

2016 Minerals Yearbook

GHANA

THE MINERAL INDUSTRY OF GHANA

By Alberto Alexander Perez

In 2016, Ghana's real gross domestic product (GDP) growth rate was estimated to be 3.5%, which was a slight decrease from real GDP growth in 2015 of 3.9%. The nominal GDP was estimated to have decreased to about \$36.96 billion in 2016 from \$42.80 billion (revised) in 2015. Ghana was a participant in the Extractive Industries Transparency Initiative and the Kimberley Process Certification Scheme. Diamond, gold, manganese, and crude petroleum continued to be key contributors to Ghana's economy. In 2016, Ghana was among the world's top 10 producers of mined gold and manganese, accounting for about 3% of gold production and about 2% of manganese production. Other mineral commodities produced in the country included aluminum, bauxite, cement, lead (secondary), natural gas, petroleum products, salt, and silver. In addition to these mineral commodities, Ghana produced a variety of construction materials in 2016, such as clay, lime, limestone, sand and gravel, and stone (International Monetary Fund, 2017, p. 7, 31; Corathers, 2018; George, 2018).

Minerals in the National Economy

Ghana's mineral sector contributed 4.2% to the country's real GDP in 2016 compared with 5.4% in 2015. Real growth in the mining sector decreased to -7.6% in 2016 from -6.1% in 2015. Gold and natural gas and petroleum exports accounted for about 56% of the country's total export earnings in 2016 compared with about 50% in 2015 (Ghana Statistical Service, 2017, p. 6, 8; International Monetary Fund, 2017, p. 35).

Nonfuel mineral export revenue generated by the members of the Ghana Chamber of Mines increased by 52.4% to \$5.05 billion from \$3.32 billion (revised) in 2015. The increase in revenue was mostly attributed to the increase in the international price of gold. Member companies of the Ghana Chamber of Mines employed a total of 11,628 people in 2016 compared with 9,939 people in 2015. About 98% of people employed by the industry were reported to be Ghanaian nationals (Ghana Chamber of Mines, 2017, p. 8–12).

The deterioration of the Western railway line, which was used in the hauling of bulk materials to Ghana's port facilities, continued to be a problem for mining companies, as it was in a bad state of repair. The Ghana Chamber of Mines estimated that the cost of transporting bulk materials by road was about 50% higher than the cost of hauling these materials by rail. The Ghana Chamber of Mines also reported that about 20% of the revenue generated by all its member companies was used to pay for the cost of electricity and diesel in 2016 (Ghana Chamber of Mines, 2017, p. 9, 22).

Government Policies and Programs

The legislative framework for the mineral sector in Ghana is provided by the Minerals and Mining Act 703 of 2006 and the Petroleum (Exploration and Production) Law of 1984. The

Minerals Commission is the Government entity responsible for the regulation and management of Ghana's mineral resources and for coordinating Government policy related to them. The corporate income tax for mining companies operating in the country is 35% and the royalty rate on total revenue earned from the mining of nonfuel minerals is not to exceed 6% or be less than 3%. Under the Minerals and Mining Act, the possession and use of mercury is legal; however, the purchase of mercury must be authorized by the Government and the mercury may be acquired only from dealers authorized by the Government. The law also regulates the licensing of small-scale gold mining operations and allows for the creation of District offices to oversee small-scale gold mining operations. The purchase and sale of minerals without a license is illegal.

Production

In 2016, bauxite production as reported by the Bank of Ghana increased by 55.9% to 1.60 million metric tons (Mt) from a revised 1.03 Mt in 2015 and primary aluminum production increased by 38% to 40,000 metric tons (t) from an estimated 29,000 t. Mine production of manganese ore (gross weight) was reported to have increased by 33% to 1.97 Mt from 1.48 Mt in 2015, and the production of manganese content increased by 32.9% to 553,000 t from 416,000 t in 2015. Secondary lead production decreased by 41% to 1,800 t from 3,048 t in 2015, and crude petroleum decreased by 4.4% to about 35.8 million barrels (Mbbbl) from 37.4 Mbbbl in 2015. Rough diamond production decreased by about 18.4% to 142,000 carats and gold production by artisanal, large-scale, and small-scale producers, by nearly 7% to 125,000 kilograms (kg). Ghana's only aluminum smelter continued to operate below production capacity. Production of salt and silver was estimated, and the production of silver was estimated to have decreased by about 40% in 2016. Output data for other industrial minerals, such as clay, lime, limestone, sand and gravel, and stone was inadequate to make reliable estimates of output. Data on mineral production are in table 1.

Structure of the Mineral Industry

The Ministry of Lands and Natural Resources (MLNR), through the Geological Survey Department (GSD), the Minerals Commission, and the Precious Minerals Marketing Co. Ltd. (PMMC), oversees all aspects of Ghana's mineral sector. The GSD is responsible for providing geologic information and serves as the repository for the country's geoscientific data. Through its Inspectorate Division, the Minerals Commission institutes and enforces environmental, health, and safety standards in the country's mines and ensures that mining companies and all mining-related activities comply with Ghana's mining and mineral law. The PMMC is responsible for promoting the country's precious minerals and jewelry industry.

Ghana National Petroleum Corp. (GNPC), through the Petroleum Commission, is responsible for the exploration, development, and production of Ghana's hydrocarbon resources. Ghana National Gas Company (GNGC) is responsible for the development of the country's natural gas resources as well as processing and distributing natural gas from foreign sources. The majority of mining operations in Ghana were privately owned, although artisanal mining accounted for all diamond production in the country in 2016 and about one-third of the country's gold production. Table 2 is a list of major mineral industry facilities.

Mineral Trade

In 2015, owing to increased international prices of the goods that Ghana exports, Ghana's total export earnings increased compared with those of the previous year. Estimated data reported by the Bank of Ghana showed that total merchandise export receipts increased by 7.9% to about \$11.1 billion in 2016 from \$10.3 billion in 2015. In 2016, gold export receipts amounted to about \$4.92 billion and crude petroleum export receipts amounted to about \$1.4 billion. Manganese export receipts increased by about 52% to \$100.2 million from \$66 million in 2015. The value of Ghana's merchandise imports was estimated to have decreased by 4.2% to about \$12.9 billion. The value of petroleum and natural gas imports decreased by nearly 10.8% to about \$1.8 billion. Exports of rough diamond decreased by about 22.9% to 143,005 carats from 185,376 carats in 2015 and generated \$4.9 million in revenue (Bank of Ghana, 2017, p. 10, 16–18; Kimberley Process Rough Diamond Statistics, 2018).

Commodity Review

Metals

Gold.—Gold in Ghana was produced at both industrial and artisanal scales. At the industrial scale, gold mining was carried out by various international mining companies. The Government held a 10% free-carried interest in all large-scale gold mining operations in the country.

Asanko Gold Inc. of Canada, through its subsidiary Keegan Resources (Ghana) Ltd., completed the development of the Asanko gold mine and began production in April. The company announced that it had produced about 5,064 kg in 2016 and was on target to produce the estimated 5,900 kilograms per year (kg/yr) that it had previously announced. Phase 2 of the mine development would include the expansion of production to about 12,800 kg/yr by 2018. The life of the mine was estimated to be 10.5 years (Asanko Gold Inc., 2017, p. 8; Ghana Chamber of Mines, 2017, p. 31).

In June, Resolute Mining Ltd. of Australia completed a feasibility study for the development of the Bibiani gold project, of which it had 90% ownership. The Bibiani Mine was expected to produce up to 3,110 kg/yr of gold. An initial gold reserve estimate was calculated at 5.4 Mt of ore at a grade of 3.7 grams per metric ton gold and containing about 19,906 kg of gold. The projected lifespan of the mine based on the initial estimated ore reserve was 5 years. During the 1990s,

the Bibiani Mine had operated as an open pit mine, but the mine was closed in January 2009 owing to low metallurgical recovery rates and financial difficulties related to the 2008 global financial crisis. As of yearend 2016, the mine remained on care-and-maintenance status (tables 1, 2; Mining Review Africa, 2016; Resolute Mining Ltd., 2016, p. 21–22, 40).

The Obuasi Mine continued to be on a limited operational status in 2016; mining operations were scaled down starting in 2014 after underground production ceased during the fourth quarter of that year. As of yearend 2016, the Obuasi Mine had produced 95.5 kg of gold compared with 1,637 kg in 2015. AngloGold Ashanti Ltd. of South Africa. continued to explore for options to optimize the long-term sustainability of the mine (AngloGold Ashanti Ltd., 2017, p. 16, 26; Ghana Chamber of Mines, 2017, p. 17).

At the Nzema Mine, Endeavour Mining Corp. of Canada produced gold from its own sources and from high-grade ore purchased from local artisanal miners. Total gold output from the Nzema Mine decreased in 2016 by 25.7% to 2,728 kg from 3,431 kg in 2015 (Endeavour Mining Corp., 2017, p. 12, 18; Ghana Chamber of Mines, 2017, p. 31).

Golden Star Resources Ltd. of Canada operated the Bogoso-Prestea open pit and underground gold mine complex and the Wassa open pit mine, which were located near the towns of Prestea and Tarkwa, respectively. In 2016, production from the Bogoso-Prestea Mine decreased by about 21.4% to 2,789 kg from 3,550 kg in 2015. The decrease in production was mostly attributed to a decrease in throughput resulting from the continued suspension of the processing of refractory ore at the Bogoso Mine during the first quarter of 2016. Golden Star operated a gold-ore-processing facility at Bogoso, which used bio-oxidation technology to treat refractory ore and a carbon-in-leach processing facility to treat nonrefractory ore. The Wassa open pit mine produced a total of 3,246 kg of gold in 2016 compared with 3,367 kg in 2015 (Ghana Chamber of Mines, 2017, p. 31; Golden Star Resources Ltd., 2017, p. 6–10, 13).

Gold Fields Ltd. of South Africa operated the Damang and the Tarkwa gold mines. Gold production at the Tarkwa Mine remained at about the same level as in the previous year, producing 17,667 kg in 2016 compared with 17,365 kg in 2015. Gold production at the Damang Mine, which was also identified as the Abosso project, decreased to 4,595 kg in 2016 from 5,219 kg in 2015, mainly as a result of the processing of lower grade ore (Ghana Chamber of Mines, 2017, p. 31; Gold Fields Ltd., 2017, p. 66–67).

Newmont Mining Corp. of the United States owned and operated the Ahafo and the Akyem gold mines. Production of gold at the Ahafo Mine increased by about 5.2% to 10,850 kg in 2016 from 10,326 kg in 2015; gold production from the Akyem Mine remained at about the same level as in 2015, producing 14,628 kg in 2016 compared with 14,700 kg in the previous year. Newmont continued to evaluate alternatives to increase efficiency at the Ahafo mill to increase production by an additional 700 kg/yr. The company also planned to develop underground resources from its Subika pit, which was undergoing a definitive feasibility study. The Subika pit was one of the three pits from which ore was mined at Ahafo (Ghana Chamber of Mines, 2017, p. 31; Newmont Mining Corp., 2017, p. 24, 39–40, 57).

Lead.—Gravita Ghana Ltd., which was a subsidiary of Gravita India Ltd., was the only secondary lead producer in Ghana. The company produced remelted lead ingots from the recycling of lead acid battery scrap. In 2016, production of secondary lead decreased by 41% to 1,800 t from 3,048 t 2015. Although the company did not state the reason for the decrease in production, the drop in international prices of lead in the first part of 2016 likely had an effect on the production of secondary lead in the country (table 1; Gravita India Ltd., 2018, p. 23).

Manganese.—Channel Islands-based Consolidated Minerals Ltd. (CONSMIN) produced high-grade manganese carbonate ore at the Nsuta Mine in the Western Region through its subsidiary Ghana Manganese Co. Ltd. (GMC). In 2016, manganese content of ore production increased by about 32.9%. Manganese ore from the Nsuta Mine was mainly exported to China for the production of alloys and electrolytic manganese metal (table 1; Consolidated Minerals Ltd., 2016, p. 2–3, 8).

Industrial Minerals

Diamond.—In 2016, the Akwatia Mine, which was Ghana's only commercial diamond mine, remained on care-and-maintenance status as the Government struggled to find new partners for its development. Ghana's diamond production was from small-scale and artisanal miners who operated in the Bonsa River valley near the town of Tarkwa and in the Birim Valley between the towns of Akwatia and Oda. All diamond production in Ghana was from secondary deposits, and there were no known diamondiferous kimberlites in the country. In 2016, Ghana produced a total of 141,530 carats of rough diamond compared with 174,218 carats in 2015. Diamond produced by artisanal and small-scale miners was purchased by the PMMC and exported to international markets (Ghana Chamber of Mines, 2017, p. 10; Kimberley Process Rough Diamond Statistics, 2018).

Mineral Fuels

Petroleum.—Crude petroleum production in Ghana was from the Jubilee and the Saltpond fields. The Jubilee field was operated by a consortium of companies led by Tullow Oil plc of the United Kingdom. In August 2016, first oil flowed from the Tweneboa-Enyenra- Ntomme (TEN) field. Tullow and its partners were engaged in the development of the field, which is located in the Deepwater Tano Block about 60 kilometers offshore western Ghana. The project was developed at a cost of \$5 billion (not including floating production storage and offloading facility lease costs), and average production was expected to be about 23,000 barrels per day of crude petroleum. The export of associated gas from the TEN field was scheduled to begin 1 year after the production of first oil (Tullow Oil plc, 2016, p. 6, 24; 2018).

On April 30, 2015, the Special Chamber of the International Tribunal of the Law of the Sea in Hamburg ruled in the dispute between Côte d'Ivoire and Ghana concerning the delimitation of the maritime boundary between the two countries in the Atlantic Ocean. The tribunal determined that Ghana had the right to continue with the development of the TEN field but required that no new drilling be conducted in the disputed area until a

final ruling is issued in late 2017 (Dogbevi, 2015; Tullow Oil plc, 2016, p. 37–38).

Outlook

The ongoing development of gold and hydrocarbon resources is likely to continue to enhance Ghana's position as a world mineral producer. Gold production from the Asanko Mine, once the mine was commissioned in 2016, was expected to help counterbalance the loss of gold production from the Bibiani and the Obuasi Mines by 2017. Assuming that gold production from the country's long-established mines remains at about the same level as in 2016, the restarting of underground gold mining operations at the Prestea Mine and the development of underground resources at the Wassa Mine are likely to further increase Ghana's total annual gold production capacity by 2018. In the short run, however, electricity shortages may serve as deterrents to foreign direct investment in mining. In the medium to long run, natural gas may become a primary fuel for power generation in Ghana, but that will depend on the successful completion of the country's natural gas transmission network and on increased supply of natural gas from its various fields. In 2017, crude petroleum production from the TEN field is expected to counterbalance the loss of the reduced production from the Saltpond field, which is expected to continue to have a decrease in production through 2016.

References Cited

- AngloGold Ashanti Ltd., 2017, Integrated report 2016: Johannesburg, South Africa, December 21, 201 p. (Accessed April 4, 2018, at <http://www.aga-reports.com/17/download/AGA-IR17.pdf>.)
- Asanko Gold Inc., 2017, Management discussion and analysis—Year ended March 31, 2017: Vancouver, British Columbia, Canada, Asanko Gold Inc., 29 p. (Accessed April 2, 2018, at https://s21.q4cdn.com/214525344/files/doc_financials/2017/Q1-2017-Asanko-Consolidated-FS_FINAL.pdf.)
- Bank of Ghana, 2017, Annual report 2016: Accra, Ghana, Bank of Ghana, 92 p. (Accessed April 5, 2018, at https://www.bog.gov.gh/privatecontent/Publications/Annual_Reports/Annual%20Report%202016%20final%2024th%20June.pdf.)
- Consolidated Minerals Ltd., 2016, Annual report 2016: St Helier, Jersey [Channel Islands], 62 p. (Accessed April 5, 2018, at <http://www.consmin.com/wp-content/uploads/2015/01/CML-Annual-Report-2016.pdf>.)
- Corathers, L.A., 2018, Manganese: U.S. Geological Survey Mineral Commodity Summaries 2018, p. 104–105.
- Dogbevi, E.K., 2015, ITLOS ruling on maritime border dispute is credit positive for Ghana—Moody's: Ghana Business News, April 30. (Accessed March 27, 2017, at <https://www.ghanabusinessnews.com/2015/04/30/itlos-ruling-on-maritime-border-dispute-is-credit-positive-for-ghana-moodys/>.)
- Endeavour Mining Corp., 2017, Corporate presentation—Endeavour Mining Q4 and full year 2016 results: Vancouver, British Columbia, Canada, Endeavour Mining Corp., March 7, 23 p. (Accessed April 7, 2017, at <https://www.endeavourmining.com/investors/presentations-and-factsheets/default.aspx>.)
- George, M.W., 2018, Gold: U.S. Geological Survey Mineral Commodity Summaries 2018, p. 70–71.
- Ghana Chamber of Mines, 2017, Performance of the mining industry in 2016: Accra, Ghana, Ghana Chamber of Mines, 33 p.
- Ghana Statistical Service, 2017, Revised 2016 annual gross domestic product: Accra, Ghana, Ghana Statistical Service, September, 10 p. (Accessed April 9, 2018, at http://www.statsghana.gov.gh/docfiles/GDP/GDP2016/September/Annual_2016_GDP_September_2017_Edition.pdf.)
- Golden Star Resources Ltd., 2017, Annual report 2016: Toronto, Ontario, Canada, Golden Star Resources Ltd., 21 p. (Accessed April 3, 2018, at <http://www.annualreports.com/Click/18729>.)

- Gold Fields Ltd., 2017, Integrated annual report 2016: Johannesburg, South Africa, Gold Fields Ltd., 150 p. (Accessed April 8, 2018, at <http://www.goldfields.co.za/pdf/reports/iar-2016.pdf>.)
- Gravita India Ltd., 2018, Annual report 2016–2017: Rajasthan, India, Gravita India Ltd., 168 p. (Accessed April 10, 2018, at <http://www.gravitaindia.com/wp-content/uploads/pdf/gravita-annual-report-2016-17.pdf>.)
- International Monetary Fund, 2017, Ghana—2017 article IV consultation, in Fourth review under the extended credit facility arrangement and request for waiver for nonobservance of performance criteria, and modifications of performance criteria—Press release; staff report; and statement by the Executive Director for Ghana: Washington, DC, International Monetary Fund Country Report no. 17/262, September 6, 124 p. (Accessed April 10, 2018, at <http://www.imf.org/~media/Files/Publications/CR/2017/cr17262.ashx>.)
- Kimberley Process Rough Diamond Statistics, 2018, Annual global summary—2016 production, imports, exports, and KPC counts: Kimberley Process Rough Diamond Statistics, March 18, 1 p. (Accessed April 10, 2018, at https://kimberleyprocessstatistics.org/public_statistics.)
- Mining Review Africa, 2016, Resolute Mining completes feasibility study for Bibiani underground mine, Mining Review Africa, June 23. (Accessed April 11, 2018, at <https://www.miningreview.com/resolute-mining-completes-feasibility-study-underground-mine-bibiani/>.)
- Newmont Mining Corp., 2017, 2016 annual report and Form 10–K: Greenwood Village, Colorado, Newmont Mining Corp., 174 p. (Accessed April 6, 2018, at <http://www.newmont.com/investor-relations/financial-reports/annual-reports/default.aspx>.)
- Resolute Mining Ltd., 2016, A proven gold producer—Annual report 2015: Perth, Western Australia, Australia, Resolute Mining Ltd., 128 p. (Accessed September 8, 2016, at www.annualreports.com/HostedData/AnnualReportArchive/R/ASX_RSG_2015.pdf.)
- Tullow Oil plc, 2016, Annual report and accounts 2015: London, United Kingdom, Tullow Oil plc 1 p. (Accessed April 5, 2018, at http://www.tulloil.com/Media/docs/default-source/3_investors/2015-annual-report/tullow-oil-2015-annual-report-and-accounts.pdf?sfvrsn=2.)
- Tullow Oil plc, 2018, Operations, TEN field: London, United Kingdom, Tullow Oil plc, February 14. (Accessed April 10, 2018, at <https://www.tulloil.com/operations/west-africa/ghana/ten-field>.)

TABLE 1
GHANA: PRODUCTION OF MINERAL COMMODITIES¹

(Thousand metric tons, gross weight, unless otherwise specified)

Commodity ²		2012	2013	2014	2015	2016
METALS						
Aluminum:						
Bauxite		710	817	906	1,026	1,600
Aluminum metal, primary		32	25	24	29	40
Gold, mine production, Au content:						
Artisanal and small-scale producers	kilograms	45,560	44,836	46,336	45,000 ^e	45,000 ^e
Large-scale producers	do.	86,972	89,224	90,754	85,424	79,667
Lead, refinery production, secondary	metric tons	2,961	3,076	2,817	3,048	1,800
Manganese, mine production:						
Gross weight		1,467	1,812	1,497	1,478	1,967
Mn content		414	510	418	416	553
Silver, mine production, exported ore, Ag content	kilograms	3,200 ^e	3,300 ^e	3,400 ^e	3,200	2,000 ^e
INDUSTRIAL MINERALS						
Cement, hydraulic		4,600 ^r	4,500 ^{r,e}	4,500 ^{r,e}	3,830 ^r	3,800 ^e
Diamond, gem, unspecified	thousand carats	233	169	242	174	142
Salt ^e		250	250	250	250	250
MINERAL FUELS AND RELATED MATERIALS						
Natural gas	thousand cubic meters	--	--	53,983 ³	68,558 ^r	68,600 ^e
Petroleum, crude	thousand 42-gallon barrels	26,429	35,588	37,202 ^r	37,412 ^r	35,770

^eEstimated. ^rRevised. do. Ditto. -- Zero.

¹Table includes data available through March 13, 2018. All data are reported unless otherwise noted. Estimated data are rounded to no more than three significant digits; may not add to totals shown.

²In addition to the commodities listed, clay, lime, limestone, refined petroleum products, sand and gravel, and stone may have been produced in Ghana, but available information was inadequate to make reliable estimates of output.

³Natural gas exported from the Jubilee field to the Atuabo natural gas processing plant.

TABLE 2
GHANA: STRUCTURE OF THE MINERAL INDUSTRY IN 2016

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum		Volta Aluminum Co. Ltd. (VALCO) (Government, 100%)	Aluminum smelter at Tema	200.
Bauxite		Ghana Bauxite Company Ltd. (GBCL) (Bosai Minerals Group Co. Ltd., 80%, and Government, 20%)	Bauxite mine at Awaso	1,600.
Cement		Ghana Cement Company Ltd. (GHACEM) (HeidelbergCement AG, 93.1%)	Clinker grinding plant at Takoradi	2,200.
Do.		do.	Clinker grinding plant at Tema	2,200.
Do.		Diamond Cement Ghana Ltd.	Cement plant at Aflao ¹	1,500.
Do.		Savanna Cement Company Ltd. (SAVACEM) and Diamond Cement Ghana Ltd.	Town of Buipe, Central Gonja District	300.
Diamond	thousand carats	Great Consolidated Diamond Ghana Ltd. (Government, 100%)	Placer mine at Akwatia, ² Birim Valley	360.
Do.	do.	Artisanal diamond miners	Birim Valley	500 to 900.
Gold	kilograms	AngloGold Ashanti Ltd., 90%	Obuasi surface and underground mine, 60 kilometers south of Kumasi	1,700.
Do.	do.	do.	Iduapriem Mine, 70 kilometers north of Takoradi	8,800.
Do.	do.	Resolute (Bibiani) Ltd. (Resolute Mining Ltd., 90%, and Government, 10%)	Bibiani Mine, ³ 250 kilometers northwest of Accra	3,400.
Do.	do.	Golden Star (Bogoso/Prestea) Ltd. (Golden Star Resources Ltd., 90%, and Government, 10%)	Bogoso-Prestea open pit mine, 300 kilometers west of Accra	7,300.
Do.	do.	Golden Star (Wassa) Ltd. (GSWL) (Golden Star Resources Ltd., 90%, and Government, 10%)	Wassa Mine, 30 kilometers northwest of Tarkwa	7,000.
Do.	do.	Gold Fields Ltd., 90%, and Government, 10%	Tarkwa open pit mine and carbon-in-leach and heap-leach plants, 300 kilometers west of Accra	21,800.
Do.	do.	Keegan Resources (Ghana) Ltd. (Asanko Gold Inc.)	Asanko Mine, Ashanti Region	7,600.
Do.	do.	do.	Damang Mine and carbon-in-leach plant, 360 kilometers west of Accra	6,000.
Do.	do.	Newmont Mining Corp., 90%	Ahafo Mine, 290 kilometers northwest of Accra, Brong Ahafo region	17,100.
Do.	do.	do.	Akyem Mine	14,700.
Do.	do.	Endeavour Mining Corp., 90%, and Government, 10%	Nzema Mine, 280 kilometers west of Accra, East municipal district	3,100.
Do.	do.	Chirano Gold Mine Ltd. (Kinross Gold Corp., 90%, and Government, 10%)	Chirano Mine, 100 kilometers from Kumasi, southwestern Ghana	9,000.
Do.	do.	Perseus Mining Ltd.	Edikan gold mine	6,200.
Do.	do.	Artisanal and small-scale gold miners	Throughout Ghana	> 46,000.
Lead, secondary		Gravita Ghana Ltd. (Gravita India Ltd.)	Tema	6.
Limestone and lime		Carmeuse Lime Products (Ghana) Ltd. (Carmeuse SA)	Takoradi	NA.
Manganese ore		Ghana Manganese Company Ltd. (Ghana Consolidated Minerals Ltd., 90%, and Government, 10%)	Open pit mine at Nsuta-Wassa Western Region	1,500.

See footnotes at end of table.

TABLE 2—Continued
GHANA: STRUCTURE OF THE MINERAL INDUSTRY IN 2016

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Petroleum, crude	thousand 42-gallon barrels	Tullow Oil plc, 34.71%; Anadarko Petroleum Corp., 23.49%; Kosmos Energy LLC, 23.49%; Ghana National Petroleum Corp. (GNPC), 13.75%; Sabre Oil & Gas Holdings Ltd., 2.81%; E.O. Group Ltd., 1.75%	Jubilee field, 60 kilometers offshore	43,800.
Do.	do.	Saltpond Offshore Producing Company [Lushann-Eternit Energy Ltd., 55% and Ghana National Petroleum Corp. (GNPC), 45%]	Saltpond field, 13 kilometers offshore	90.
Petroleum products	do.	Tema Oil Refinery (Government, 100%)	Refinery at Tema	16,400.
Salt		Panbros Salt Industry Ltd.	Salt pan at Mendskrom, near Accra	250.
Do.		Elmina Salt Producers Association	Artisanal salt pan mining, near Elmina	NA.

Do., do. Ditto. NA Not available. > Greater than.

¹Used imported clinker.

²On care-and-maintenance status.

³Under redevelopment.