



# 2015 Minerals Yearbook

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**MAURITANIA [ADVANCE RELEASE]**

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# THE MINERAL INDUSTRY OF MAURITANIA

By Mowafa Taib

The mining sector has been an important contributor to Mauritania's economy for more than 50 years; it accounted for 22.9% of the country's gross domestic product (GDP) in 2015. Mauritania's economy, which was heavily dependent on mining, continued to be adversely affected by the decline in crude petroleum and metal prices in 2014 and 2015, especially that of iron ore. The GDP increased in real terms by only 0.2% compared with a revised increase of 6.6% in 2014. In 2015, Mauritania supplied the world with copper, crude petroleum, gold, and iron ore. Mauritania was Africa's 2d-ranked exporter of iron ore after South Africa and the world's 12th-ranked exporter of iron ore, in terms of export value. The country also produced modest quantities of cement, crude steel, granite, gypsum, marble, quartz, and salt. Mauritania was not a significant consumer of minerals (table 1; Société Nationale Industrielle et Minière, 2013c; Banque Centrale de Mauritanie, 2016, p. 107–110; Workman, 2016).

## Minerals in the National Economy

The value of mineral sector activity, which included crude petroleum and metal production, decreased in real terms by 6.9% in 2015 compared with a revised increase of 6.2% in 2014. The contribution of the mineral sector to the GDP decreased to 22.9% in 2015 from 29.6% in 2014 and 45.4% in 2011. The value of petroleum sector activity decreased by 47.7% in 2015 compared with a decrease of 19.6% in 2014. The contribution of iron ore mining to the country's GDP decreased sharply in 2015 to 0.4% from 6.4% in 2014 and 24.1% in 2011. Copper and gold contributed 3.4% to Mauritania's GDP in 2015 compared with 3.1% in 2014 and 17% in 2013 (Banque Centrale de Mauritanie, 2016, p. 107–110).

The flow of foreign direct investment (FDI) to Mauritania continued in 2015 but at a much reduced rate compared with the historic surge of 2012. The estimated value of FDI inflow to Mauritania in 2015 was \$495 million, which was slightly less than the \$500 million (revised) received in 2014 and 65% less than the \$1.4 billion received in 2012. The value of greenfield FDI projects in Mauritania was zero in 2015 compared with \$1.3 billion in 2014 (United Nations Conference on Trade and Development, 2016, p. 197, 211).

## Government Policies and Programs

The Ministère du Pétrole de l'Énergie et des Mines [Ministry of Petroleum and Energy and Mining] is responsible for overseeing activity in the mineral fuels industry. The Government approved several amendments to its hydrocarbon code and mining code in 2011. The Ministère de l'Industrie et des Mines [Ministry of Industry and Mines] is the Government agency responsible for regulating the country's mining industry activity. The Direction des Mines et de la Géologie [Department of Mines and Geology] implements the Government's policies to enhance

foreign investment in the mining sector of Mauritania. The code minier [mining law] awards exploration permits on a "first-come, first-served" basis for a 3-year period that can be renewed twice for up to 3 years each time. Mining licenses are awarded for a 30-year period and are renewable for up to 10 additional years. The law exempts mining companies from customs duties for equipment during exploration and the first 5 years of production and permanently on fuel and spare parts. The tax code includes a 25% corporate income tax rate after a tax exemption for the first 3 years of production, a tax withholding rate of 14% on repatriated earnings, and a 16% value-added tax (Ministère du Pétrole de l'Énergie et des Mines, 2012).

The revisions to the mining code in 2012 changed the method by which royalties are calculated and the area of land that is assigned for exploration permits. Mining royalties range from 1.5% to 6.5% of the price of the final processed mineral product. The royalty for Group 1 minerals, which include chromium, iron ore, manganese, titanium, and vanadium, is assessed at 2.5% of the international commodity price. The royalty increases to 3% for iron ore sold at The Steel Index (TSI) price of between \$100 and \$150 per metric ton and to 3.5% for iron ore sold at a price of between \$150 and \$200 per metric ton. The royalty for Group 2 minerals, which include precious and nonferrous metals, is 3% of the price on the London Metal Exchange (LME), except for copper (ranges between 3% and 5%, depending on the LME price), gold (ranges between 4% and 6.5%, depending on the LME price), and platinum-group elements (4%). The royalty for Group 3 minerals, which include coal and fuel minerals, is 1.5% of the sale price; Group 4 minerals, which include uranium and other radioactive materials, 3.5%; Group 5 minerals, industrial minerals and construction materials, 2.5%; and Group 6 minerals (gemstones) and Group 7 minerals (diamond), 5% and 6%, respectively. Revisions to the mining law added a 10% tax on all mining transactions (such as transferring a license from one company to another) and made international commodity prices the basis for the royalty calculation. The area of land allocated for each exploration permit was reduced to 500 square kilometers (km<sup>2</sup>) from 1,000 km<sup>2</sup> for all minerals except for the areas allocated for diamond concessions, which remains at 5,000 km<sup>2</sup> (Ministère du Pétrole de l'Énergie et des Mines, 2012).

## Production

In 2015, copper production increased by 36% compared with that of 2014. Iron ore output decreased, by 17%; crude petroleum, by 12%, and gold, by 10%. Data on mineral production are in table 1.

## Structure of the Mineral Industry

Almost all the more than 70 local and international companies that were involved in mineral exploration and production in

Mauritania were privately owned except for Société Nationale Industrielle et Minière (SNIM), which was a majority state-owned mining company (78.35% interest). SNIM operated iron ore mines at Guelb el Rhein, Kedia d'Idjill, M'Haoudat, and Zouerate in northern Mauritania. SNIM also owned and operated a 700-kilometer (km) heavy-haul railway and a shipping terminal at the Port of Nouadhibou on the Atlantic coast. SNIM subsidiaries included Granites et Arbres de Mauritanie S.A. (GMM), Société Arabe des Industries Métallurgiques S.A. (SAMIA), and Société Arabe du Fer et de l'Acier S.A. (SAFA) (table 2; Société Nationale Industrielle et Minière, 2015c).

Société Mauritanienne des Hydrocarbures et de Patrimoine Minier (SMHPM), which is Mauritania's national oil company, maintained a 10% interest in petroleum exploration offshore and onshore concessions in Mauritania, and the remaining 90% interest is held by international oil companies (Société Mauritanienne des Hydrocarbures et de Patrimoine Minier, 2015).

Tasiast Mauritanie Ltd. S.A. (a wholly owned subsidiary of Kinross Gold Corp. of Canada) and Mauritanian Copper Mines S.A. (MCM) (a wholly owned subsidiary of First Quantum Minerals Ltd. of Australia) produced gold in 2015. MCM was the sole producer of copper, as was PETRONAS International Corp. Ltd. (a subsidiary of Petroliaam Nasional Berhad of Malaysia) for crude petroleum. Two companies produced cement—Ciment de Mauritanie S.A. and Mauritano-Française des Ciments S.A. SAMIA was the sole producer of gypsum, Mauritania Minerals Co. S.A. (MMC) produced quartz, and Société Mauritanienne des Industries du Sel (SOMISEL) was responsible for salt output (table 2; Mauritania Minerals Co. S.A., 2014).

## Mineral Trade

The value of total exports in Mauritania decreased to about \$1.4 billion in 2015 from \$1.9 billion in 2014 and about \$2.8 billion in 2011. The decrease was mainly attributable to lower mineral commodity prices on world markets. The value of Mauritania's iron ore exports, which were 11.4 million metric tons (Mt) in 2015 compared with 13.6 Mt in 2014, decreased by 53% to \$340 million in 2015 from \$731 million in 2014 and about \$1.4 billion in 2013. The decrease was attributable to a 43% decrease in iron ore prices in 2015, which averaged \$43 per metric ton, and to decreased output owing to workers' strikes. Seventy percent of Mauritania's iron ore exports in 2015 went to China, 13% to Germany, 9% to Italy, and 8% to France. Gold exports decreased in value by 12% in 2015 compared with a 13% increase in 2014, owing to lower gold output. Copper exports, however, increased in value by 26% in 2015 compared with that of 2014. The increase was attributable to a 59% increase in export tonnage. The value of crude petroleum exports decreased by 6% in 2015 compared with a 10% decrease in 2014. The decrease was attributed to lower crude petroleum prices, which decreased by 50% in 2015 compared with those of 2013, and to lower volumes of exports in 2014 and 2015 (Banque Centrale de Mauritanie, 2016, p. 45–47, 48, 112).

## Commodity Review

### Metals

**Copper.**—The Guelb Moghrein Mine produced 45,001 metric tons (t) of copper in 2015 compared with 33,079 t (revised) in 2014. The increase was due to higher throughput as MCM milled 4 Mt of sulfide ore in 2015 compared with 3 Mt in 2014. The mine was wholly owned and operated by MCM. The total probable and proven reserves at the Guelb Moghrein Mine, which includes high- and low-grade stockpile materials, were estimated to be 31.3 Mt of ore grading 0.92% copper and 0.69 gram per metric ton gold. The company planned to produce 40,000 metric tons per year (t/yr) of copper between 2016 and 2018 (First Quantum Minerals Ltd., 2016a, p. 17, 21, 40; 2016b).

OreCorp Mauritania S.A.R.L., which was a subsidiary of OreCorp Ltd. of Australia, held two licenses at south Akjoujt to explore for copper, gold, and nickel in a 460-km<sup>2</sup> area. The Akjoujt South project lies in the Proterozoic Mauritanide belt and is located 30 km south of the Guelb Moghrein Mine. In 2015, OreCorp Mauritania carried out a diamond drilling program to test for previously defined geophysical targets of copper-nickel sulfide mineralization (OreCorp Ltd., 2016).

**Gold.**—Gold output decreased to 8,618 kilograms (kg) in 2015 from 9,625 kg in 2014. Two mines produced gold in Mauritania in 2015—the Guelb Moghrein copper-gold mine and the Tasiast gold mine. The Guelb Moghrein Mine produced 1,991 kg of gold in 2015, which was about 13% more than the 1,522 kg (revised) of gold produced in 2014. The Tasiast gold mine was owned and operated by Kinross and located in northwestern Mauritania; it produced 6,813 kg of gold in 2015 compared with 8,102 kg in 2014, which was a 15.9% decrease. As of yearend 2015, estimates of proven and probable mineral reserves at the Tasiast deposit were 255,000 kg (reported as 8.2 million troy ounces). The open pit mine, which used heap leach and milling for ore processing, had an expected mine life of 15 years. Kinross's phase 1 expansion plan for the mine would increase the mill throughput capacity to 12,000 metric tons per day (t/d) from the current 8,000 t/d by 2018. Annual production at the Tasiast gold mine between 2018 and 2027 was expected to be 12,700 kg (reported as 409,000 troy ounces). The company also completed a phase 2 expansion study, which would increase milling capacity at the mine to 30,000 t/d and double gold production to 24,200 kilograms per year (kg/yr) between 2018 and 2027 (reported as 777,000 troy ounces) (table 1; First Quantum Minerals Ltd., 2016a, p. 17, 21, 40; Kinross Gold Corp., 2016a, b).

**Iron Ore.**—Mauritania's iron ore production decreased to 11.6 Mt in 2015 from 14.0 Mt in 2014. SNIM was the sole iron ore producer in the country; it operated three iron ore mines—the Guelb el Rhein Mine, the Kedia d'Idjill Mine, and the M'Haoudat Mine. The Guelb el Rhein deposit contained several hundred million metric tons of magnetite ore grading 37% iron; the ore is concentrated at the Guelb el Rhein plant by dry magnetic separation to increase the iron content to

66%. Hematite iron ore deposits located at the Kedia d'Idjill and the M'Haoudat areas accounted for 60% of SNIM's iron ore production (tables 1, 2; Société Nationale Industrielle et Minière, 2013a).

In 2015, SNIM continued the implementation of its strategic program, which was approved in 2013 and based on building new iron ore concentration plants that use low-grade ore; the company aimed to increase iron ore production to 25 million metric tons per year (Mt/yr) by 2019 and 40 Mt/yr by 2025. SNIM sought to become one of the world's top five exporters of seaborne iron ore. By yearend 2015, Mauritania had the capacity to process, transport, and export more than 16 Mt/yr of iron ore following completion of construction of a second loading wharf at the Port of Nouadhibou on the Atlantic coast (Société Nationale Industrielle et Minière, 2013b–d, 2015b; Manson, 2014).

In November 2015, SNIM started production at the phase 2 Guelb el Rhein plant (Guelb 2), which was a new iron ore mining complex in Zouerate. Guelb 2 added 4 Mt/yr of production capacity of high-grade concentrated iron ore (containing up to 68.5% iron with less than 4.5% silica). The \$924 million project added 946 direct jobs (Société Nationale Industrielle et Minière, 2015a).

In November 2015, Sphere Minerals Ltd. (a subsidiary of Glencore plc of Switzerland) completed a feasibility study at the El Aouj East deposit as well as ore reserves updates at the El Aouj East and Askaf North projects. El Aouj Mining Co. S.A. was a 50–50 joint venture of SNIM and Sphere. El Aouj Mining estimated the total ore reserves at the El Aouj East site to be 930 Mt of magnetite iron ore grading 35% iron based on a December 2013 mineral resource estimate of 2,050 Mt of iron ore grading 36% iron. In 2014, the company said that El Aouj could support production of 9.5 Mt/yr of iron ore for 200 years (Mining-technology.com, 2014b; Sphere Minerals Ltd., 2015, p. 1).

In March 2015, Glencore plc of Switzerland abandoned its 88% share of the Askaf iron ore project, which had been developed by Sphere. Glencore had paid \$1 billion for the development of rail and infrastructure to support the project. Glencore and Sphere, which withdrew from the project citing low iron ore prices on the world market, remained liable to pay rail and access fees to the Government under the 18-year deal. The Askaf project was expected to start production in 2017 and have the capacity to produce 7.5 Mt/yr of iron ore. In 2014, Sphere awarded an engineering and procurement and a construction contract to Essar Projects of India to build the beneficiation plant (Mining-technology.com, 2014a; Steel Orbis, 2014; Ker, 2015).

In 2015, Mauritania Saudi Mining and Steel S.A. (Takamul), which was a 50–50 joint venture created between SNIM and Saudi Basic Industries Corp. (SABIC), started exploration at the Atomai Mines in Zouerate, northern Mauritania. Reserves (unspecified class) at the Atomai deposit were estimated to be 616 Mt of ore grading 36% iron (Mauritania Saudi Mining and Steel S.A., 2015; Porter GeoConsultancy Pty Ltd., 2017).

Société Minière d'Afrique du Sud et de l'Ouest S.A. (SOMASO), which was a joint venture of TransAfrika Resources Ltd. (70% interest) and Agrineq S.A. (30% interest), continued exploration work at the Kaouat iron ore project (prospecting permit 273B1), which is located 255 km northeast of Nouakchott and covers 1,474 km<sup>2</sup>. SOMASO identified

an exploration target of 600 Mt of iron ore grading 30% iron, which could potentially be concentrated to 67% iron with 2% silica. The company completed a mine work program for a pilot plant that would have the capacity to produce 20,000 metric tons per month (TransAfrika Resources Ltd., 2015, p. 3).

Charter Pacific Corp. (CPC) of Australia held an exploration permit for iron ore at Kaoua El Khadra, which is located near Akjoujt and the copper-gold Guelb Moghrein Mine. The company owned a 51% interest in the permit, and SNIM owned the remaining 49% interest. CPC set up an exploration target of up to 4.4 billion metric tons of magnetite banded iron formations containing on average 30% iron and planned to install a magnetic-separation beneficiation plant to produce higher content iron ore. Legleitit Iron Mauritanie (a 70%-owned subsidiary of CPC) was awarded a mining permit for an advanced hematite deposit that hosts direct-shipping-grade iron ore. The Legleitit iron ore deposit has an estimated inferred resource of 12.2 Mt of iron ore containing 59% iron that has the potential to support production of 1 Mt/yr of direct-shipping-grade iron ore for 10 years (Charter Pacific Corp., 2013, 2015; Swanepoel, 2014).

### *Mineral Fuels and Related Materials*

**Petroleum.**—Crude petroleum output decreased by 12% in 2015 compared with a decrease of 11% in 2014 owing to the depletion of reserves at the offshore Chinguetti oilfield (table 1). PC Mauritania I Pty. Ltd. and PC Mauritania II B.V. (subsidiaries of PETRONAS International Corp. Ltd.) were the operators of the Chinguetti oilfield. Tullow Oil plc of the United Kingdom was exploring for crude petroleum in eight offshore permits, including Blocks C–3, C–10, C–18, Block 7, and PSC B (Chinguetti EEA). Tullow had planned to build the first natural gas pipeline in the country to carry natural gas from the Banda gasfield to Nouakchott in 2013 but decided in 2014 not to pursue the project further owing to difficulties in securing funds. Production at the gasfield was expected to begin in 2015; however, the project did not receive sufficient funding and was not completed by yearend 2015. In 2015, Tullow conducted exploration operations following a technical oil discovery at Fregate-1 well in Block 7. The company increased its exploration acreage after signing a production-sharing contract with the Government for the shallow water Block C–3 license area in April. Other companies that were exploring for oil and gas in Mauritania included Chariot Oil & Gas Ltd. of the United Kingdom, Kosmos Energy Ltd. of the United States, Repsol S.A. of Spain, RWE Dea A.G. of Germany, and Total E&P Mauritania (a subsidiary of Total S.A. of France) (table 1; North Africa Post, 2012; Tullow Oil plc, 2015, p. 14, 53, 163).

**Uranium.**—In 2015, Aura Energy Ltd. started the Tiris definitive feasibility study by drilling 4,250 meters at the Tiris site to explore for and update its mineral resources. Resources at the Tiris deposit were estimated to be 66 Mt grading 334 parts per million (ppm) U<sub>3</sub>O<sub>8</sub> for a total of 22,000 t of U<sub>3</sub>O<sub>8</sub>. A preliminary scoping study of the Tiris project completed in 2014 discovered the presence of very shallow uranium mineralization, which, after simple beneficiation (washing and screening), had the potential to create a high-grade leach feed. Aura Energy hoped that the results of the scoping study would lead to the

construction of a uranium mine and leach-processing plant capable of producing 333,000 kg/yr of  $U_3O_8$  for 15 years, with low upfront capital and operating cost (Aura Energy Ltd., 2015, p. 3, 82; 2016).

Forte Energy N.L. held 10 Group 4 exploration permits in northern Mauritania that cover 9,925 km<sup>2</sup>. Forte conducted vehicle-based radiometric surveys and very-low-frequency electromagnetic surveys at the Anomaly 238 (A238), which is located 55 km southeast of Bir Moghrein and the Bir En Nar prospect near Zednes. The inferred estimates for the A238 mineral resource was 45.2 Mt containing 235 ppm  $U_3O_8$  for 10,600 t of contained  $U_3O_8$  (reported as 23.4 million pounds) at a cutoff grade of 100 ppm. Estimates for indicated and inferred mineral resources at the Bir En Nar resource were 1.33 Mt containing 704 ppm  $U_3O_8$  for a total of 936,000 kg (reported as 2.06 million pounds) at a cutoff grade of 100 ppm (Forte Energy N.L., 2016).

## Outlook

Mauritania is likely to continue to develop its mineral resources in general, including iron ore despite the decline in iron ore prices in recent years. SNIM is planning to increase its capacity to produce iron ore to 25 Mt/yr by 2019 and to 40 Mt/yr by 2025 from the current 16 Mt/yr. This long-term goal is expected to be achieved following the recovery of iron ore prices on the world market and after the completion of the iron ore projects that are currently being implemented as partnerships between SNIM and international mining companies, including ArcelorMittal, CPC, China Minmetals, SOMASO, and Sphere. Copper production by MCM is expected to remain at 40,000 t/yr through 2018. Gold production at the Tasiast gold mine is expected to increase to more than 12,000 kg/yr by 2018 following the completion of the phase 1 expansion plan and to exceed 24,000 kg/yr by 2020 following the completion of the phase 2 expansion plan. Uranium production by Aura Energy at the Tiris uranium project is expected to begin within the next 5 years.

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TABLE 1  
MAURITANIA: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity <sup>2</sup>	2011	2012	2013	2014	2015
<b>METALS</b>					
Copper, mine output, Cu content	35,281	37,670	37,970	33,079 <sup>r</sup>	45,001
Gold, mine output, Au content kilograms	8,172	7,652	9,513	9,625	8,618
<b>Iron and steel:</b>					
<b>Iron ore:</b>					
Gross weight thousand metric tons	11,160	11,200	13,060	14,000	11,610
Fe content do.	7,250	7,280	8,125	8,645	7,198
Steel <sup>c</sup>	2,000	2,000	2,000	2,000	2,000
<b>INDUSTRIAL MINERALS</b>					
Cement, hydraulic	565,029	630,000	690,000	770,000	788,234
Gypsum <sup>c</sup>	72,153 <sup>3</sup>	75,000	65,000	65,000	70,000
Salt	690	700	700	700	700
<b>MINERAL FUELS</b>					
Petroleum, crude thousand 42-gallon barrels	2,824	2,400	2,460	2,200	1,933

<sup>a</sup>Estimated; estimated data are rounded to no more than three significant digits. <sup>r</sup>Revised. do. Ditto.

<sup>1</sup>Table includes data available through August 17, 2016.

<sup>2</sup>In addition to the commodities listed, modest quantities of crude construction materials (clays, sand and gravel, and stone), granite, marble, phosphate rock, and quartz presumably were produced, but output was not reported quantitatively, and available information was inadequate to make reliable estimates of output.

<sup>3</sup>Reported figure.

TABLE 2  
MAURITANIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2015

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Cement		Ciment de Mauritanie S.A.	Nouakchott	900
Do.		Mauritano-Française des Ciments S.A.	do.	450
Copper		Mauritanian Copper Mines S.A. (MCM) (First Quantum Minerals Ltd., 100%)	Guelb Moghrein Mine, Akjoujt, Inchiri Region	45
Gold	kilograms	Tasiast Mauritanie Ltd. S.A. (Kinross Gold Corp., 100%)	Tasiast gold mine, 300 kilometers north of Nouakchott	8,000
Do.	do.	Mauritanian Copper Mines S.A. (MCM) (First Quantum Minerals Ltd., 100%)	Guelb Moghrein Mine, Akjoujt, Inchiri Region	2,000
Gypsum		Société Arabe des Industries Métallurgiques (SAMIA) [Industrial Bank of Kuwait, 50%, and Société Nationale Industrielle et Minière (SNIM), 50%]	Quarries at Sebkhia N'dramcha, 50 km west of Nouakchott, and a plant at Nouakchott	75
<b>Iron and steel:</b>				
Iron ore		Société Nationale Industrielle et Minière (SNIM) (Government, 78.35%; Industrial Bank of Kuwait K.S.C., 7.17%; Arab Mining Co., 5.66%; Iraq Foreign Development Fund, 4.59%; Office National des Hydrocarbures et des Mines, 2.30%; Islamic Development Bank, 1.79%; private investors, 0.14%)	Guelb el Rhein, Kedia d'Idjill, and M'Haoudat Mines at Zouerate mining center, Tiris Zemmour Region	16,000
Steel	metric tons	Société Arabe du Fer et de l'Acier (SAFA) [Société Nationale Industrielle et Minière (SNIM), 100%]	Nouadhibou	2,000
Petroleum, crude	thousand 42-gallon barrels	PETRONAS International Corp. Ltd. (Petroliam Nasional Berhad, 100%)	Chinguetti oilfield, 80 kilometers offshore	3,000
Quartz		Joint venture of Mauritania Minerals Co. S.A. (MMC), 90%, and Government, 10%	Oum Agueineina	500
Salt	metric tons	Société Mauritanienne des Industries du Sel (SOMISEL)	Sebkhia de N'Terert and Sebkhiet ej Jill brine pits, in the southwestern part of the country	1,000

Do., do. Ditto