



Netherlands Commission for  
Environmental Assessment

# Advice on Terms of Reference for the EIA for the Lime Stone Open Pit Mine at Obajana, Nigeria

Memorandum by the NCEA

10 January 2005



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Advice of the Secretariat

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**To** FMO  
**Attn** Hans Stefan Michelberger

**From** Mr. A.J. Kolhoff (Technical Secretary – Netherlands Commission for Environmental Impact Assessment)

**Date** 10 January 2005

**Subject** Advice on Terms of Reference for the EIA for the Lime Stone Open Pit Mine at Obajana, Nigeria (10 January 2005)

By: Secretariat of the Netherlands Commission for EIA  
Advice 2005-001

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## 1. Introduction

At the request of FMO-finance, the Netherlands Commission for EIA (NCEIA) has reviewed four EIA reports for four components of one large scale project: The Obajana cement complex in Nigeria, planning to produce 5 million tons of cement per year. The Commission has submitted one advisory review on these four report dd. 15 July 2004.

In December 2004 FMO-finance requested the NCEIA to draft an advice on Terms of Reference for the EIA report for an open pit lime stone quarry. Resulting in this advice of the secretariat of the NCEIA.

This quarry will produce lime stone that will form the resource for the cement production. The other components consist of the construction of a cement factory, the construction of a dam in a river to secure regular supply of water for the factory and the construction of a gas pipeline to fuel the furnaces of the cement factory.

## 2. Contents of the EIA report

The EIA report will contain the following sections which are in line with the requirements for a category "A" EIA report under

World Bank Guidelines for Environmental Assessment (operational Policy 4.01–January 1999)<sup>1</sup>:

1. An executive summary,
2. The policy and administrative framework
3. The project description
4. The environmental baseline study
5. The potential environmental impacts
6. The analysis of the alternatives
7. The monitoring and decommissioning, water management plan, waste management plan guidelines. Guidelines for an environmental management plan.
8. The references

## **2. Policy, legal and administrative framework.**

The Nigerian mining environmental regulations should be listed. When specific environmental standards are not or not yet available, World Bank standards and guidelines as specified in the World Bank Environment Health and Safety Guidelines 1995 and the World Bank Pollution Prevention and Abatement Handbook 1998 should be adopted.

In addition from an international environment perspective the international agreements<sup>2</sup> of which Nigeria is a party should be listed.

## **3. Project description**

It comprises:

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<sup>1</sup> Environnemental Management plan excluded

<sup>2</sup> as possibly e.g. Rio Declaration, 1992, International Tropical Timber Agreement 1994, UN Convention to Combat Desertification, Kyoto, ....

- The historical background of the project and of the exploration activities.
- The project location on a geographical map at a scale equal or larger than 1/40,000 including the villages, the rivers, the other main project components as the plant, the roads, the dam, the elevation lines. A graphical scale should be attached.
- The infrastructure and site access.
- The mine development, including at least five stages: initial stage, after five years, after ten years, after 15 years and the final stage before the decommissioning. For each stage will be presented at an appropriate scale and size (at least A3 format) a plan view and at least two relevant cross sections (perpendicularly positioned). The working levels and the corresponding groundwater levels will be indicated, the access trails and corresponding gradients as well. Besides the open pit, also the different mine components should be indicated: waste rock dump, marble stock piles, other material stock pile, Mimi River and tributaries diversion schemes, crusher, workshops, fuel storage, explosives store, mine infrastructure.
- The groundwater system, the reuse of the abstracted groundwater.
- For the waste rock dump will be indicated: the bulk volume at different stages, the slopes, the berms, the inter-berm-slope angles, the re-vegetation process, the storm-water drains location, the sedimentation ponds before the run-off will be discharged to the river and the actions taken to avoid erosion phenomena.
- The top soil heaps.

- The river and creeks diversion schemes with the related earth works and selected earth dump sites.
- The mine workshops, store, crusher, fuel oil storage, power supply, communication system.

#### **4. Environmental and socio-economic baseline study**

It includes:

- The climate (mainly from the Lokoja Station and already part of the existing EIA report).
- The air quality (probably because the Obajana area remoteness and until recently the absence of infrastructure and industry there are no air quality data, subsequently it will be limited to field observations and awareness of grassland fires, burn agriculture, charcoal burning consequences).
- The landscape and topography.
- The geology including the structural features (faults, folds, strikes), a geological map and geological cross sections (with a vertical scale ten times larger than the horizontal scale).
- The hydro-geology. In order to determine weather lowering of the groundwater table might be an issue. Consequently additional field investigations are required in order to determine the groundwater conditions. These include the implementation, inside the marble body, of observation wells, at least 10 at a depth corresponding to the bottom of the marble body or 50m. They also include three pumping tests at three different locations, selected in such a way that they are representative of the entire marble body to be mined. Besides the previously

mentioned 10 observation wells, three specific wells for pumping tests with an adapted diameter to pump at least 50m<sup>3</sup>/h and nine specific observation wells (for each pumping well three observation wells) should be implemented. In addition to the standard short pumping test (a few hours duration) for each of the three wells a long duration test should be performed (14 days). The observation and pumping wells location should be based on the results of the existing geophysical investigation and on the field and aerial photography's observation. The deliverables will be a groundwater contour map at a scale of 1/10,000 and the hydrodynamic parameters (hydraulic conductivity and storage coefficients). Groundwater samples will be taken and analysed. In addition to the chemical parameters as usually determined (see existing EIA report, chapter four page 26) will be determined the arsenic content will be determined.

- Soils classification and chemical analysis.
- Surface water, water quality and hydrography.
- Terrestrial flora at the site.
- Terrestrial fauna at the site.
- Aquatic flora and fauna at the site.
- Noise and vibration. Probably there is no historical noise data for the mine site. One may assume the highest noise levels generated are associated with thunderstorms, wind and rain. The noise level should be estimated on the LA90.T index.
- Land use and land capability by sedentary and migratory (groups of) people.

## 5. The potential environmental impact.

The identification and assessment of the environmental impacts the following should be undertaken:

- Review of Mine design studies
- Interviews with the Obajana mine management and operators
- Site visit to inspect mine area
- A review of the environmental data in the project area.

In the already performed and to upgrade EIA study, an environmental impact matrix (EIM) has been constructed. This matrix will be revised and upgraded. The matrix will be divided into the following 11 sections based on the major mine components as outlined in section 3.

- Open pit
- River diversion scheme
- Tributaries diversion scheme
- Groundwater lowering
- Waste rock dumps
- Marble stockpiles
- Other material stockpiles
- Top soil stockpile
- Crusher
- Mine workshops, fuel oil storage facilities, at this stage the storage of the explosives at the plant site should be considered and compared with the proposed storing close to the quarry

- Infrastructure and communications

Each section in the EIM is then evaluated in relation to the data included in the baseline study in order to identify and evaluate potential environmental impacts. The baseline study addressed the following bio-physical topics.

- Climate
- Air quality
- Topography
- Geology
- Hydrogeology
- Hydrology
- Terrestrial fauna and flora
- Aquatic fauna and flora
- Land use
- Noise and vibration
- Infrastructure and communication.

The impact on the environment of each mine component will then be assessed over the 3 stages of mine life (construction, operation and closure) and in the event of an accidental release to the environment. Impacts have to be quantified as a deviation from observed baseline conditions.

The following criteria will be used to characterise the project impacts and introduced in the EIM:

- Overall negative or positive impact
- Probability estimation of the impact occurrence
- Instant or cumulative nature of the impact



- Scale of impact: local, regional, national
- Significance of impact : deviation from baseline condition
- Duration of the impact.

In this section the eventual mitigation measures will be recommended. When proceeding to the EIM construction one will outline to be aware to take into consideration the impact of the dust on the flora and fauna, the impacts on the surface water quality which could arise from the erosion of the waste rock dumps, fuel or oil spills, sediment loads in the river the impact of the diversion of the river on the flow regime changing from a relatively meandering stream to a straight man-made channel, the mine de-watering consequences on the groundwater regime and quality (by oxidation of minerals in and around the deposits), the impact of the seepage from the stockpiles and dumps on the groundwater, noise and vibration impacts on the settlements, impact from the crusher and rock-waste dump on the employees health and settlements.

#### **6. The monitoring and decommissioning, water management plan, waste management plan guidelines. Guidelines for an environmental management plan.**

This section will take into consideration the impacts and the mitigation measures outlined in the previous section (section 5).

The section also includes the monitoring to propose and the decommissioning and closure plans. A plan view and at least two relevant cross sections (perpendicularly positioned) will be delivered at the same scale as the plan views of section 4, The decommissioning levels will be indicated, the corresponding slopes as well. Besides the open pit, are also indicated the different mine components after decommissioning: waste rock dump, other dumps, Mimi River and tributaries as diverted, and the situation of the other mine infrastructure remains, stockpile remains. Monitoring wells are indicated.

In this section the water management will be considered at a larger scale. The water management of the mine will be integrated into the Mimi and Adankole river watershed management plan.

Guidelines are given so that Dangote can develop a hazardous and non-hazardous waste management plan, to ensure that solid and liquid waste arising from the mine and off site investments are identified, collected, stored and finally disposed of in an environmentally responsible manner. The waste management plan will be integrated in a larger plan including the waste generated at the plant, the compound and surroundings.

Guidelines will be given so that a specific, measurable, attainable, reliable and time bound plan (SMART) to manage the environmental impacts can be developed.

Required Skills of Consultants: a senior environmentalist and a senior hydro-geologist with at least ten years experience, two in mine projects, two in projects in Africa. Fluent in English.