



FEDERAL REPUBLIC OF NIGERIA



POTENTIAL COAL RESOURCE AND POWER GENERATION DEVELOPMENT OPPORTUNITIES IN NIGERIA





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INTRODUCTION TO NIGERIA

Nigeria is located in West Africa about 10 degrees north of the equator. It is bordered on the West by the Republic of Benin, on the north by the Republic of Niger and on the east by the Republic of Cameroon. To the south, the country is bounded by approximately 800 kilometers of the Atlantic Ocean, from Badagry in the west to the Rio del Rey in the east. Nigeria occupies an area of 923,800 square kilometers and the vegetation ranges in gradation from tropical and mangroves on the coast through rain forest to desert in the far north.

Nigeria's National Population Commission estimates the Country's current population at 135 million. It is the most populous country in Africa and the tenth most populous in the world. Approximately one-third of the population lives in urban areas while rural areas account for the remaining two-thirds.

The Nigerian economy has experienced continuing growth in the last several years. In 2004, the Gross Domestic Product increased by 6.1% from 2003. The Country's major export is petroleum.

Nigeria was a British colony, but became independent in 1960. Six years later, Nigeria first came under military rule. After a civil war between 1966 and 1970, there was a brief return to democratic governance between 1979 and 1983, then a relapse into military rule. Nigeria finally returned to democratic rule in 1999 under a presidential system with three tiers of government at the federal, state and local levels. The federal level comprises an executive arm, a bicameral legislative arm and a judiciary arm. There are 36 states and a Federal Capital Territory. Each state has its own executive arm and house of assembly. Each state is further divided into Local Government Areas (LGAs), Each of the 774 LGAs has a chairman and council.

NIGERIA'S ELECTRIC POWER INDUSTRY

Nigeria's electric power generating and grid distribution capability is currently in the range of 3,500 to 4,500 megawatts (MW) - - far short of that required to support the current

population and to keep the economy growing. The Government estimates that current demand for power throughout the Country is in the range of 20,000 to 25,000 MW. Power is currently produced from several small gas fired and hydropower generating facilities. Power from the electricity distribution grid is supplemented by numerous small, costly diesel powered generators in the Country's towns and villages.

The electricity supply in Nigeria is characterized by frequent power failures and load shedding, resulting in economic losses through lost production, damaged equipment and the need for expensive stand-by power. The Country has an excessive reliance on its current non-coal generating facilities while its vast coal reserves remain unutilized.

Nigeria has large petroleum and gas resources along its Atlantic Coastal basins. These are being developed by the private sector for export and the Government does not wish to depend solely upon these resources for power generation within the country

Nigeria has major coal resources that have not been well explored or exploited. The government has recently placed a high priority on utilizing those resources to increase the Country's electrical generating capacity. Nigeria's goal is to revitalize the coal mining industry and expand power generation by attracting foreign companies to develop these large coal resources and construct coal-fired generating plants that will connect to the Country's electrical distribution grid.

There is also a significant potential domestic demand for coal briquettes to replace wood for cooking and domestic and industrial heating. The use of wood by the Country's growing population is causing increasingly rapid deforestation in many parts of the country.

The exploitation of coal for electricity generation and the production of coal briquettes for domestic and industrial heating will bring a number of benefits including:

- Increased and more reliable electricity supply;
- Lower cost electrical energy;
- Expanded industrialization of the economy;
- Increased employment and human resources development;
- Increased capacity utilization of existing industries;
- Increased national income through taxes; and
- Reduced deforestation and prevention of desert encroachment in the northern parts of the Country.

Privatization of the energy sector has already been initiated through the Electric Power Sector Reform Act of 2005. The former National Electricity Power Authority (NEPA) is being unbundled into generation, transmission and distribution companies that will become privatized. Meanwhile, several Independent Power Producers (IPPs) are already operating in Lagos, Abuja and Port Harcourt.



COAL MINING HISTORY

Coal was first discovered in 1909 near Udi (central eastern Nigeria). In 1950, the Nigerian Coal Corporation (NCC) was formed and given the responsibility for exploration, development and mining the coal resources. The NCC is 100% owned by the Federal Government and is headquartered in Enugu. NCC has operated two underground mines, Okpara and Onyeama, and two surface mines, Orukpa and Okaba, located on the eastern edge of the Anambra Coal Basin. Between 1950 and 1959, coal production in the Enugu mines increased annually from 583,487 tonnes to a peak of 905,397 tonnes. After 1959, production decreased significantly each year including the Civil War period of 1966 to 1970 when no coal production was reported.

Production in the 1980s was less than 100,000 tonnes annually and decreased further in the 1990s. Much of this production was utilized by the railroad and some smaller tonnages were exported. NCC has not operated any coal mines for several years. The Agency has recently entered into several joint ventures with outside entities to mine coal, but those efforts have met with limited success. Nigeria's only significant coal mine is the Okaba mine (Okaba coal field), which is operated under a production sharing agreement with Nordic Industries Limited. Production of 2,712 tonnes was recorded in 2001. There is also a small mine at the Orukpa coal field, which is not currently in production.

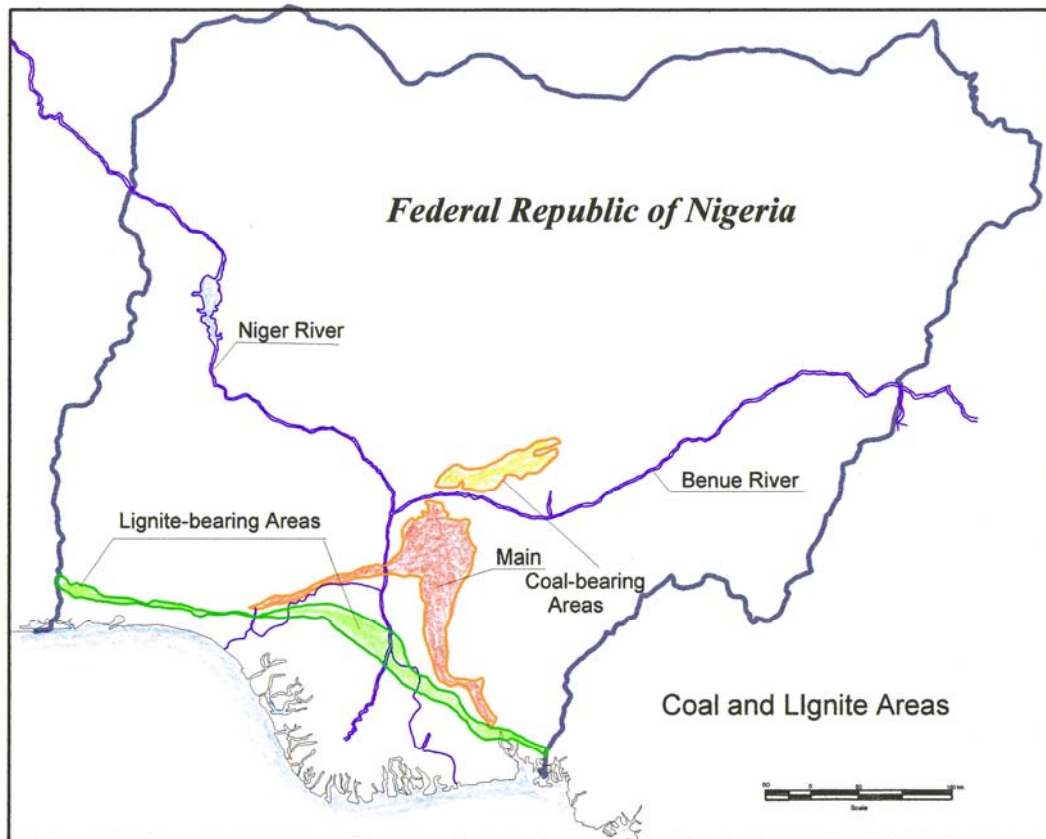
Nigeria permits 100% repatriation of profits and offers a number of basic facilities that are necessary for the conduct of coal mining and power generation including:

- Provisions for 100% foreign ownership of mining concerns and power generation plants;
- Developed infrastructure including road links, railways, deep ocean terminal and jetties,
- Export Processing Zones and Free Trading Zones;
- A national electric power grid that is currently being upgraded;
- Local markets for industrial commodities;
- An existing Stock Exchange;
- Fixed and mobile communication systems;
- Several private and state owned airlines with daily flights between major cities; and
- Existing formats for joint venture and production sharing contracts.

NIGERIAN COAL RESOURCES

Nigerian coal has been found suitable for boiler fuel, production of high calorific gas, domestic heating, briquettes, formed coke and the manufacture of a wide range of chemicals including waxes, resins, adhesives and dyes. Their characteristic properties (low sulfur and ash content and low thermoplastic properties), make these sub-bituminous coals ideal for coal-fired electric power plants. Some Nigerian coals can be used to produce formed-coke of metallurgical quality.

The domestic coal market is latently large. Besides the potential for power generation, Nigeria currently imports coals of various grades and qualities including coke, pellets, briquettes, anthracite, coking coal and form coke. There is also the potential for coal exports to countries such as China, Israel, Japan, Ghana, the U.S., Europe and India.



The Nigerian government has recognized the need to revitalize the Country's coal mining industry to provide fuel for power generation and domestic use. Under a grant from the United States Trade and Development Agency (USTDA), Nigeria's Ministry of Solid Minerals Development has undertaken a Feasibility Study to determine the potential for coal resource development.

The Study is being conducted by Behre Dolbear & Company (USA), Inc., an international mining consulting firm. In 2005, Behre Dolbear was commissioned to:

- Evaluate available data and quantify coal resources in accordance with internationally accepted resource definitions;
- Identify coal deposits that have the highest potential for near term development, utilizing world class coal mining practices;
- Determine the potential of developing an economically viable coal mining and power generating industry to supply electrical energy to the Nigerian electrical grid; and
- Develop the most effective strategies to revitalize the Nigerian coal industry.

Behre Dolbear is supported in Nigeria by Global Minerals Limited (GML), with whom it has collaborated for over ten years.

THE ANAMBRA COAL BASIN

Coal occurs in several areas in Nigeria and ranges from bituminous to lignite. The coal deposits of the Anambra Basin, located in southeastern Nigeria, appear to contain the largest and most economically viable coal resources. This basin covers an area of approximately 1.5 million hectares and is constrained by the Niger River on the west, the Benue River on the north and the Enugu Escarpment on the east. The coal is predominantly in one seam that outcrops along the eastern side of the basin at the base of the Enugu Escarpment and dips gently toward the center of the basin.

The primary focus of the Study is on thermal coal reserves in the eastern flank of the Anambra Basin. The Study is focusing on this area because the coal is of good quality and because there is a significant amount of geological data available from four idle mines and from historical drilling. Little is currently known about the coal resource potential on the western side of the basin along the east bank of the Niger River. However, coal outcroppings have been reported at Idah and Dekina on the northwestern side of the basin, demonstrating that coal exists on the western side of the basin as well as the east.

The coal resources on the eastern side of the basin occur in one primary coal seam that appears to be continuous throughout this area. Exploration within the basin is limited, but there are four small coal mines in the eastern outcrops of the basin northwest of the city of Enugu and two smaller mines farther north. In addition, 123 shallow drill holes have been drilled to depths of 335 meters or less. Not all of those holes penetrated the main coal horizon. Only minor structural faults have been identified. Where the seam has been intercepted by drilling, the potentially mineable coal ranges in thickness from less than 1 meter to over 3.6 meters and averages 2.11 meters. A number of coal sections along the eastern outcrop have also been measured, but in general these resources have not been sufficiently explored to define the potential proven reserves.

The Study has subdivided the Anambra Coal Basin into seven coal mining districts, focusing on three that have been explored to a greater degree than the others. These have been defined as the Kogi, Benue (Orukpa-Ezimo) and Enugu Coal Districts. Each of these districts has two or more defined coal resource areas.

KOGI DISTRICT

The Kogi Coal District, covering 225,000 hectares of the Anambra Coal Basin, lies on the northeastern side of the basin. Two areas within the district have been explored to a limited degree. The more northern of the two areas, Ogboyoga, has the greatest amount of available drill data, where 27 holes have been drilled and cored and 15 separate measurements have been taken of outcrops of the main coal seam in stream drainages. Behre Dolbear used the guidelines of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (also known as the JORC Code) to delineate a total of 123 million metric tonnes of coal (Demonstrated) underling an estimated 8,900 hectares. An additional 165 million tonnes of coal classed as non-reportable resource by the JORC Code definitions, is projected to lie in the Ogboyoga area. The coal thickness in this area is approximately 2.0 meters. The other area of interest is Okaba, the site of a small idle surface mine. Near Okaba 17 core holes have been drilled, all of which intersected the main coal seam. No outcrop samples have been reported for this area. A total of 100 million tonnes of demonstrated coal (JORC) have been estimated to underlie 2,770 hectares in the Okaba area and an additional 435 million tonnes of non-reportable coal resource are projected to the west of existing drilling. In total the Kogi Coal District is estimated to have a Demonstrated Coal Resource of 223 million tonnes averaging 3.6 meters thick, which underlies 8,900 hectares, or 4 percent of the District. The total non-reportable resources by JORC Code are 600 million tonnes.

BENUE DISTRICT (Orukpa-Ezimo)

The Benue Coal District, covering 175,000 hectare of the coal basin, is immediately south of the Kogi District along the eastern outcrop of the Anambra Basin. It also has two areas of interest. The more northern of the two, Orukpa, includes a small idle surface mine and a total of 11 drill holes. Six coal outcroppings have also been measured in streams in the area. Based on these data, Behre Dolbear estimates that a reportable coal resource of 81 million tonnes (Demonstrated – JORC) exists along the outcrop. Another 117 million tonnes of non-reportable coal, as defined by the JORC Code, is projected to exist west of the existing drilling. The average coal thickness is 3.1 meters. Immediately south of the Orukpa area is the Ezimo area. This area has limited exploration, with only four drill holes penetrating the main coal seam. Ten coal outcroppings have also been measured, not all of which have exposed the entire seam. Based upon this limited data, a total of 43 million tonnes of demonstrated coal resource have been projected for the Ezimo area. An additional 263 million tonnes of non-reportable coal resource is projected to exist west of the existing drilling. The average coal thickness in this area is also 3.1 meters. In total the Benue District (Orukpa-Ezimo) is estimated to have a Demonstrated Coal Resource of 124 million tonnes, which underlies 4,700 hectares, or 3 percent of the District. The total non-reportable resources, as defined in accordance with the JORC Code, are 380 million tonnes

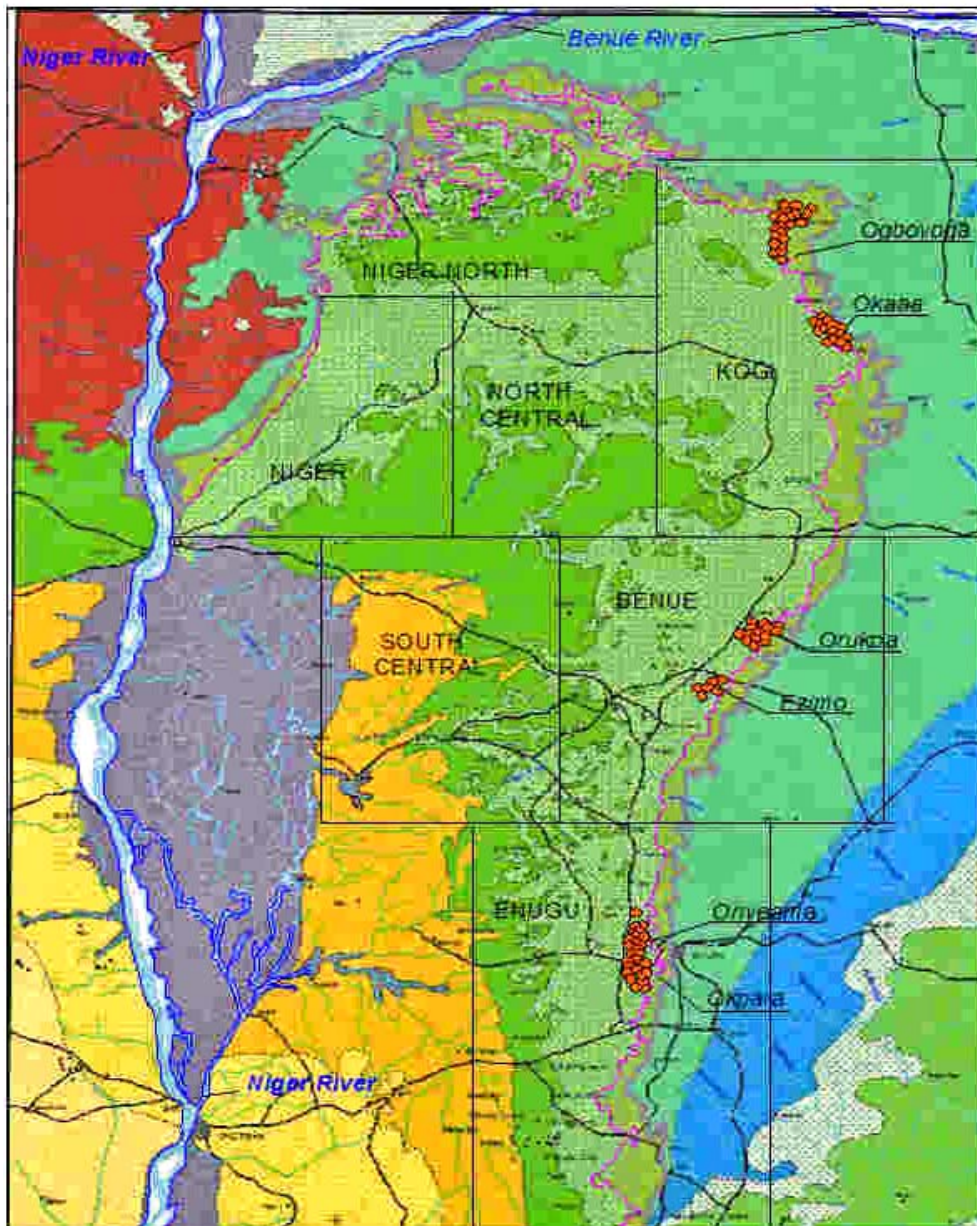
ENUGU DISTRICT

The Enugu Coal District, covering 270,000 hectares of the coal basin, is centered around Enugu City, south of the Benue District. It has supported the largest amount of commercial mining in the past. In addition to two underground mines, there are a total of 36 drill holes drilled in the area. Previous studies have estimated the demonstrated coal resource to be 49 million tonnes averaging 2.2 meters thick. An additional 111 million non-reportable tonnes of in place coal are inferred to exist west of the old mine workings.

SUMMARY OF COAL RESERVES

Within the areas of these three districts where sufficient drilling exists to make reasonable estimates of in-place coal resources, a total of 396 million metric tonnes can be demonstrated using JORC classification criteria. An additional 1,091 million tonnes of inferred and hypothetical coal resources have been delineated in these three districts. The entire currently defined coal resource for the areas studied is 1,487 million tonnes. The coal seam thickness averages 2.2 meters through out the area from Enugu north to Ogboyoga. The remaining districts are essentially unexplored.

NIGERIAN COAL MINE DISTRICTS



Coal in the areas studied is considered to be an excellent thermal coal for fueling coal-fired electrical generating plants, or for other industrial use.

Considerable additional work must be done to fully explore and prove the coal resources in the Kogi,

Benue and Enugu Districts, but there is enough information to indicate that there is a high probability that each of these Districts can support a significant coal-fired generating plant.

The Coal Resource estimates and approximate coal quality for the areas studied are summarized in the following tables.

**Summary of Reportable and Non-reportable Coal Resources
Kogi, Benue (Orupka-Ezimo) and Enugu Districts
(million tonnes)**

Area	Reportable Tonnes			Non-Reportable Tonnes			Total Resource
	Measured	Indicated	Demonstrated	Inferred	Hypothetical	Total	
Ogboyoga	56	67	123	83	82	165	288
Okaba	45	55	100	191	244	435	535
Orupka	40	41	81	88	29	117	198
Ezimo	17	26	43	112	151	263	306
Enugu		49	49	111	-	111	160
Total			396	585	506	1,091	1,487

Approximations of Coal Quality by Area (A. R. Basis)

Area	Moisture (%)	Ash (%)	Sulphur (%)	Heating Value Btu/lb.	Kcal/kg
Ogboyoga	13.50	8.00	0.58	9,930	5,520
Okaba	10.30	9.30	0.65	10,280	5,710
Orupka	11.80	11.20	0.40	9,990	5,550
Ezimo	10.90	6.40	0.50	10,900	6,050
Enugu	7.60	6.70	0.93	11,900	6,610

OTHER COAL DEPOSITS

Other potentially significant coal and lignite resources in Nigeria include:

- The Inyi Deposit south of the city of Enugu with a potential resource of approximately 10 million tonnes;
- The Afikpo deposit located south and east of Inyi in an area that is heavily populated, where mine development might be expensive;
- The Lafia Obi deposit located northeast of the mining districts described above with an estimated inferred resource of 33 million tonnes of potential metallurgical coal resources. Over 139 holes have been drilled and exploration shafts have been sunk in the area. The Nigerian Government has paid considerable attention to the potential

commercialization of this resource, but additional exploration is required before this can be defined as a commercial resource;

- The Gombe deposit is located east of Lafia-Obi. Preliminary drilling has indicated the presence of metallurgical grade coal, but no resource estimates have been made for this area; and
- The Asaba Lignite deposit is on the coastal plain south of the Anambra Basin. A total of 19 holes have been drilled in two areas. Although these data are limited they strongly suggest that a significant lignite resource exists in this area. More exploration is required to determine if it is an economic resource.

COAL MINING POTENTIAL PRELIMINARY MINING PLAN

The mining plans described here are preliminary and are based on limited information. They were developed by Behre Dolbear to test the economic viability of the coal fields and their potential to produce thermal coal to fuel large electrical generating stations. Behre Dolbear believes these indicative mining methods are most applicable to the deposits and that the suggested production rates can be reasonably expected from these deposits.

KOGI MINING DISTRICT

Behre Dolbear has developed a mining plan for the Kogi coal resources to determine if the coal resources can be developed as one mining complex. The planned mining operation would consist of surface and highwall operations and underground longwall operations that can supply coal to a single, coal-fired power plant.

Based on the information available regarding the coal seam and the topography, surface mining will be limited to contour mining along the outcrop of the coal seam, similar to contour coal mining operations in the eastern United States. The proposed plan is to initially face up an area for the underground mine portals using surface mining equipment. Surface contour mining will then begin, working both north and south from the portal area along the outcrop. The coal will be stripped from the outcrop to a point where the depth of the overburden reaches about 30 to 40 meters. In most areas, the depth of cover increases rapidly from the outcrop line. On average, a surface contour cut can only be about 250 meters wide from the coal outcrop because at that point the cost of stripping the overburden will probably render surface mining uneconomic. The coal under higher cover will be mined by highwall and underground mining methods. The conceptual surface mining operation would use two fleets of equipment, each consisting of a 12 cubic meter front-end loader and three 90 tonne overburden trucks. The overburden from the surface mining operation will be trucked to backfill the highwall behind the mining operations and the mined out area will be reclaimed. On this basis the surface mining operation might be expected to produce between 500,000 and 600,000 tonnes per year.

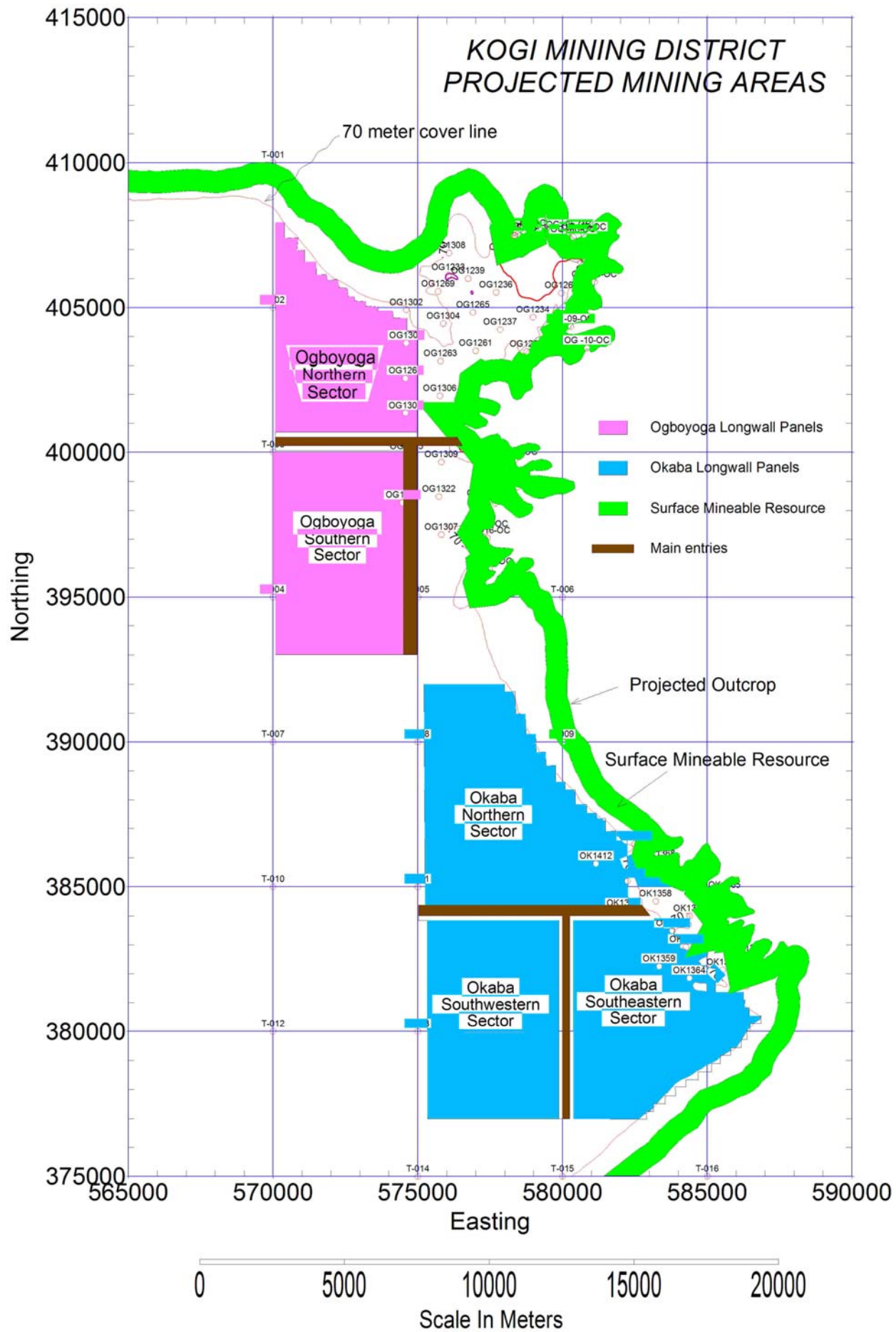
Surface mining will expose the coal seam for highwall mining, which will follow directly behind the surface mining operation. Highwall mining technology has been used successfully in both the eastern and western United States to extract coal resources that are beyond the economical stripping ratio for surface mining and where the overburden is too thin for safe underground operations. When deployed in the proper manor, highwall mining is one of the safest, most productive

and environmentally friendly methods. It is also among the lowest cost methods. Highwall mining utilizes a modified continuous miner, similar to those used in underground operations, which drives an entry into the coal seam exposed by surface mining. Entry depth can vary from 250 to 375 meters into the highwall. The miner and all conveying equipment are operated from the surface where an operator directs the miner with remote controls. As the miner advances, coal is conveyed to the surface by a conveyor that trails the machine. When an entry is completed, all equipment is backed out to the surface and moved laterally to drive a new entry about 2 meters from the previous entry. Like surface mining, this mining method results in very high coal recovery. The process continues along the highwall following the surface mine advance. It can be expected to produce 600,000 tonnes per year. Coal production from the combined surface and highwall mining operations should be approximately 1.2 million tonnes per year. Based on current information there should be sufficient coal resources to support the combined surface and highwall mining operation for over 30 years at this projected rate of production. A wide barrier of coal will remain between the highwall mining area and the underground mine workings.

The conceptual plan assumes that underground mine development will begin as soon as surface mining at the portal area is completed. Seven main entries will be driven approximately 4,000 meters in from the highwall before longwall mining begins. The main entries will be developed utilizing continuous miners, shuttle cars, roof bolters, feeder breakers and conveyor belts. The longwall panels will be developed using a two-entry system with continuous miner sections, because, based on historical underground mining experience in this area, little gas is expected. The longwall panels are planned to initially be 220 meters wide, but will increase in width to approximately 300 meters as underground mining personnel gain experience. The longwall panels are to be located under a minimum of 70 meters of overburden cover and in the areas where the coal seam is at least 1.5 meters thick. Based on the available geologic information, the roof and floor conditions and the overburden depth appear to be ideal for longwall mining.

During the projected two years of mine development, coal production from the underground mine is expected to be in the range of 300,000 to 500,000 tonnes per year. Production will increase when the longwall begins operation. When the longwall workforce has gained sufficient experience, coal production is projected to increase to 2.0 million tonnes per year. Production should exceed 4.0 million tonnes by the eighth year. At that time, mine development should permit the installation of a second longwall unit and by the

KOGI MINING DISTRICT PROJECTED MINING AREAS



eleventh year the underground mine is estimated to be producing approximately 8.0 million tonnes per year. It should be noted that many longwall mines elsewhere in the world have exceeded these projected production rates when operated by experienced crews. It is likely that the above projections are conservative.

Coal from the highwall miner and surface mining operations will be trucked to centralized coal handling and stockpiling facilities where it will be crushed and conveyed to a large stockpile. Coal from the underground mine will be conveyed directly into the stockpile. The coal will then be conveyed from the mine stockpile to a generating station located near the underground mine portals.

The combined production from the surface and highwall mining operations and the underground mine should reach approximately 5.0 million tonnes per year by year 9 and approximately 9 to 10 million tonnes per year by year 11. Based upon a potential in place coal resource in the range of 800 million tonnes, the Kogi District mining complex might supply fuel to a large generating station for over 60 years.

The potential resource base for this mine is within 4000 meters of the outcrop but further drilling will be required to prove reserves and justify the construction of mines. It appears that, given further exploration, substantial additional coal resources might be defined in the area west of the proposed mines.

The preceding map shows a generalized layout of the surface and underground mining operations in the Kogi District and the approximate coal outcrop, the surface mining areas and the generalized location of a coal-fired electrical generating plant.

BENUE MINING DISTRICT (ORUKPA-EZIMO)

The Benue Mining District adjoining the Kogi District on its southern boundary has mining conditions similar to the Kogi Mining District. Although Behre Dolbear has not completed its evaluation of this area it is expected that mining methods in the Benue district will very similar to those used in the Kogi District. It is also expected that the production rates from mines in the Benue District (Orupka-Ezimo areas) will be in the range of 9 to 10 million tonnes per year, as in the Kogi District. At this rate of mining, the Benue District with a currently defined potential resource in the range of 500 million tonnes, can supply fuel to a large generating station for over 40 years.

ENUGU MINING DISTRICT

Behre Dolbear's current evaluation indicates that the Enugu District might not be as attractive as the Kogi or Benue Districts. Development of surface contour mining operations will probably be very similar to the other two districts, but development of underground mines will be more difficult due to the presence of old mine workings. Most of the potential underground coal resources will be behind the existing underground workings and they will have to be accessed through or around these old workings. For safety and environmental reasons, this can be extremely expensive. Also, there is less historical drilling data on the reserves behind the mine workings. Additional drilling will be required to raise the confidence level of the area.

Behre Dolbear has not yet developed preliminary mining plans for the Enugu District. However, there is a good probability that additional drilling in this district could result in reserves comparable to those in the other two districts. Limited data suggests that coal from the Enugu area has a higher thermal ranking and that its coals will be suitable for export, or for the manufacture of coal briquettes.

POTENTIAL POWER GENERATION COAL-FIRED POWER PLANTS

It appears that the Kogi District and the Benue (Orupka-Ezimo) District can each support a coal-fired power plant with ultimate capacity of approximately 3,500 MW. These plants would be built in phases to match the production buildup of the associated coal mining operations. They will probably consist of several units in the size range of 500 to 700 MW. The economics and logistics of coal transportation will probably dictate that the power plants be sited near the portals of the underground mine where coal can be conveyed directly to the generating facility. This region is considered to be tropical, so sufficient water might be available to operate a plant with cooling towers. If sufficient water is not available, it might be more economic to build a 50 to 76 kilometer pipeline from the Benue River to the plants than to transport the coal to a plant located on the river.

Based on their coal resource potential these Districts should ultimately be able to support electrical generating capacity of approximately 7,000 MW. There is the possibility that a third power plant of 2,500 to 3,500 MW might be supported by Enugu's resources.

SUMMARY

Existing data demonstrates substantial coal resources in the Districts discussed above. Behre Dolbear has a high level of confidence that substantial, economically mineable coal reserves, sufficient to support several major coal-fired power generation plants, can be proven. Further exploration is required by the Nigerian government or mining and/or power companies to prove those reserves and develop confidence required to support investments in major mines and generating facilities.

Behre Dolbear believes there is a good probability that adequate reserves can be proven to support coal-fired electrical generation in the range of 7,000 to 8,000 MW. It is possible that the coal resources on the east side of the Anambra Coal Basin might ultimately support 10,000 to 15,000 MW of electrical generation.

The Nigerian government is actively seeking participation in development of its thermal coal resources for electrical power generation. This situation in Nigeria presents an excellent opportunity for a company, or consortium of companies, with expertise in coal mining and power generation to develop a business with a life cycle of 40 to 60 years in a developing nation that has excellent growth opportunities.



FEDERAL REPUBLIC OF NIGERIA

