

THE MINERAL INDUSTRY OF

NIGERIA

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Nigeria was Africa's largest oil producer in 1997. According to the U.S. Department of Energy (Energy Information Administration, May 1998, Monthly energy review—international energy, accessed June 23, 1998, at URL <http://www.eia.doe.gov/emeu/mer/contents.html>), Nigeria ranked ninth in world production of crude petroleum by volume, accounting for about 3% of world production and about 8% of the Organization of Petroleum Exporting Countries' total production. The oil sector remained the cornerstone of the Nigerian economy, providing about 80% of total Government revenues and accounting for about 98% of the country's total export earnings (Africa Business Information Services, 1997, Exports & imports, accessed June 11, 1998, at URL <http://www.afbis.com/nigeria/data/exports.htm>).

Despite recurrent disruptions in the availability of petroleum fuels and electrical energy, Nigeria's gross domestic product was reported to have grown by an estimated 3.8% in 1997 compared with a 3.3% growth rate in 1996, and inflation increased at an annual rate of 28% in 1997 compared with an escalation of 29% in 1996 and a 73% jump in 1996 (Goldman, 1997a; OPEC Bulletin, 1997a; Africa Business Information Services, 1997, A "policeman" for the Nigerian economy, accessed on June 11, 1998, at URL <http://www.afbis.com/nigeria/neic.htm>; Anayo Korie, April 21, 1997, Joint venture funds stall activities of oil firms, accessed April 25, 1997, via URL <http://www.nigeriangalleria.com/news/xprsnws.htm>).

During 1997, the Government's income was adversely affected by the decreasing oil prices. Spot prices for Bonny Light, one of Nigeria's crude oil exports, averaged \$19.40 per barrel in 1997 compared with \$21.24 per barrel in 1996 (Middle East Economic Survey, Spot quotations for the OPEC reference basket, accessed July 7, 1998, at URL http://www.mees.com/dotcom/opec_basket).

Several laws and associated regulations and amendments addressed mineral operations, including the Nigerian Coal Corporation Act of 1950, the Explosives Act of 1964, the Tin Act No. 25 of 1967, the Quarries Act of 1969, the Nigerian Mining Corporation Act of 1972, the Gold Trading Act of 1990, and the Investment Promotion Decree of 1995. Additional legislation, including the Oil Pipelines Act of 1956, the Land Use Act of 1978, the Associated Gas Re-Injection Act of 1979, and the Oil Mineral Producing Areas Development Commission Decree of 1992, regulated petroleum and natural gas operations. Environmental guidelines or regulations included the Federal Environmental Protection Agency Act of 1988, the Effluent Limitation Regulations of 1991, the Pollution Abatement Regulations of 1991, the Pollution Control Guidelines of 1991, the Solid and Hazardous Waste Regulations of 1991, the Environmental Impact Assessment Decree of 1992, the Federal Environmental Protection Agency (amendment) Decree of 1992, and the Harmful Waste Act of 1992.

Nigeria exported about 244 million barrels of crude oil to the United States, its largest customer, in 1997. Accounting for 8% of

the United States total crude oil imports, Nigeria trailed only Venezuela, Mexico, Saudi Arabia, and Canada in order of volume (Energy Information Administration, May 1998, Monthly energy review—Petroleum, accessed June 25, 1998, at URL <http://www.dia.doe.gov/emeu/mer/contents.html>). Nigeria also exported gemstones, liquefied petroleum gas (LPG), refined petroleum products, and tin.

The Ministry of Solid Minerals Development was involved in the promotion, exploration, and development of Nigeria's solid minerals. (See table 1.) The Ministry of Petroleum Resources concerned itself with the oil and natural gas segment of the mineral industry. The Ministry of Power and Steel administered the iron and steel sector. Environmental regulations were administered by the Federal Environmental Protection Agency and the Department of Petroleum Resources of the Ministry of Petroleum Resources.

All mineral rights were held by the Federal Government, which encouraged the diversification of the mineral industry. All minerals with significant production were produced by state-owned companies or joint-ventures with the military Government. (See table 2.) Decades of the Government's indifference to the nonfuel mineral industry resulted in widespread unregulated artisanal mineral operations (Post Express, February 27, 1997, TACCIMA calls for exploration of mineral deposits, accessed April 25, 1997, via URL <http://www.nigeriangalleria.com/news/xprsnws.htm>). The Ministry of Solid Minerals Development was trying to resuscitate national production of barite, coal, kaolin, gold, iron ore, marble, and tin, and to formalize operations at deposits that had been developed by unlicensed small-scale miners. The Ministry also was attempting to introduce new mineral resource development, such as salt production. The Nigerian Minerals Appraisal and Monetisation Program (NIMAMOP) successfully increased the awareness of local government officials of their mineral resources. Behre Dolbear & Co. Inc. of the United States, AMTEC International Ltd. of France, and Global Minerals Ltd. of Nigeria, as the NIMAMOP consortium, completed a data base of mineral deposits in Nigeria.

The Aluminum Smelter Co. of Nigeria started one potline of the two-potline, 193,000-metric-ton-per-year (t/yr) smelter at Ikot Abasi, Cross River State, late in the year. The plant was powered by natural gas. Reynolds Metals Co. of the United States was to purchase about 153,000 t/yr of the plant's primary aluminum production. After test runs were completed, output of the one potline had reached 16% of its capacity by yearend (Reynolds Metals Co., 1998, Form 10-K for year ending December 31, 1997, accessed June 11, 1998, at URL <http://www.sec.gov/Archives/edgar/data/83604/0000083604-98-00008.txt>).

Delta Steel Co. Ltd. at Aladja, near Warri, remained idle in 1997. Nigeria's Minister of Power & Steel was negotiating with the Chinese Government to lease the Delta Steel complex.

The National Fertilizer Co. of Nigeria Ltd. closed its 1,000-metric-

ton-per-day (t/d) ammonia plant for a 3-month maintenance program in August. The plant's 1,500-t/d urea facility also was shut down for a 5-month overhaul. The Government's October 1997 deregulation of fertilizer distribution and pricing could create more favorable market conditions for the refurbished plant.

The Ministry of Solid Minerals Development complained that oilfield drilling-fluids companies were thwarting national efforts to encourage barite production. Nigerian barite was blended with higher grade imported material to achieve API specifications. Unfortunately however, shipments of local lower-than-anticipated specific gravity barite were spurned by the blenders (Post Express, March 30, 1998, Solid Minerals Ministry slams barytes miners, accessed June 12, 1998, at URL <http://www.postexpresswired.com/postexpress.nsf/cae9a9be809d4d8a85256436005cf58e/c0d09395c3ece6d1852565d7004cbc2a?OpenDocument>).

The traditional lack of natural gas demand in Nigeria was slowly beginning to change. The Chevron Nigeria Ltd. (40% equity interest) and Nigeria National Petroleum Corp. (NNPC) (60% equity interest) joint venture completed the \$569 million LPG extraction plant at Escravos and began shipping LPG via a floating storage and offloading vessel in September. The onshore gas plant had the capacity to process 1.9 billion cubic meters per year of natural gas from the Okam and the Mefa Fields. The plant was designed to recover 2.9 million barrels per year of propane and butane gas for export. An additional 700,000 barrels per year of condensate were projected to be recovered from the gas stream and mingled with crude oil at the Escravos tank farm (Yahoo Finance, September 29, 1997, Chevron sees delay in Nigerian gas project, accessed September 30, 1997, at URL http://biz.yahoo.com/97/09/29/chv_y0024_2.html). The plant's 1.5 billion cubic meters per year of dry gas output were earmarked for the Nigeria Gas Co. When the plant opened, Nigeria Gas could only resell dry gas at the rate of 1.3 million cubic meters per day (Mm³/d). By yearend, sales to the national electricity generating company had increased to 2.9 Mm³/d (a rate of 1 billion cubic meters per year). Despite being forced to flare processed gas that Nigeria Gas did not take, Chevron was encouraged and planned to increase the gas plant's input capacity to almost 3 billion cubic meters per year (Yahoo Finance, December 17, 1997, Chevron Nigeria LPG plant reaches capacity, accessed December 18, 1997, at URL http://biz.yahoo.com/971217/nigeria_gas_1.html). Mobil Producing Nigeria Unlimited and Shell Petroleum Development Co. of Nigeria also were building gas-processing plants in the delta region.

Construction of the Nigeria Liquefied Natural Gas Ltd. (NLNG) facility was nearly 60% completed at yearend. NLNG's 5.78-million-metric-ton-per-year-capacity¹ liquefied natural gas (LNG) liquefaction plant at Finima on Bonny Island is slated to begin LNG deliveries in October 1999 to Botas of Turkey, Enagas of Spain, and Gaz de France. In December 1996, ENEL SpA., the Italian electrical utility, announced the unilateral cancellation of its 20-year take-or-pay contract for about one-half of NLNG's annual output. After lengthy negotiations, ENEL agreed to allow its contracted LNG allocation to be delivered to Gaz de France's Atlantic coast terminal at Montoir en Bretagne. In return, Gaz de France was to supply ENEL with natural gas of an equivalent heating value (Betts, 1997; Petroleum Economist, 1997).

¹Upon regasification at the discharge terminals, the proposed annual plant output will be equivalent to 7.15 billion cubic meters of natural gas.

Production of crude petroleum increased slightly in 1997. Most production was from onshore fields in the delta of the Niger River, augmented by offshore wells. Oil exploration activity had moved offshore, with increasing emphasis being placed on deep-water ventures.

New offshore oilfields coming on-line in 1997 included the Ima Field (formerly the Ngo Prospect) of Abacan Resources Corp. of Canada and Amni International Petroleum Development Co. Ltd. of Nigeria and the Ukpokiti Field of Conoco Energy Nigeria Ltd., Express Petroleum and Gas Co. Ltd. of Nigeria, and Camac International (Nigeria) Ltd.

In June, Ashland Nigeria Exploration Ltd., a subsidiary of Ashland Inc. of the United States, sold its production-sharing contracts (PSC) in Nigeria to Perenco S.A. of France. The Nigerian Government proceeded to cancel the PSC licenses, citing the lack of the Government's written consent to the transfer (OPEC Bulletin, 1997b). The issue remained under negotiation for the remainder of 1997.

Nigeria had four oil refineries with a combined throughput capacity of 445,000 barrels per day. The refineries were inactive or produced below capacity. Refinery problems were attributed to various causes, including deferred maintenance (Arab Oil & Gas, 1997). Additionally, product pipelines to population centers in the interior were damaged repeatedly when fuels were illegally diverted from the pipelines (Anayo Korie, April 21, 1997, Joint venture funds stall activities of oil firms, accessed April, 25, 1997 via URL <http://www.nigeriagallery.com/news/xprsnws.htm>). Banned by the Government in September 1996, importation of petroleum products was resumed in June 1997 because of the nationwide fuel shortages and resultant civil unrest. Negotiations were underway between NNPC and a subsidiary of Total S.A. of France concerning the renovation of the Kaduna refinery.

The Government estimated that oil reserves were about 125 billion barrels (Abuja Mirror, October 1, 1997, Oil reserve hits 125 billion barrels, accessed April 3, 1998, at URL <http://www.ndirect.co.uk/~n.today/mcover26.htm>).

Oil and gas operations were intermittently disrupted. Segments of the population of the coastal delta region who felt they were not benefiting from local petroleum production directed a wide range of demands at local and foreign mineral companies for better living conditions, electricity, employment, flood walls, road building, schools, and potable water supply (Yahoo Finance, December 19, 1997, Focus—Shell hit by rash of attacks in Nigeria, accessed December 19, 1997, at URL http://biz.yahoo.com/finance/971219/oil_nigeria_1.htm; Yahoo Finance, October 17, 1997, Militants halt production at Nigeria oil company, accessed October 27, 1997, at URL http://biz.yahoo.com/finance/97/10/17/y0024_z00_6.html; Yahoo Finance, October 8, 1997, Shell Nigeria has deal to reopen two wells, accessed October 9, 1997, at URL http://biz.yahoo.com/finance/97/10/09/y0024_z00_2.html).

The Nigerian railway system consists of 3,510 kilometers (km) of 1.067-meter-gauge track. The two main north-south lines, from Lagos to Kano (1,126 km) and from Port Harcourt to Maiduguri (1,443 km), were connected by a 179-km east-west line from Kaduna to Kafanchan. The China Civil Engineering Construction Corp. of the Chinese Ministry of Railways began a \$250 million 30-month rehabilitation of the railroad. Maintenance or renovation was begun on the rail lines, including the Ajaokuta-Itakpe line. New locomotives and rolling stock also were imported from China.

Roads, which totaled about 143,000 km, were generally in poor condition because they were heavily used and poorly maintained. Mineral commodities were also transported on the navigable inland waterways, which totaled about 9,000 km mainly on the Niger and the Benue Rivers. Major ports from west to east included Apapa and Tin Can Island in Lagos, Koko near Warri, Port Harcourt, and Calabar. The major petroleum terminals were at Bonny, Brass River, Escravos, Forcados, Kwa Iboe, Odudu, and Pennington.

Petroleum is expected to continue to dominate the Nigerian economy for the foreseeable future, despite continued decreases in funding of NNPC by the Government. In 1997, NNPC's Government-approved budget was for about 40% less than was requested to fund joint ventures. NNPC's repeated postponement of payments for its share of joint-venture operations could adversely affect the Government's target of increasing crude oil production by 50% by the turn of the century (Corzine, 1997). Planned petroleum-exploration and field-development projects were being suspended or prolonged because of NNPC's inability to fund its share of the projects (Anayo Korie, April 21, 1997, Joint venture funds stall activities of oil firms, accessed April 25, 1997, via URL <http://www.nigeriangallery.com/news/xprsnws.htm>).

The Government has proposed to eliminate natural gas flaring by 2010. With the development of local industrial markets and LNG exports, natural gas could eventually approach oil's importance to the Nigerian economy. The utilization of Nigerian natural gas could provide a reliable energy source for the West African region and a feedstock for the Nigerian chemical and petrochemical industries.

Development of nonfuel minerals would significantly broaden the country's industrial base. The Government's fiscal and financial incentive programs are designed to attract local and foreign investments in the mineral industry and the Ministry of Solid Minerals Development energetically advocated new mineral investment opportunities in Nigeria. The country's reputation for civil strife, corruption, fraud, political uncertainty, poor infrastructure, and the threat of international sanctions has apparently tempered international investor's interest (Ayithey, 1998; Economist, 1996; Goldman, 1997b; Knott, 1997; Metal Bulletin, 1997; Rupert, 1998; Wall Street Journal, 1997; Washington Post, 1997; Mojeed Jamiu, May 7, 1998, Expected rebound of economy still a mirage, Lagos Concord, transcription from Foreign Broadcast Information Service, May 14, 1998, accessed June 10, 1998 at URL <http://fbis.fedworld.gov>).

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Major Sources of Information

Ministry of Solid Minerals Development
New Secretariat Complex
Annex 3, 5th Floor
Abuja, Nigeria

Nigerian National Petroleum Corporation
NNPC Building Falomo
Lagos, Nigeria
Telephone: (234) 1-261-4650

Major Publications

Nigeria Ministry of Solid Minerals Development: Brief on Nigeria's Mining Potentials.

Nigeria Ministry of Solid Minerals Development: Solid Minerals Development in Nigeria.

Post Express, daily.

TABLE 1
NIGERIA : PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity 2/	1993	1994	1995	1996 e/	1997 e/
METALS					
Columbium and tantalum concentrates: e/					
Gross weight	40	30	65 r/ 3/	57 r/ 3/	60
Columbium content	17	17	26 r/	23 r/	23
Gold	1,400	4,800	5,000 e/	6,000	6,000
Iron and steel: e/					
Iron ore, gross weight	400	400	168	100	50
Steel, crude	150	105 3/	36	20	--
Lead, metal, refined e/	5	4	4	4	4
Tin:					
Mine output, cassiterite concentrate:					
Gross weight e/	200	278	357 r/ 3/	139 r/ 3/	150
Sn content	175	185	250 e/	100	100
Metal, smelter	169	179	259 r/	100 r/ 3/	100
INDUSTRIAL MINERALS					
Barite	--	--	--	--	4,000
Cement, hydraulic e/	3,200	2,600 3/	3,000	4,000 r/	6,000
Clays:					
Kaolin	1,300 e/	105,000	11,950 r/	102,078 r/ 3/	100,000
Unspecified e/	60,100	104,000	100,000	100,000	100,000
Feldspar e/	700	1,000	3,722 r/ 3/	800 r/ 3/	1,000
Gypsum e/	10,000	10,000	150,000 r/ 3/	383,250 r/	300,000
Nitrogen: e/					
N content of ammonia	270 r/	200 r/	170 r/	164 r/	134
N content of urea	300 r/	200 r/	100 r/	114 r/	41
Stone:					
Limestone	1,400 e/	2,700	3,128 r/	2,095 r/ 3/	2,000
Marble	3	8	67 r/	29 r/ 3/	30
Shale	195	32	500 e/	500	500
Topaz	834 4/	1,022 4/	1,000 e/	1,500	1,500
MINERAL FUELS AND RELATED MATERIALS					
Coal, bituminous e/	50,000 r/	130,000 r/	29,000 r/ 3/	7,116 r/ 3/	7,000
Gas, natural: e/					
Gross	31,300	34,000	35,000	37,000	40,000
Dry	2,600	4,600	5,000	6,000	7,500
Petroleum:					
Crude	748,000	743,500	740,000	798,620 r/	800,000
Refinery products:					
Gasoline	30,800	23,000	24,900 r/	23,000	13,000
Jet fuel e/	500	500	350 r/	300 r/	200
Kerosene	14,500	12,000	14,200 r/	10,000	8,000
Distillate fuel oil	15,500	22,000	23,000 r/	20,000	10,000
Residual fuel oil	800	20,000	23,000 r/	18,000	12,000
Unspecified	1,000	13,500	21,200 r/	8,000	7,000
Total	63,100	91,000	102,930 r/	79,300	50,200

e/ Estimated. r/ Revised.

1/ Includes data available through June 26, 1998.

2/ In addition to the commodities listed, amethyst, aquamarine, barite, bitumen, diamond, emerald, garnet, granite, gypsum, lead, phosphate rock, sapphire, soda ash, talc, tourmaline, zinc, zircon, and a variety of crude construction materials (stone, sand and gravel) are produced; but information is inadequate to estimate output.

3/ Reported figure.

4/ Exports.

TABLE 2
NIGERIA: STRUCTURE OF THE MINERAL INDUSTRY IN 1997

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum		Aluminum Smelter Co. of Nigeria (Government, 70%; Ferrostaal AG of Germany, 20%; and Reynolds International of the United States, 10%)	Ikot Abasi	97 1/
Cement		West Africa Portland Cement Co. (Associated International Cement, 39.4%; Odu'a, 26.8%; public, 17.2%; Government, 16.6%)	Ewekoro Shagamu	750 600
Coal		Nigerian Coal Corp. (Government, 100%)	Enugu	150
Iron and steel:				
Iron ore		National Iron Ore Mining Co. (Government, 100%)	Itakpe	5,500
Iron		Delta Steel Co. Ltd. (Government, 100%)	Aladja	2,000
Steel		Ajaokuta Steel Co. Ltd. (Government, 100%)	Ajaokuta	1,350 2/
Do.		Delta Steel Co. Ltd. (Government, 100%)	Aladja	1,000 3/
Do.		Jos Steel Rolling Co. Ltd. (Government, 100%)	Jos	210 3/
Do.		Katsina Steel Rolling Co. Ltd. (Government, 100%)	Katsina	210 3/
Do.		Oshogbo Steel Rolling Co. Ltd. (Government, 100%)	Oshogbo	210 3/
Natural gas, liquefied		Nigeria Liquefied Natural Gas Ltd. (Nigerian National Petroleum Corp., 49%; Royal Dutch/Shell Group, 26%, Elf Nigeria Ltd., 15%; and Nigeria AGIP Oil Co., 10%)	Finima	5,780 2/
Nitrogen				
Ammonia, nitrogen content		National Fertilizer Co. of Nigeria Ltd. (Government, 63%; M.W. Kellogg Co., 37%)	Onne	300 4/
Urea, nitrogen content		do.	do.	255 5/
Petroleum:				
Crude	million 42-gallon barrels	Shell Petroleum Development Co. of Nigeria and Nigerian National Petroleum Corp. joint venture	Niger Delta	340
Do.	do.	Mobil Producing Nigeria Unlimited and Nigerian National Petroleum Corp. joint venture	do.	200
Do.	do.	Chevron Nigeria Ltd. and Nigerian National Petroleum Corp. joint venture	do.	150
Do.	do.	Nigeria AGIP Oil Co. and Nigerian National Petroleum Corp. joint venture	do.	70
Do.	do.	Elf Petroleum Nigeria Ltd. and Nigerian National Petroleum Corp. joint venture	do.	50
Do.	do.	Texaco Overseas Producing Co. of Nigeria, Chevron Nigeria Ltd. and Nigerian National Petroleum Corp. joint venture	do.	25
Do.	do.	Nigeria Petroleum Development Co. and Consolidated Oil Ltd.	do.	5
Natural gas liquids	do.	Mobil Producing Nigeria Unlimited and Nigerian National Petroleum Corp.	Oso Field	18 2/
Refinery products	do.	New Port Harcourt refinery (Government, 100%)	Port Harcourt	55
Do.	do.	Warri refinery (Government, 100%)	Warri	43
Do.	do.	Kaduna refinery (Government, 100%)	Kaduna	38 6/
Do.	do.	Old Port Harcourt refinery (Government, 100%)	Port Harcourt	22 3/
Tin		Makeri Smelting Co. Ltd. (Government, 100%)	Jos	1

1/ A two-potline 193,000-metric-ton-per-year-capacity smelter is under construction. One potline was operating at yearend.

2/ Under construction.

3/ Idle during 1997.

4/ Closed for maintenance August through November 1997.

5/ Closed for maintenance August 1997 through January 1998.

6/ Closed since July 1997.