

THE MINERAL INDUSTRIES OF DJIBOUTI, ERITREA, AND ETHIOPIA

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Djibouti

The few reports available in recent years on mineral industry activity in Djibouti indicated intermittent entrepreneurial production of small quantities of limestone and construction materials, including clays, sand, gravel and crushed stone, as well as some marble and granite dimension stone. Artisanal salt production at Lake Assal has been displaced by small-scale commercial operations. Other mineral occurrences of potential economic interest include diatomite, geothermal fluids and mineral salts, gold, gypsum, perlite, pumice, and, possibly, petroleum. Most of these are near Lake Assal, although some gold indications were further west near Yoboki and in the south near Ali Sabieh.

The Government was trying to attract foreign investment to develop the mineral industry. In December 1997, the joint venture of Quest International Resources Corp. of the United States and Seven Star Minerals received exploration permits for several base and precious mineral prospects.

Djibouti was attempting to recapture some Ethiopian foreign trade from Eritrea, which handled most of Ethiopia's exports in 1997. Rehabilitation of the 781-kilometer (km) Djibouti-Ethiopian railroad was under negotiation. The railroad, which had been the major transportation link from Addis Ababa, Ethiopia to the Red Sea, was operated as a joint venture by the Djiboutian and the Ethiopian Governments. The Port Autonome International de Djibouti installed a new wharf and was having the Djibouti shipping channel dredged to about 12 meters.

Eritrea

Eritrea, bordering the Red Sea in northeastern Africa, became an independent nation on May 24, 1993. Agriculture accounted for about 50% of the nation's gross domestic product and the energy and minerals sectors contributed about 1% (U.S. Embassy Asmara, March 1998, Eritrea's economy—Sector report—Mining and energy sectors offer opportunity for U.S., accessed September 16, 1998, at URL <http://usiahq.usis.usemb.se/abtusia/posts/ET9/wwwhc01x.html>)¹. To meet the demand for the rehabilitation of the nation's building stock and transportation network, Eritrean mineral production in 1997 was focused on the construction materials sector. Dimension stone, base and precious metals, and petroleum attracted international mineral exploration investment. (See table 1.)

The Government, interested in the potential economic

enhancement that mineral production and beneficiation could provide, was actively seeking international investment in its mineral industry. The petroleum operations code was issued in July 1993; a general investment code was issued in 1994; and Mining Proclamation No. 68/1995, Mining Income Tax Proclamation No. 69/1995, and Regulations on Mining Operations Legal Notice 19/1995 were issued in March 1995. Royalties were 5% on precious metals and 3.5% on other minerals, the mining corporate income tax rate was 38%, and there was no export tax on minerals. The Government could acquire 10% free interest in new mining investments, and acquisition of an additional 20% equity in the venture by the Government was negotiable.

The Department of Mines, a unit of the Ministry of Energy and Mines (formerly the Ministry of Energy, Mining, and Water Resources), maintained a historical exploration and mining data base. The Ministry awarded exploration and prospecting licenses during formal licensing rounds in September 1995 and November 1997. New applications for mineral property licenses were to be considered according to Mining Proclamation No. 68/1995.

During 1997, the joint venture of Anglo American Prospecting Services (Proprietary) Ltd. of South Africa (60%) and Rift Resources Ltd. of Canada (40%) was granted an exploration license for the Augaro gold property. Rift Resources was also exploring the Ketina and the Nefasit-Mount Subub licenses through its Eritrean-Timmins Resource Ventures plc subsidiary and obtained the Tekeze exploration license in 1997. Ashanti Goldfields Co. Ltd. of Ghana continued exploration and subsequently abandoned its Ketina and Medrezen licenses. LaSource Development Eritrea (La Source SAS of France) drilled the Adi Nefas concession. Ophir Ventures Inc. farmed out 90% of its interest in the Raba and Semait license to Venture Resources Co. of the United States, which prior to yearend, dropped the property. After drilling the Adi Casci, the Adi Rassi, and the Torat targets on its Galla Valley license, Pan African Resources Corp. (PARC) of Canada, a subsidiary of Golden Star Resources Ltd., initiated the cancellation of its interest in the property. Phelps Dodge Exploration Corp. of the United States worked its prospecting licenses. WMC (Overseas) Pty. Ltd. of Australia explored its license areas in the Debub region and the Semenawi Keyih Bahri area.

The Centre pour le Développement Industriel ACP-UE and the Istituto Nazionale per il Commercio Estero sponsored a tour of Eritrean marble quarries by Italian stone-finishing companies.

Anadarko Eritrea Co., a wholly owned subsidiary of Anadarko Petroleum Corp. of the United States, obtained a production-sharing contract on the Edd Block in the Red Sea and was working with reprocessed seismic data on the Edd and the Zula

¹Pursuant to Section 1601 of the Foreign Affairs Reform and Restructuring Act of 1998, as contained in Public Law 105-277, this U.S. Information Agency URL was transferred to <http://www.usia.gov/abtusia/posts/ET9/wwwhc01x.html>

offshore blocks. Azienda Generali Italiana Petroli S.p.A. (Agip) of Italy subsequently acquired a 30% interest in the Edd and the Zula Blocks. Anadarko and Agip planned exploratory drilling in 1998.

Eritrea's mineral facilities included a 45,000-metric-ton-per-year (t/yr) cement plant at Massawa, the country's main Red Sea port; associated quarries for limestone, clay or shale, and gypsum; and the Orota Iron and Steel Plant. The obsolescent Soviet-built 18,000-barrel-per-day petroleum refinery at Assab, owned by the Eritrean Government and operated by Ethiopian Petroleum Corp., began a 1-year shutdown in August. The Government planned to study options to renovate the plant to reduce the high operating costs. In addition, there were solar-evaporation sea salt plants, each with estimated capacities of more than 100,000 t/yr, near Massawa and Assab; quarries for dimension stone (granite and marble); and sources of silica sand and other raw materials for a 20-metric-ton-per-day glassworks in Asmara. Numerous artisanal gold workings were located south and southwest of Asmara.

Mineral occurrences in Eritrea included a beryl-bearing pegmatite at Shiliki; copper, zinc, and lead sulfides in the Asmara region; many primary gold deposits in the Precambrian terranes west of Asmara; iron deposits east and south of Asmara; and a nickel-chromite deposit in the northwest near the Sudanese border. Other mineral occurrences included asbestos, barite, feldspar, kaolin, petroleum along the mostly desert coastal plain and in the Dahlak Islands offshore of Massawa, potash in the Danakil Depression southeast of Asmara, salt on the Dahlak Islands and the Mineral prospects, and sylvite (Ministry of Energy and Mines, 1997).

The nation's infrastructure, which suffered severe damage from the 30-year Ethiopian civil war that ended in 1991, was being rehabilitated. More than \$278 million was earmarked for road construction in 1998 (U.S. Embassy Asmara, February 1998, Eritrea's economy—Sector report—Construction boom, accessed September 16, 1998, at URL <http://usiahq.usis.usemb.se/abtusia/posts/ET9/wwwhc01w.html>)². The 308-km railroad from Ak'orda through Asmara to Massawa was being rebuilt, and the Red Sea ports at Assab and Massawa were being renovated.

Eritrea was suffering from a severe energy shortage. The nation had approximately 60 megawatts (MW) of electrical generating capacity, fueled by imported diesel. Keangnam Enterprises of Korea was building an 84-MW diesel powerplant at Hirgigo, near Massawa.

The demand for construction and industrial materials is not expected to abate for several years, given the anticipated extensive rebuilding. International mining investment was focused on the sites of historical operations in Eritrea. Disappointing results of exploration on some initial license areas, combined with the drop in the price of gold, made 1997 a frustrating year for the Government and the exploration companies. Exploration activity was expected to rebound as additional mining and petroleum leases are authorized.

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Ethiopia

The minerals industry was a minor contributor to Ethiopia's economy in 1997. The Government, however, was seeking foreign investment and anticipated that mineral exports could significantly increase the nation's foreign exchange earnings. Gold was the most significant Ethiopian mineral export, whereas fertilizer and petroleum products were the most significant mineral imports. Construction materials, including brick clay, limestone and shale mined for cement production, gypsum for cement and plaster, sand and gravel, and crushed and dimension stone, were also important Ethiopian mineral commodities. A variety of other minerals were also produced. (See table 2.)

The Government, through the Ethiopian Investment Authority and the Ministry of Mines and Energy, was promoting mineral sector investment, especially development of known bentonite, coal, columbium, diatomite, natural gas, gold, granite, iron ore, marble, nickel, phosphate, potash, silica sand, soda ash, and tantalum resources.

The Ethiopian Institute of Geological Surveys conducted mapping and mineral prospecting. The state-owned Ethiopian Mineral Resources Development Corp. (EMRDC) was involved in development and production of mineral resources. Mining Proclamation 52/1993, Mining Income Tax Proclamation 53/1993, Mining Operations Regulation 182/1994, Proclamation 22/1996, Proclamation 23/1996, and the Investment Proclamation of June 1996 formed the legal basis for mining in Ethiopia. The Government retained title to all land, and mining operations were subject to national and regional governmental approval. The Government could acquire 2% participation interest in mining ventures and, in 1997, levied a 35% income tax on mining operations. The royalty rate was 5% on precious metals and 3% on other minerals. The November 19, 1997, trade directive establishing hard currency as the basis of exchange between Ethiopia and Eritrea, instead of the Ethiopian birr, resulted in a temporary salt shortage in Ethiopia.

Thirteen companies bid for the 3,000-kilogram-per-year (kg/yr)-capacity Lega Dembi gold mine that the Government offered to the private sector. Midroc Ethiopia Ltd. submitted the winning bid of \$175 million and subsequently transferred operational control to its associate company, National Mining Corp. At yearend, Midroc was negotiating a mining agreement for the Lega Dembi Mine with the Ministry of Mines and Energy. In June, the Ethiopian Privatization Agency solicited bids for the 300-kg/yr Adola gold placer operation. The Ministry estimated that about 1,000 kg/yr was produced by 30,000 to 40,000 people engaged in artisanal gold production (Addis Tribune, March 20, 1997, Illegal gold production and trade rampant, accessed on April 1, 1998 at URL <http://addistribune.ethiopiaonline.net/Archives/1997/03/20-03-97/gold.html>).

Exploration and production operations in southern and southwestern Ethiopia were severely hampered during October and November by the El Niño rains and associated flooding. The joint venture between Ashanti and Ezana Mining Development plc of Ethiopia explored the Hawsen and the Shire prospects in northern Ethiopia. Ezana Mining was owned by the Tigray regional government. The joint venture of Canyon Resources Africa Ltd., a subsidiary of Canyon Resources Corp. of the United

States, and JCI Ltd. of South Africa was investigating the Megado Serdo, the Meleka Abeba, and the Tendaho Graben area properties. Emerging Africa Gold (EAG) Inc., an associated company of St. Geneviève Resources Ltd. of Canada, acquired the Agusha-Gumu gold and base metal license and relinquished the Sirkole gold license. During 1997, EAG also dropped the Yubdo platinum property as a result of the noneconomic platinum recoveries reported during metallurgical testing.

EMRDC was exploring for gold in the Oromia region. International Roraima Gold Corp. of Guyana ran geochemical surveys over the Koko-Kenticha property in the Adola gold belt of southern Ethiopia. The joint venture of JCI and Blue Nile International Mining plc of Ethiopia was exploring the Katta-Gulliso property in western Wellega. At yearend, JCI acquired the Werseti-Gudba and the Chambi licenses in the Borena region of southern Ethiopia. National Mining Corp. of Ethiopia held gold exploration licenses at Dawa-Digati and Okote in southern Ethiopia.

PARC released most of the Dul Mountain gold prospect adjacent to the border with Sudan in 1997. After additional exploration, PARC indicated it would surrender the remaining section of the lease property in 1998. Rift Resources held gold exploration licenses for the Humera, the Moyale, and the Negele-Bul Bul prospects. Tan Range Exploration Corp. of Canada was exploring for gold on the Hagere Mariam and the Tulu Kapi concessions and for platinum-group metals on the Blue Nile license. Tan Range entered into an alliance with JCI on two of the licenses.

In 1997, the construction of the 730,000-t/yr capacity Mesebo cement factory near Mekele in the Tigray region was begun, and the production of the Addis Ababa and the Muger cement plants of the state-owned Ethiopian Cement Corp. exceeded their respective capacities. At yearend, the Ethiopian Privatization Agency requested bids on the 20,000-t/yr capacity Dire Dawa cement factory, the smallest of the state-owned cement plants.

Privately owned construction materials operations ranged from local sand and gravel pits to export-oriented dimension stone quarries. EMRDC produced feldspar, kaolin, silica sand, and talc. A 6,000-t/yr kaolin mine in the Borena area and an 8,000-t/yr feldspar and quartz operation at Kentecha began operations in 1997. A permit to explore for salt in the Afar region was issued to Ato Tsegaye Gebreyesus. As part of the Lakes Soda Ash Development Project, EMRDC operated a 20,000-t/yr soda ash plant at Lake Abijata in the Rift Valley about 125 km south of Addis Ababa.

Hunt Oil of the United States acquired a production-sharing contract in the Ogaden region. The Government planned to lease a number of additional areas in the same region. With the closure of the Assab refinery in Eritrea, Ethiopia was expected to import about 830,000 t/yr of petroleum products (Indian Ocean Newsletter, 1997). Partially to offset the need to import petroleum products, Zhongyuan Petroleum Exploration Bureau of China began the development of the Calub Field, west of Shilabo in the Ogaden region, for the Calub Gas Development Share Co., a venture of the federal (90%) and regional governments and private investors. The \$5.6 million project was designed to process 186 million cubic meters per year of natural gas and to extract 65,000 t/yr of natural gas liquids from the gas stream.

The gas plant was to be operational by 2000. Product distribution was contingent on the national road network being extended into the area (Addis Tribune, May 22, 1997, Agreement to complete eight gas wells signed, accessed on April 1, 1998 at URL <http://addistribune.ethiopiaonline.net/Archives/1997/05/22-05-97/wells.html>).

The physical infrastructure had limitations, primarily associated with war damage. Roads from Addis Ababa to Assab (about 1,000 km) carried more than 80% of landlocked Ethiopia's exports in 1997. The Government began a massive rehabilitation of the road network. The Government also encouraged increased utilization of the Djibouti-Ethiopian railroad.

Ethiopia's electrical generating capacity of 371 MW was of limited availability outside urban areas. The 75-MW Tis Abay II hydroelectrical powerplant and a 35-MW geothermal powerplant were under construction and hydroelectric plants were proposed for Gilgel Gibe (190 MW), Gojeb (153 MW), and Tekeze (305 MW). Rehabilitation of a 100-MW generator at Finchaa also was contemplated.

Economic development and export growth are expected to increase as improvements in the nation's transportation infrastructure are made. The outlook was for increased activity by domestic and international minerals companies, eventually resulting in increased use of Ethiopia's natural resources.

References Cited

- Indian Ocean Newsletter, 1997, Ethiopia—New petroleum needs: Indian Ocean Newsletter, no. 775, July 26, p. 7.
Ministry of Energy and Mines, 1997, Mineral prospects of the state of Eritrea: Ministry of Energy and Mines, 16 p.

Major Sources of Information

- Department of Mines
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Major Publications

Ministry of Mines and Energy, undated, Geology, mineral occurrences, mining policy and investment opportunities in Ethiopia: Addis Ababa, Ministry of Mines and Energy, Ethiopia, 24 p.

Techno-Economic Consulting, Inc., 1994, Introducing the mineral wealth of Ethiopia: New York, United Nations Department of Development Support and Management

Services, 19 p.

Wegner, Hans-Ulrich, and Häusser, Ilse, 1996, Äthiopien: Hannover/Berlin, Bundesanstalt für Geowissenschaften und Rohstoffe, Rohstoffwirtschaftliche Länderberichte XXXIX, 103 p. (In German.)

———1996, Eritrea: Hannover/Berlin, Bundesanstalt für Geowissenschaften und Rohstoffe, Rohstoffwirtschaftliche Länderberichte XL, 41 p. (In German.)

TABLE 1
ERITREA: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity	1993	1994	1995	1996	1997 e/
Basalt	XX	114,483	233,555	509,300	510,000
Cement	XX	45,000 e/	49,947	47,031	50,000
Clays:					
Common	XX	62,970	88,676	81,600	80,000
Kaolin	XX	5,231	3,200	2,620	2,500
Coral	XX	74,404	78,603	69,269	70,000
Feldspar	XX	6,823	--	--	--
Gold	XX	78 kilograms	59	98	350
Granite	XX	43,803	82,007	130,000	130,000
Gravel	XX	80,622	1,172,500	1,715,000 r/	2,000,000
Gypsum	XX	15	20	23	20
Lime	XX	6,294	6,955	7,000 e/	7,000
Limestone e/	XX	60,000	70,000	80,000	80,000
Marble 3/	XX	190	292,400	218,300	220,000
Pumice	XX	183	233	300 e/	300
Quartz	XX	488	276	870	900
Salt	XX	207,836	254,700	200,412	200,000
Sand	XX	464,883	911,508	1,000,000 e/	2,000,000
Silica sand	XX	38,014	966,200	1,481,100	1,500,000
Talc	XX	3	--	--	--
Petroleum products	XX	5,150 thousand 42-gallon barrels	4,336	4,500	3,000

e/ Estimated. r/ Revised. XX Not applicable.

1/ Includes data available through October 2, 1998.

2/ Eritrea became independent in May 1993. Prior production reported under Ethiopia.

3/ In addition to tonnage listed in this table, 108,545 square meters of marble were produced for the construction industry in 1995.

TABLE 2
ETHIOPIA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity	1993	1994	1995	1996	1997	
Cement, hydraulic	350,000	464,396 3/	611,437 3/	650,000 r/	700,000	
Clays: 4/						
Brick	15,000	10,000	7,000	7,000	6,000	
Kaolin (China clay)	500	8	15	15	16	
Diatomite	10	150 3/	150 3/	150 3/	150	
Feldspar	10,000	4,000	4,000	4,000	5,000	
Gold, mine output, Au content	kilograms	3,387	2,370	4,500 3/	2,500 3/	3,000
Gypsum and anhydrite, crude	2,500	30,700	124,000 3/	124,000 3/	120,000	
Lime	100	2,727 3/	3,091 3/	3,100 3/	2,500	
Petroleum refinery products	thousand 42-gallon barrels	4,000	--	--	--	
Platinum, mine output, Pt content 5/	grams	--	--	100	100	
Pumice 4/	40,000	127,000	360,000	360,000	325,000	
Salt:						
Marine	120,000	--	--	--	--	
Rock	10,000	5,000	5,000	5,000	5,000	
Scoria	8,000	190,000	240,000	250,000	250,000	
Soda ash, natural	248 3/	2,150 3/	20,000 3/	20,000 3/	15,000	
Stone, sand and gravel: 4/						
Construction stone, crushed	thousand tons	1,000	300	750	750	
Dimension stone 6/		3,000	42,000	38,000	40,000	
Limestone 7/	thousand tons	100	700	3,215,000	3,300,000	
Sand 8/	do.	1,000	6,040	1,600	1,600	
Silica sand		40,000	5,000	6,000	7,000	
Tantalite, concentrate (40% Ta ₂ O ₅)	17 3/	26 3/	20 3/	20 3/	20	

r/ Revised.

1/ Data are for year ending July 7 of the year listed. For 1993, some production (particularly cement and component limestone, shale or clay, gold, gypsum, petroleum refinery products, salt, and stone) may be in Eritrea, which became independent in May 1993.

2/ In addition to the commodities listed, some lignite, semiprecious gemstones, steel semimanufactures, and talc reportedly were produced, and silver was reportedly contained in gold ingots from the Lege Dembi Mine, but information is inadequate to reliably estimate output.

3/ Reported figure.

4/ When reported as volume or pieces, conversions to metric tons are estimated.

5/ No platinum production was officially reported after 1988. However, some artisanal platinum probably continued to be produced, and platinum was also reported by others as being contained in gold ingots from the Lege Dembi gold mine, which started up in 1990; but information is inadequate to reliably estimate output.

6/ Includes marble.

7/ Apparently does not include production for cement manufacture for the period 1992 to 1994. Normally, the manufacture of 1 ton of cement requires from 30 to 100 kilograms of gypsum as well as from 1.3 to 1.8 tons of limestone and up to 0.5 ton of shale and/or clay.

8/ May include gravel.