Executive Summary

Introduction

Exploration for coal in Nigeria began in 1906, but production did not commence until 1916 in an area now known as Enugu State. By 1919, the Geological Survey of Nigeria (GSN) was established as a department of government to take over and continue the work of the survey teams. The Minerals Ordinance 1946 and the Coal Ordinance No. 29 of 1950 provided the legal basis for the development of solid minerals.

The Nigerian Coal Corporation (NCC) was established in 1950 under the Coal Ordinance No. 20, and is owned by the Federal Government of Nigeria. NCC is headquartered in Enugu, Nigeria and had the exclusive rights to mine coal in Nigeria until 1999 when the Federal Government of Nigeria established a policy that de-regulated mineral exploration and exploitation. This opened up the sector to private industry participation and resulted in NCC entering into joint ventures on an equity participation basis, but it has currently divested of its operating interests in the sector as part of the reform programme in the Solid Minerals sector.

For this purpose, Milhouse Energy Services Limited has proposed to mine the extensive coal deposit resources in Nigeria and has acquired an Exploration Licence No. 22826EL (appendix 1) at Awhum in Udi LGA, Enugu State. Milhouse Energy Services Limited has commissioned Boot Resources Nigeria Limited to carry out an Environmental and Social Impact Assessment (ESIA) study for the proposed Project.

Project Location

Milhouse Coal Mining Project is located at Awhum Community in Udi Local Government Area of Enugu state. The licence area is 96 cadastre units, covering 19.2 km² on an Exploration Licence No. 22826EL. The mine site is 3.5km away from Awhum community and is accessible through Nineth Mile – Opi Nsukka road. The project is in South Eastern Nigeria and falls within longitude 070°25’ to 070°28’ and Latitude 06°31’ to 06°33’.

Terms of Reference for the ESIA

The ToR approved by the FMEng defined the scope of work, objectives, baseline data requirements and assessment tools and methods for the ESIA. The document also outlined the regulatory and administrative framework within which the ESIA would be conducted and highlighted, the key issues/ activities of environmental concern in the proposed project planning and implementation.
ESIA Objectives

The ESIA objectives include establishing the existing biophysical, socio-economic and health conditions of the project area, identifying and assessing the potential and associated impacts of the proposed mining project and making recommendations to eliminate/mitigate/control the magnitude and significance of the hazards and effects.

ESIA Methodology

The collection of environmental baseline data/information, environmental impact analysis and the preparation of the report were performed by a multi-disciplinary team. The team selection was based on characteristics of the project environment and experience/discipline of each specialist. A team leader coordinated the tasks and team members towards achieving set targets as well as liaison with client.

Specific tasks included reconnaissance survey, field samples collection, laboratory analyses, impact assessment and mitigation and the development of an EMP.

Legal and Administrative Framework

The legal and regulatory framework for carrying out the ESIA of the proposed Coal Mining at Udi are contained in Milhouse’s policies, relevant national statutes and international environmental conventions to which Nigeria is signatory and listed below:

- \textit{Environmental Impact Assessment Act No 86 of 1992}
- \textit{Nigerian Minerals and Mining Act 2007}
- \textit{National Environmental Protection Regulation (NEPR, 1991)}
- \textit{Nigerian Minerals and Mines Regulation, 2011}
- \textit{Endangered Species Act 11, 1985}
- \textit{Land Use Act, 1978}
- \textit{Enugu State Environmental Sanitation Authority (BENSESA)}
- \textit{MILHOUSE’s Health, Safety and Environment Policy}
- \textit{International Conventions and Treaties Ratified by Nigeria}
Project Objectives

Milhouse Energy’s main objective is to mine coal to supply as fuel to the proposed Milhouse 200MW and 36MW Coal Power Plants at Awhum and Nsukka respectively.

Possible Uses of Coal

Coal produced from this mine will be used as fossil fuel by a process of combustion, for power generation. It will be useful in cement and smelting industries, Battery making companies, Steel mills etc. It will also make a wonderful blend for the production of smokeless coal briquette. The by-product from these plants will serve as feed stocks to the downstream industries.

The Need for the Project

The need to bring the Nigerian economy into the 21st Century is rested on a reliable power generation system that has adequate electrical power to supply the needs of the population and attract industry to the country. Without a reliable and expandable power generation system, the country cannot support modernization or industrialization.

Benefits of the Proposed Project

The potential benefits of the proposed coal mining project include; creation of job opportunities especially for inhabitants of the area; promotion and expansion of industrial growth with attendant stimulation of socio-economic activities; expansion and provision of social amenities and infrastructure such as access roads, hospitals, potable water, schools, etc in the project area; boost in local and regional economy through the provision of employment and award of contracts especially during coal mine development and operation stages.

Project Options

Option 1: No Project Option: The ‘No Project’ option means that the coal mining project will not be executed. This implies that the status quo remains. This alternative is not considered a viable option because the present scenario of insufficient energy source for domestic, commercial or industrial purposes is inimical to Nigeria’s vision 2020 development agenda.

This option is therefore considered not socially and economically sustainable for Nigeria. This option is therefore rejected.
Option 2: Delayed Project: The ‘Delayed Project’ option implies that the planned project will be delayed until a much later date. The implication of delayed project option will mean that all the preliminary works and associated efforts/costs already incurred by the proponent would have amounted to economic wastage. Similarly, the unpredictable inflationary trend in the global economy which may lead to unanticipated increases in project costs is an economic indication that the delay option is not a viable consideration for the project. This option is also rejected.

Option 3: Project Implementation Option: The ‘Project Implementation’ option means that the coal mining project will be executed. The coal deposits in the area will be explored with the aim of supplying as fuel to the proposed Milhouse Coal-fired Power Plant, thereby increasing energy sources for domestic, commercial and industrial purposes; revitalizing of the Nigerian coal industry; expanding the electrical generating capacity; and also for export to foreign buyers. The inherent benefits of allowing the project to go ahead as planned are numerous both to the proponent, host communities, Enugu State and Nigeria at large. This option is therefore chosen for its economic, social and environmental benefits.

Project Alternatives

Alternative 1: Underground Mining Option: In an underground mining method called ‘stoping’ or ‘block caving,’ sections or blocks of rock are removed in vertical strips that leave a connected underground cavity that is usually filled with cemented aggregate and waste rock. This option is rejected because outcrops of coal deposits in the project area would be unexploited. The result of this is loss of earnings.

Alternative 2: Highwall Mining Option: Highwall mining is a proven primary method for mining coal from outcropping horizontal seams. This alternative implies mining of coal from underneath the final highwall, when the strip limit is reached. This option is good, but cannot be used alone as the surface has to be fully exploited before continuing to highwall.

Alternative 3: Surface Mining Option: Surface mining is usually suitable for mineral ores that are close to the ground surface. Surface mines are naturally extended until either the valuable deposit is exhausted, or the cost of de-cresting larger volumes of overburden makes further mining an uneconomic option to shoulder. Preliminary investigations on the measured to proven reserve area, revealed that multiple coal seam identified in the area are near the surface (at less than 10m depth), the open cast mining method is the suitable method to adopt. This option is therefore accepted.
Value of the Project

The project will provide fuel for electricity generation, stimulate the development of industries and provide labour and employment opportunities. In monetary terms, the project value is estimated at $240 million USD, however, the specific value of the proposed project in terms of financial estimation will be calculated following coal mining activities.

Envisaged Sustainability

Using the pillars of sustainability; environmental, economic, social and technical sustainability, the proposed project is considered sustainable.

Resource Sustainability: The overall reserve for the entire coalfield is estimated at about 27Mt and shallower than 10m below surface. At a production rate in the range of 0.952Mta, the Milhouse Coal Mine project is expected to be viable and sustain operations for at least twenty eight (28) years. It is expected that mining operations will be continuous for the stated period.

Technical Sustainability: The proposed project will be technically viable because, both the personnel and the technique employed for the mining, which is the open cast (surface) mining, are readily available and it will depend on the abundant coal deposits in the area. The recovery ratio of the coal, which is the percent of mineable coal recovered from the seam, is also expected to be high. The average recovery ratio from all surface mines is about 83%.

Economical Sustainability: The installation and operation of the proposed coal mining and subsequent creation of employment opportunity will guarantee economic sustainability. This is in addition to the revenue accruable to the local, State and Federal governments. Indirect employment in the form of markets, shops and sources of revenue will also sprang up within the vicinity of the mine. The project area will also attract skilled labour and professionals, some of whom might eventually settle in the area. This will lead to the emergence of little towns and villages around the project, which will increase the economic condition of the area. The project will therefore leave the environment economically healthier than it met it.

Environmental Sustainability: To assure environmental sustainability of the proposed project, Milhouse Energy shall ensure the proposed coal mining activities is executed with minimal negative impacts on the environment whilst ensuring that all recommended mitigation measures for the identified significant impacts are adhered to strictly. In addition, this project shall be carried-out in accordance with the relevant national and international regulatory and legislative guidelines as well as best practice principles using up-to-date technology that exert minimal impacts on the environment.
Social Sustainability: To assure social sustainability of the proposed project, Milhouse Energy is poised to ensure that adverse impacts to the local communities during the project life cycle are negligible. Milhouse Energy shall also ensure social inclusion by designing and implementing a robust and continual engagement programme with local communities throughout the life span of the project as well as sharing some of the project benefits to the host communities in the form of Corporate Social Responsibilities (CSR).

Overview of the Project

The project consists of the development of 27Mt of measured to proven reserve within the Nsukka formation in the Anambra Basin. The project is planned to mine up to 952 thousand tons of Run Of Mine (ROM) coal per annum (pa) by open cut methods, to produce an average of 619Ktpa of product coal for power generation to the national grid. Project production life is anticipated to be 28 – 29 years based on current economic assessment of the reserve. Assuming production is maintained at current level, and with a continuing exploration success leading to resource growth, the life of mine is expected to extend beyond 29 years. Milhouse has developed a mining plan for the Awhum coal concession area. Mining operations would commence in 2018 and has been restricted to the concession area.

Waste Management Plan

- The mine wastes to be considered include:
  - Overburden/Interburden: This consists of the top soil (humus), red earth, (lateritic soil), sand stones.
  - Vegetation cover: Some plant species will be transplanted.
  - Water: This will mostly involve the water quality management. Due to the introduction of silts and other contaminants like oil
  - Mud: Sedimentation ponds would be constructed where mud would be allowed to settle and consolidate.
  - Slimes: Slimes would be treated in a similar method by constructing pits where it would be collected.
  - Domestic and office waste (Refuse): Refuse generated from the offices and mining camps would be incinerated.
Description of Baseline Condition

The description of the baseline conditions of the project area is based on analysis of both primary and secondary data from various sources. Primary data source includes a one-season (wet season) field sampling conducted in accordance with the FMEnv approved ToR. Secondary data sources include existing published literatures, research studies, maps and textbooks related to the proposed project and those peculiar to the project area. In particular, existing approved environmental assessment reports of infrastructural project in nearby area (ESIA Report of Zuma 828 Coal, 2010) as well as meteorological and climate related information for the project area obtained from the Nigerian Meteorological Agency (NIMET). The baseline information was essentially obtained for both biophysical and social environmental components: Climate and Meteorology; Air and Noise Level; Soils and land; Surface water and Groundwater; Geology and Hydrogeology; Ecological Biodiversity (Aquatic and Terrestrial Flora and Fauna); Socio-economic and Community Health.

Socio-Economics

The methodology used for the socio economics survey include Focused Group Discussions, Questionnaire administration, Participatory Rural Appraisal Technique and Rapid Rural Appraisal Technique. A consultation exercise was carried out in order to ensure proper social profiling, which involves the gathering of socio-economic data of the study area. The study area comprises of communities in the immediate project area, as well as adjacent communities. This exercise helps to identify stakeholders in the project.

Associated and Potential Impacts

The objectives of this Impact Assessment are:

- To establish the significant potential impacts of the proposed project activities on the biophysical, social, and health for the immediate and surrounding environments
- To evaluate alternatives for environmental impact that could lead to sustainable development
- To incorporate the recommendations of the ESIA into the decision making process for the mining project.

Some of the potential impacts of the proposed mining project include:

**Loss of Farmland:** Following exploration, portions where sufficient coal seam of economic value is found will be acquired from local farmers. Land acquisition will inadvertently lead to economic displacement of people from their source of livelihood. Loss of land is a significant impact as it may be directly linked to other socioeconomic impacts including loss of land based livelihood, reduction in food production and consumption, loss of economic trees and potential grievance and conflicts over land resettlement & compensation.
Loss of Employment: There is potential for mine closure when it is no longer economically or environmentally viable to continue coal mining or when the coal deposit is exhausted. Mine closure will lead to loss of jobs, especially for permanent mine workers, and sudden economic halt in the project region.

Cumulative Impact: Cumulative impacts are those that result from the successive, incremental, and/or combined effects of an action, project, or activity when added to other existing, planned, and/or reasonably anticipated future ones. For practical reasons, the identification and management of cumulative impacts are limited to those effects generally recognized as important on the basis of scientific concerns and/or concerns of affected communities.

Specifically, for the proposed mine development project, cumulative impact was assessed based on the documented evidence that there are coal deposit in commercial quantity in the area and thus multiple exploration licences will be issued to other mining companies. Consequently, there may be more than one mining companies exploiting the area at the same time.

In view of this, impacts such as; loss of farmland and environmental degradation, have been identified as likely to have cumulative effects on biophysical and social components of the environment of the project area:

Mitigation Measures

The mitigation measures proposed for the predicted medium and high-ranking impacts arising from this proposed mining project would recognize the following:

- Environmental laws in Nigeria, with emphasis on permissible limits for waste streams FMENV (formerly FEPA, 1991)
- Best Available Technology for Sustainable Development
- Concerns of stakeholders during consultation meetings, and focus group discussions with the socio economic/health teams.

Impact mitigation may involve all or some of the following:

- Avoiding the impacts altogether by not taking a certain action or parts of an action.
- Minimizing the impacts by limiting the degree or magnitude of the action and its implementation
- Rectifying the impact by repairing, rehabilitating or restoring the affected environment
- Compensating for the impact by replacing or providing substitute resources.

The mitigation measures of the identified impacts are contained in the section of ESMP.
Environmental Management Plan

The Environmental Management Plan has been formulated with the aim of ensuring that all the identified significant impacts from the project are mitigated to as low as reasonably possible. It specifies the mitigation measures, and the action parties to manage the biophysical, social and health environment at the various phases of the project. The proponent and the regulators are joint responsible action parties.

**Land take**
- Resettlement of community, guided by a Resettlement Action Plan (RAC) which will be developed in concert with the people of the community.

**Vegetation**
- Some plant species will be removed and replanted in designated places.

**Soil degradation and soil/ground water contamination**
- Provide containment, proper treatment and disposal of chemicals and liquid discharges

**Change in employment and income levels**
- Assist local communities as appropriate

**Noise**
- Enforce no night driving policy by contractors
- Contractor to plan activities such that World Bank Guidelines are not exceeded around the communities
- Communities will be consulted prior to periods of expected peak noise levels
- Exhaust mufflers will be installed in the vehicles where necessary to dampen engine sound

**Air pollution**
- Ensure that all mobile and stationary combustion engines are properly maintained

**Behavioural Influences/social vices**
- Intensive enlightenment campaign and health education for the abatement of abuse of Drugs, alcohol and tobacco in the communities and among workers throughout the life of the project,
- Project management will ensure that contractor enforces alcohol & drug policy for staff
Traffic

- Place visible warning signs on roads and vehicles
- Install speed breakers at sections of the roads traversing communities
- Large and slow moving vehicles will be scheduled during off-peak periods
- Raise community awareness of unusual activity via the community relations team
- Ensure appropriate maintenance of roads around project site.
- Transportation of heavy equipment to the site will be accompanied by public warning and precautions such as labels; sirens etc.

Facilities and Infrastructures

- Ensure appropriate maintenance of the road to project site with a view to improving its functionality.
- Contractor to provide a detailed housing plan for staff and other workers
- Advertise construction jobs that will be available.
- Site job recruitment centres away from the project area to discourage influx of people
- Movement of unauthorized persons into construction areas and camp will be strictly restricted

Decommissioning

The overall objective plan will be to demonstrate the effectiveness of the ESMP by restoring the project site to its original status as much as possible at the end of the project lifespan. Demolition must be sequential and the demolished waste disposed of in a proper manner. Reusable items should be sold, recycle, reduce, reuse and recovery will be adopted as applicable to ensure reduction of the volume or relative toxicity of liquid or solid wastes. Access roads and culverts built for the project will not be dismantled.

Monitoring

Water/sediments

This will be done monthly and the physical parameters which include conductivity, TDS, pH, temperature, dissolved oxygen and microbial load will be monitored.
Effluent

This will be monitored continuously, daily to check oil and grease and weekly to monitor the physical parameters which includes: Conductivity, TDS, pH, temperature, Dissolved Oxygen and microbial load.

Bio-treated waste water

This will be monitored weekly to monitor the physical parameters which includes: Conductivity, TDS, pH, temperature, Dissolved Oxygen and microbial load.

Air Quality

This monitoring will be done weekly based on permit to monitor the quantity of gaseous emissions in the atmosphere.

Noise

This will be monitored monthly (day and night) and the parameter will be decibel.

Groundwater

This will be monitored every 6 months, the parameters to be monitored are: Conductivity, TDS, pH, temperature, Dissolved Oxygen and microbial load.

Conclusion

This ESIA identifies and evaluate all environmental and socioeconomic impacts of the coal mining operation and recommends proactive measures to manage all significant adverse impacts as well as measures to enhance the benefits of the project. This was done essentially to ensure that the proposed project is implemented in an environmentally and socially sound and sustainable manner.