermore, Nigeria is in dire need to diversify her economy from a single commodity economy (petroleum), and the OCP/ CPP project shall contribute to that achieving that need.

**Value of the Project**

The proposed cement manufacturing plant is particularly suited for Obajana because of its strategic position and proximity to the vast limestone deposit it intends to exploit in Kogi state. The Obajana Cement Company, at Obajana should produce most of the cement required in the middle belt, North Eastern and the North Central states of Nigeria. The price of cement has remained high at all times because of the persistent high demand for the product, which is reflected, in the high cost of the product. The production of cement at Obajana will reduce the cost of cement occasioned by the high cost of transport in moving cement from Lagos, Port Harcourt and Ewekoro in Ogun state and Ashaka in Gombe State. Production from the Benue Cement Company alone cannot satisfy the demand of cement for this area.

The technology that is proposed for the construction of Obajana cement is the most recent technology the world over. Starting with the construction phase to the operational phase there will be a transfer of this technology to Nigerian engineers who will be involved in the construction work. The development of Obajana cement will facilitate the development of Kogi state as a commercial centre. Part of the negative values of the project will be the impact the project will have on its operational environment. Such impacts are identified in the report and mitigation measures are developed in this report, as well as for those purposes.

**Envisaged Sustainability**

All the raw materials needed for the manufacture of cement are available in Nigeria. The limestone shall be sourced from a nearby dedicated quarry which has proven reserves that shall last for over the 50 years expected lifespan of the OCP/ CPP project.

**Project Alternatives Considered**

*Alternative 1:* No project option: This suggests that the proposed project should not be executed. This negates the need to increase domestic production and conserve foreign exchange therefore, this alternative was rejected.

*Alternative 2: Import Bulk Cement and Bag:* This option is presently being practiced by several companies in Nigeria. However, this option is not acceptable because most of the employment opportunities available to the people from the process of cement production will be lost to the country where finished bulk cement will be imported from. In addition to this, the loss of foreign exchange to the exporting country is a disadvantage. For these reasons, this option is rejected.

*Option 3: Import already Bagged Cement:* To import bagged cement will deny the immediate locality a wider range of employment opportunities. Also this would not be a durable venture considering increasing government restrictions on importations. The option of importing bagged cement will have the least impact of releasing dust into the environment but it is no longer economically viable and it is therefore not acceptable.

*Option 4: Manufacturing from raw materials (considered option):* The manufacturing of cement entails crushing, grinding, firing / blending of basic raw materials at different stages of production. The proposed cement plant is expected to provide 2500 jobs in all categories. In addition, there is the transfer of technology associated with installation, operation of the equipment and maintenance and savings on foreign exchange, hence this alternative was chosen.

### **Scope of the Project**

The scope of the OCP/ CPP project, as covered by this EIA includes:

- *Obajana Cement Plant:* a twin cement processing plant with annual combined capacity of 5 million metric tones
- *Captive Power Plant:* three 45-megawatts gas turbines to provide the electricity needs of OCP and related facilities.
- *Housing colony:* 328 housing with sewage treatment plant

### **Process Description**

*Cement Production Process:* The basic raw materials for the production of cement are laterite, clay/marl, laterite, and gypsum. All of these raw materials shall be obtained from a dedicated mine to be located about 8 km away from the cement plant, with the exception of gypsum, which shall be sourced through vendors in the northeastern region of Nigeria.

### **Baseline Environmental Characteristics**

*Climatic Characteristics:* the climate of the proposed project site is characteristically that of moist (Guinea) savanna - characterized by tall a mixture of trees, shrubs, tall grasses and herbs in a mosaic pattern. Rainfall lasts from May to October, with dry season occurring in between. Wind speeds obtained from 5-year data (1997 and 2002) obtained from the Federal Department of Meteorology station at Lokoja, which is the closest meteorological station to Obajana, shows that wind speed range between 3.0 and 4.6 Knots in the months of June/ July and 1.5 to 3.7 knots for December/January. The prevailing wind direction for the months of June/July and December/January are South to South westerly and North Easterly respectively.

*Air Quality:* The concentration of suspended particulate matter in the area showed seasonal changes in value, being low in the wet season and much higher during the dry season (13.4 to 30.2 ppm). The concentrations of the pollutant gases such as SO<sub>2</sub>, NO<sub>2</sub>, NO, CO and H<sub>2</sub>S were found to be either not detectable or detected at very low concentrations.

*Surface Water:* The pH of River Oyini ranged from 5.51 to 5.65. The results for conductivity indicate that the water is freshwater, TDS (90.0 to 142.0 mg/l), TSS (1750.0 to 3913.0 mg/l) and hardness (1.51 to 1.94 mg/l). As the results of Ca<sup>2+</sup> demonstrated, river Oyini (1.24 to 1.50 mg/l) appear to have dissolved ancient rocks containing CaCO<sub>3</sub>. NO<sub>3</sub> result was 0.05 mg/l, which is low. DO and BOD<sub>5</sub> ranged from 5.8 to 6.8 mg O<sub>2</sub>/l. The phosphate contents vary widely (range: 6.04 – 13.85 mg l<sup>-1</sup>). There are no remarkable seasonal variations in water quality parameters.

Of all the twelve metals determined in the river water samples, six were not detected: Pb, Cu, Mn, Cr, Al and Ni (except at one site). Only trace amounts of Zn (0.048 to 0.053 mg/l); K (2.0 to 4.0 mg/l); Fe (0.92- 1.32 mg/l); Mg (0.27-4.05 mg/l) and Pb (0.05-0.29 mg/l for dry season samples) were recorded. Ca concentration was also low (range: 1.24 to 1.50 mg/l). The results of the chemical analysis of water samples show that the river was not polluted in any way.

#### 4.2.7 Soil

The soil pH ranged from 5.11 to 5.90 while Total Nitrogen (N) content of the soil samples ranged from 0.04% to 0.12%. These values compare well with medium values for mineral soils. The level nitrate in the soil ranged from 6.80 to 8.80 mg kg<sup>-1</sup> while phosphate concentrations ranged from 9.16 to 12.92 mg kg<sup>-1</sup>. The organic matter content of the topsoil ranged from .86% to 2.35%. Generally, the levels of Na, K and Mg in some soil samples were low while the levels of Ca (> 6.8 Cmol kg<sup>-1</sup>) in some samples were relatively high. These values are lower than the medium range for this type of soil. Since fertilizers are rarely used on the few farms visited, it is certain that the nitrate levels obtained must be from the microbial breakdown of soil organic matter and plant residues.

The levels of copper (1-37.9 Cmol kg<sup>-1</sup>), Manganese (14.3-57.2 Cmol kg<sup>-1</sup>), Zinc (37.4-101.1 Cmol kg<sup>-1</sup>) as well as Chromium (15.6-57.2 Cmol kg<sup>-1</sup>), Nickel (5.9-59.0 Cmol kg<sup>-1</sup>) and Aluminum (1.5-6.2 Cmol kg<sup>-1</sup>) are within values considered normal for mineral soils. The range of Pb contents in the soil was 62.1 to 434.7 Cmol kg<sup>-1</sup>. Fe was generally high (358.4 to 8154 cmol kg<sup>-1</sup>) Cu (1.00 to 5.4 cmol kg<sup>-1</sup>) and Ni (11.8 to 35.4 cmol kg<sup>-1</sup>).

*River Sediment:* The textural class of the sediment samples was sand to loamy – sand the sediment pH ranged from 5.20 to 5.89 while the total nitrogen content ranged from 0.03 to 0.32. % organic carbon ranged from 0.30% to 3.69% while % organic matter ranged from 0.52 to 6.38%. The levels of exchangeable cations were low. The level of Al, Ni, Cr, Zn and Cu are within values considered normal for sediments. However, the levels of Pb (82.8-207 mg/kg) and Fe (1937.6-20490.4 mg/kg) was high for a pristine area like Obajana.

*Vegetation Type:* The vegetation type can be broadly classified as woodland/shrub/grassland with predominantly trees/woodlands/shrubs with a subdominant grass component. It is a form of Guinea Savannah vegetation, which is a mixture of two types based on the proportion of woody species.

- (1) Savanna woodland where trees and shrubs form a fairly close canopy
- (2) Tree savanna where the trees and shrubs are scattered.

Typical tree species include: *Lophira lanceolata*, *Terminalia glaucescens*, *Daniela oliveri* (most abundant), *Hymenocardia acida*, *Vitex doniana*, *Detarium microcarpum*, *Azelia africana*, *Acacia senegalensis*, and *Parkia biglobosa*. Common weeds include *Andropogon*, *Hyparrhenia*, *Pennisetum* and *Chromola aboretum*. Whenever the canopy is open, grass is dominant. *Isobertina doka* tend to grow in almost pure communities while *Monotes kerstingii* forms pure open stands of rather small scrubby trees on sandy eroded slopes of sparse grass cover. *Uapaca togoensis* is locally dominant on low hills or slopes while rocky hills have their own characteristic vegetation usually with abundant sprawling shrubs such as *Acacia ataxacantha* and *Canthium venosum*. In general, the average tree height in the area ranges between 6-8m while the grasses are tall with an average height of 0.8-1.5m.

Riparian Forest occurs immediately adjacent to water courses; tree and shrub species are generally the same as those in the adjacent location, Common riparian species identified include the following: *Pterocarpus santalinoides*, *Brachystegia eurycoma*, *Berlinia grandiflora*, *Terminalia glaucescens* and *Cola laurifolia*.

*Agriculture:* The agricultural system in the study area can be categorized into an intensive smallholder rain-fed agriculture. This system is characterized by small plot farms (0.5 to 2ha) growing mostly rice, sweet potatoes, maize, millets, pepper, cassava and cowpea. Principal tree crops in the area include cashew and palm tree especially in swampy areas. Flood plain cropping i.e. the Fadama agricultural system is being practiced in some parts of the study area.

*Wildlife:* The birds (Aves) represented mainly by cattle egret, Quelea, Black kite, Bush fowl, Bush sparrow and the Vulture did not have a wide species diversity but relatively moderate population abundance. They displayed all the feeding habits fitting, for the food webs.

The reptiles and the amphibians; were more associated with wetness and or the aquatic environments. The West African toad was the prominent Amphibian mostly around the stream. The reptiles were more diverse; represented by the rainbow lizard, monitor lizard, the Nile crocodile, tortoise and a snake like puff adder. The mammals were represented by the squirrels, the Grass-cutter, and the rabbit. The Monkeys, the Bush pig and Bush dog represent the larger sized populations also like the birds, these exhibit varying modes of feeding.

Within the precincts of the project site, a portion of the wildlife habitats is being altered but none of the animals is even partially sedentary. As such, the construction site does not interfere with any special habitat of any wildlife. Some

of the listed species are even involved in some measure of seasonal drifts/migrations.

*Fisheries:* Fishing was not reported as one of the occupation of the people; nevertheless some form of fishing activities are practiced after the rains when the volume of the river is replenished by runoffs from the hills, the main gears used are fish traps and fences. The common species caught are *Clarias* sp *Heterobranchus* sp *Chana obscura* and *Tipapia niloticus*.

### **Socio-Economic Status**

Land Use: The proposed cement factory is the only industry in the area. Land use is basically for agriculture. As at the time of this report there were no other land-use conflicts. Other forms of land use in the area are for the building of houses.

Population: The population of Oyo village is estimated to be 1500. There had been a high influx of strangers in the past few years. There are between 146 and 150 households with an average household size of about 9.834 with more male about (58%) than females (42%).

Marital status: On Marital status, 95% of respondents were married and about 73% of the men had only one wife (monogamy). The mean (average) number of children is approximately 5. Those aged 18 years and above represent about 40%, i.e. a high potential workforce.

Level of Education: The proportion of respondent population with up to secondary school education was put at about 4% on the average (= 3.514). There are however, reliable signs of traditional education (crafts, traditional philosophy, folklores, etc.)

Occupation: Farmers accounted for about 60.3%, civil servants 11.6%, traders 4.1% and others 24%. The last category includes artisans, motorcycle transport operators and food processors and vendors (or cooked food).

Birth Rate and Death Rate: The mean birth rate was estimated at about 6.67 per month, while that of death was estimated at 1.948 per month. There is very high alien population (estimates of up to 1,000 were obtained). The occupations of these strangers were farmers (49%), traders (29.8%), civil servants (10.5%), artisans, food vendors, transporters, itinerant hawkers etc (10.7%). The strangers included Fulani, Hausas, Gwaris, Ibos, and Yoruba.

Community Structure: The people live in compounds and family groups. The settlement pattern is basically linear. There were mostly mud houses (more than 95%), with grass and corrugated iron sheets.

**Political Structure:** An Oba with the council of elders and chiefs, rules Obajana community. Other leaders e.g. the Elite, youth and religious leaders also assist in governance, directing and managing the affairs of the small rural populace.

**Natural Resources:** Natural resources mentioned are land, stream (some dry up in the hot dry season), forests and rocks. These resources belonged to all, but the authority to use was vested in the Oba.

**Staff Housing:** Obajana Cement has proposed a total of three hundred and fifty housing units for different categories of their staff. The estate will be provided with all the amenities required for it to function.

**Transport and Traffic effects:** Access to the project site is by the Lokoja- Kabba road (off Kabba Junction on the Okene road) Traffic on the road was very low at the time of this study with the occasional passage of vehicles on the road at the factory point. On transportation system, there are buses, bicycles and motorcycles. Movement within the community is by foot and to a lesser extent, bicycles.

**Community Infrastructure:** The community has one private clinic (hospital), one primary school (government owned). There is no secondary school. There is no electricity supply. There is near total reliance on streams, wells and rain harvest. There are no boreholes or mono-pumps.

**Culture:** There are two major festivals; one called Oworo festival is held once a year. The second called Agberifor- Akow is performed once in three years. Generally, visitors (i.e non- indigenes) are not restricted from these festivals.

**Crime:** Crime in the community was very low and took the form of rear occasional cases of domestic violence. However, there were periodic incidences of highway robbery on the Kabba road, which passes through the Community.

**Development projects:** As at the time of visit, there was no manufacturing company in the community, the people were aware of the proposed cement company, and expressed very strong positive responses. Dispositions and reactions to issues were indicative of a welcome atmosphere.

On the advantage of the proposed project, to the community they listed as mainly: Employment opportunities and Community development. Loss of farmland and the possibility of dust Pollution are the main disadvantages noted by the people.

### **Identified Significant Impacts**

The proposed project is predicted to have both beneficial and potentially adverse socio-economic and cultural impacts on the environment, workers and the community.

### **Beneficial Impacts**



- The establishment of the OCP shall contribute to enhancing Nigeria's domestic productivity, and help diversify Nigeria's economy, and save about US\$650 million of foreign exchange Nigeria spends on cement importation.
- Provision of employment and stimulation of local economy.
- Enhancement of community development through implementation of Company community development programme, which shall ensure the provision of basic facilities that are lacking and improvement of existing ones.
- Potential of improvement for social and cultural values of local people's exchange of values and standards through positive social interactions. Possible to positive changes in lifestyles due to availability of income when the natives take up Company jobs.

### Adverse Impacts

<i>Identified Impacts</i>	<i>Proposed Mitigation Measures</i>
<ul style="list-style-type: none"> <li>• Removal of vegetation cover/ the destruction of wildlife habitats and accelerated erosion.</li> </ul>	<ul style="list-style-type: none"> <li>• Vegetation shall be cleared in sequence: OCP site, housing colony and CPP site, in order to avoid generation of large biomass at the same time. Community members shall be allowed to harvest useful portions of the vegetation if they so wish.</li> <li>• To compensate for the loss of wildlife habitat, OCC shall I facilitate the development of a watershed management plan</li> </ul>
<ul style="list-style-type: none"> <li>• Dust emissions/solid wastes disposal during construction.</li> </ul>	<ul style="list-style-type: none"> <li>• Most of the dust generating activities during construction shall last for a brief period about 12 weeks, when excavation works are executed. Thereafter, vehicular movement shall generate most of the dusts. Dusts shall be suppressed using water browsers to spray exposed land surfaces and particularly areas likely to be disturbed by trucks and other vehicles during the construction of the factory premises. Vehicular speed limits of 25 km/h shall be observed in order to minimize dust generation.</li> </ul>
<ul style="list-style-type: none"> <li>• Air emissions during the operation phase of OCP cement plant, especially dusts</li> </ul>	<ul style="list-style-type: none"> <li>• Dust emitted during cement manufacture is generally non-toxic, non-corrosive, non-inflammable, non-explosive, and also not hazardous. Nevertheless, adequate mitigation measures such as Electrostatic Precipitators (ESP) and Fabric Filters shall be put in place.</li> <li>• Low NO<sub>x</sub> emitting burners shall be used to reduce NO<sub>x</sub> emission levels. In addition, further NO<sub>x</sub> reduction shall be achieved by firing limestone under reducing atmosphere. Also, additional NO<sub>x</sub> reduction shall achieved through recycling of Kiln flue gases for use in the pre-heaters and pre-calcinators.</li> <li>• SO<sub>x</sub> levels are expected to be quite negligible</li> </ul>

	because Nigerian gas is sulphur-free
<ul style="list-style-type: none"> <li>Impacts associated with liquid effluents (storm water, sewage, cooling water).</li> </ul>	<ul style="list-style-type: none"> <li>Sewage shall be piped into septic tanks, which when filled up shall be evacuated using sewage trucks to be treated in a sewage treatment plant prior to discharge</li> <li>For the storm water, a network of internal drainage system have been designed to storm water into a sedimentation tank, prior to discharge through and existing stream</li> <li>Cooling water shall be recycled as much as possible, but prior to recycling; it shall be cooled in a cooling tower before discharge into a retention pond from where it is recycled. Any spill over from the retention pond shall be discharged via an existing stream at approximately the same temperature as that of the stream water</li> </ul>
<ul style="list-style-type: none"> <li>Impacts associated with solid wastes</li> </ul>	<ul style="list-style-type: none"> <li>Wastes such as cement bags, wooden pallets, paper, etc., shall be reduced at source, reused or recycled via accredited vendors</li> <li>Spent mill balls and ceramic brick linings used in the kiln shall be recovered and re-used by adding it to raw materials for cement manufacture</li> </ul>
<ul style="list-style-type: none"> <li>Impacts of accidental spillages</li> </ul>	<ul style="list-style-type: none"> <li>The integrity of storage facilities shall be ensured</li> <li>Drip pans shall be made available where necessary</li> <li>Surface storage shall be avoided, and underground storage tanks shall be properly lined and monitored periodically</li> </ul>
<ul style="list-style-type: none"> <li>Conflicts due to loss of agricultural land / income derived from land</li> </ul>	<ul style="list-style-type: none"> <li>Provide reasonable compensation for lost crops/economic trees</li> <li>Liaise with the chief of Obajana to help provide alternative sites to displaced farmers</li> <li>Provide subsidies for procurement of farm inputs to assist affected farmers that may wish to continue farming on other lands</li> </ul>
<ul style="list-style-type: none"> <li>Disruption of Livelihood as a result of loss resources</li> </ul>	<ul style="list-style-type: none"> <li>As much as possible, junior staff shall be sourced from qualified members of the local communities.</li> <li>Skill acquisition programmes shall be established to assist members of the project affected communities acquire useful skills</li> <li>A micro-credit scheme shall be put in place to assist locals that may take up to trading/self-employment.</li> </ul>
<ul style="list-style-type: none"> <li>Gender Disparity in adverse social effects/ benefits</li> </ul>	<ul style="list-style-type: none"> <li>Special programs (e.g. 'female sexuality &amp; HIV', 'women in agriculture', etc.) shall be put in place to target local women</li> <li>Compensations shall be paid directly to women for crop/trees owned by them</li> </ul>

	<ul style="list-style-type: none"> <li>• Preferential treatment of women shall be encouraged where necessary taking into consideration their peculiar role and circumstances</li> </ul>
<ul style="list-style-type: none"> <li>• Social tension due to unprecedented influx of people</li> </ul>	<ul style="list-style-type: none"> <li>• train workers to respect cultural sensitivities in the host communities</li> <li>• Participate in local communities during festivals, e.g., Christmas, <i>Eid</i> ceremonies, New Yam Festivals, coronations, etc.</li> <li>• improve basic facilities/utilities such as water supply, school, and health infrastructure/supply</li> <li>• Put in place 'early warning' mechanisms to identify potential source(s) of tension/prevent them from escalating</li> </ul>
<ul style="list-style-type: none"> <li>• Danger of escalation of HIV/AIDS and sexually transmitted diseases (STDs)</li> </ul>	<ul style="list-style-type: none"> <li>• A HIV/AIDS awareness and prevention program shall be put in place to guide staff control their conducts.</li> <li>• Support NGOs to empower inhabitants of communities to take informed decisions about sexual behaviours.</li> <li>• Strengthening of healthcare system to provide voluntary counseling and testing for workers / members of host communities.</li> </ul>
<ul style="list-style-type: none"> <li>• High noise levels during cement production process.</li> </ul>	<ul style="list-style-type: none"> <li>• The OCP/ CPP project shall utilise the latest technology, which shall guarantee low noise levels. Noise will further be attenuated by the use of mufflers and silencers as dampeners.</li> <li>• Equipment, machinery and tools shall be serviced regularly to ensure low noise emission.</li> <li>• The use of ear defenders shall be mandatory in high noise sections of the OCP &amp; CPP</li> </ul>
<ul style="list-style-type: none"> <li>• Road traffic hazards due to &gt;1000 truck/vehicle movements per day</li> </ul>	<ul style="list-style-type: none"> <li>• OCC understands that the Kabba Junction – Kabba road shall be expanded by the Federal Ministry of works</li> <li>• OCC shall liaise with the Federal Road Traffic Commission (FRSC) in training of driver and road surveillance.</li> <li>• Road signs shall be placed at appropriate locations to alert motorist along the highway.</li> <li>• Speed limits shall be enforced for all vehicles approaching the OCP/ CPP</li> <li>• Traffic warden shall be stationed at strategic locations to guide traffic, especially around and within the factory site.</li> <li>• Separate inlet and outlet routes shall be provided for trucks moving into and out of the factory.</li> </ul>

### Environmental Management Plan

Obajana Cement PLC will undertake continuous monitoring of the significant impacts identified. This will make up the managerial tool through which prompt remedial action will be taken to correct unforeseen deviations in effectiveness of the mitigation measures. The results of monitoring will afford us an understanding

of the dynamics of the causes of impacts and these can be applied to future similar projects. Some of the environmental parameters to be monitored on a continuous basis will include but not strictly limited to:

- Accidents on Site
- Wastes
- Loss of Containment
- Heavy Vehicular Traffic

*Environmental Monitoring:* In compliance with statutory provisions and as part of the policies of Obajana Cement PLC; It shall periodically assess its operational environment by conducting Environmental in addition to a scheduled monitoring programme.

*Environmental Monitoring Plan:* Monitoring of the activities, detection and qualification of any likely impacts arising from the cement production process is scheduled in a program provided in table 7.1. The programme is designed to provide early warning signals about alteration in the components of the environments. The program will also indicate any changes resulting from the cement manufacturing operations.

*Scope of Monitoring:* The scope of monitoring will cover the following environmental components:

- Air quality, both indoor and ambient dust concentration
- Noise Assessment
- Surface water
- Vegetation and plant pathology
- Socio-Economics
- Occupational Health Monitoring

Equipment for continuous monitoring of particulates in the stack exhaust would be installed. Measurement of the sulfur content of raw materials and fuel, and direct measurement of particulate, SO<sub>x</sub>, and NO<sub>x</sub> levels at the plant boundary levels, would be carried out daily in the three months of operation and later monthly. The pH and temperature of heated wastewater effluent would be monitored on a continuous basis while suspended solids should be measured monthly. Other parameters stated in chapter four under surface water will also be monitored.

*Environmental Management System:* The key elements of the environmental management system of Obajana Cement PLC. will include, but not limited to:

- The recognition that an investment in environmental protection is an investment in a sound and sustainable future in which economic growth is guaranteed.
- Embracing current best practice in the industry.
- Integrating environmental and safety considerations into our product design

- Training as well as refresher courses for employees to perform all jobs in compliance with sound safety and environmental practices as well as to increase efficiency and cut costs/losses.
- Periodically carry out environmental/safety auditing and reviewing all measures aimed at ensuring compliance with all statutory regulations and laws.

*Decommissioning and Abandonment:* Feasibility studies carried out in relation to the project indicate a useful life span of over 50 years. At the expiration of the useful life of the project, adequate arrangements will be made to remove all movable assets. These may be sold or moved to another factory. Almost all the equipment and machinery shall be re-used for other industrial purposes. All plant facilities and machinery that are not deemed to be of further use will be sold off as scrap or recycled at metal depots/rolling mills.

Obajana cement Plc has carried out an Environmental Impacts Assessment of its proposed cement production facility at Obajana. Negative impacts that are likely to be associated with the proposed cement production project are primary loss of farmland and vegetation, which are irreversible significant impacts and air quality deterioration due to fugitive airborne dust. Management of the proposed project has consequently put forward mitigation measures aimed at reducing, and if possible eliminating the impact afore-mentioned.