

DJIBOUTI, ERITREA, ETHIOPIA, AND SOMALIA

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DJIBOUTI

Djibouti, which is a small East African country on the southern end of the Red Sea, has been known to produce small quantities of clays, granite, limestone, marble, salt, and sand and gravel in recent years. Other mineral occurrences of potential economic interest included diatomite, geothermal fluids and mineral salts, gold, gypsum, perlite, petroleum, and pumice.

In 2002, Djibouti's gross domestic product (GDP) amounted to about \$1.79 billion at purchasing power parity. Djibouti's GDP increased by 2.6% in 2002 after rising by 1.9% in 2001, 0.7% in 2000, and 2.2% in 1999. In 2001, construction and public works accounted for 6% of the GDP; electricity and water, 5%; and manufacturing and mining, 3% (International Monetary Fund, 2003, p. 180; 2003a§, ¹ b§; Banque Centrale de Djibouti, undated, p. 14).

By the end of 2002, the Government hoped to establish a fiscal, institutional, and legal framework to support the development of domestic natural resources. The Government also planned to promote the use of local materials in construction and public works (World Bank, 2001, p. 30).

International Cement Review (2003) estimated that Djibouti's cement consumption increased to 80,000 metric tons (t) in 2002 from 70,000 t in 2000. The country had no domestic cement production; most imports came from countries in the Persian Gulf. Djibouti also serves as a transshipment center for cement destined for Ethiopia.

Very small amounts of salt were produced at Lake Assal until 1998, when production started on a semi-industrial scale. Production increased to 173,099 t in 2001 from 135,933 t in 2000, 127,283 t in 1999, and 82,876 t in 1998 because of rising demand from Ethiopia; Eritrea had been Ethiopia's principal supplier of salt prior to the war between the two countries. From 1998 to 2001, the number of companies mining salt at Lake Assal increased to 12 from 4 (Banque Centrale de Djibouti, undated, p. 18).

Djibouti did not have production facilities for petroleum products; all petroleum demand was met through imports. In 2001, the state-owned electric utility Electricité de Djibouti (EdD) produced 235.3 gigawatthours (GWh) from four diesel-fired powerplants, compared with 232.2 GWh in 2000 and 200.7 GWh in 1997. From 1997 to 2001, total consumption of

electricity increased to 182.9 GWh from 171.9 GWh. During the same period, industrial consumption fell to 89.3 GWh from 92.7 GWh (Banque Centrale de Djibouti, undated, p. 18).

National resources of geothermal energy have been estimated to be between 230 and 860 megawatts (MW). Geothermal areas included Arta, Assal, Dorra, Gaggade Plain, Hanle Plain, Lake Abbe, Obock, and Tadjourah. The Assal geothermal project, which had a capacity of 30 MW, was expected to move forward in 2003. This project was supported by EdD and the Geothermal Development Association of Nevada (Business Council for Sustainable Energy, 2003, p. 47-49).

Djibouti's transportation network comprised about 2,900 kilometers (km) of roads, of which nearly 400 km was paved. The World Bank assisted the Government in developing a long-term program to develop the national road network. Initial investment would focus upon road links to Ethiopia to complement the planned increase in capacity at the Djibouti Port (World Bank, 2001, p. 30).

The outlook for Djibouti's mineral industry is for little growth in the short run; constraints include small domestic markets, minimal known natural resources, and modest GDP growth. The International Monetary Fund (2003, p. 180) predicted that the GDP would increase by 3% in 2003 and by 3.1% in 2004.

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¹References that include a section mark (§) are found in the Internet References Cited sections.

ERITREA

In recent years, the East African country of Eritrea, which became independent from Ethiopia in 1993, has produced a variety of minerals, rock products, and semimanufactured goods. These included basalt, cement, common clay, coral, gold, granite, gravel, gypsum, kaolin, lime, limestone, marble, pumice, quartz, salt, sand, and silica sand. The country also had deposits of such metals as chromium, copper, iron, lead, magnesium, nickel, silver, and zinc and such industrial minerals as barite, feldspar, and potash (tables 1, 3).

In 2002, Eritrea's GDP increased by 1.9% after rising by 10.2% in 2001 and falling by 13.2% in 2000. The building and construction sector accounted for 9% of the GDP; manufacturing, 9%; electricity and water, 1%; and mining and quarrying, less than 1% (International Monetary Fund, 2003a, p. 9; 2003b, p. 180).

Commodity Review

Metals

Small amounts of gold have been produced by artisanal miners; in 2002, reported gold mining ceased after declining every year since 1997. Several companies engaged in exploration for gold and base metals. Sub-Sahara Resources NL of Australia held the exploration licenses for the Adi Nefas polymetallic, Adi Nefas Doop gold, Debarwa copper-gold, and Emba Derho polymetallic deposits. Resources of zinc at these deposits were at least 191,000 t; copper, 108,000 t; silver, 197 t; and gold, 16 t (Sub-Sahara Resources NL, 2002, p. 13, 15).

In 2002, Sub-Sahara conducted exploration work at Adi Nefas Doop; exploration at Debarwa was expected to restart in December. Other prospects in areas licensed to Sub-Sahara included the abandoned Adi Shimagle, Hara Hot, and Medrizien gold mines, and the Jerkeka base metals prospect (Sub-Sahara Resources NL, 2002, p. 13, 15).

In late 2002, Nevsun Resources Ltd. restarted exploration for gold in western Eritrea; the company held licenses for the Ak, Bisha, and Okreb properties. Dragon Mining NL held the license for the Zara exploration project. Other gold exploration companies with interests in Eritrea included Eritrean Minerals Corp. and Sanu Resources (Hadgu, 2002; Nevsun Resources Ltd., 2003).

Industrial Minerals

Cement.—International Cement Review (2003) estimated that Eritrea's consumption of cement rose to 170,000 t in 2002 from 150,000 t in 2001. Eritrea Cement Works produced less than one-third of domestic cement needs; the majority of Eritrea's cement was imported from Jordan.

Clay and Shale.—National output of kaolin fell to 250 t in 2002 from 588 t in 2001 and 3,809 t in 1998. From 1998 to 2002, the production of common clay rose to 225,504 t from 80,000 t (table 1). About 25.6 million bricks were produced in 2002 compared with 21.7 million in 2001; the value of bricks

produced in Eritrea amounted to \$1 million in 2001 (Alem Kibreab, Eritrea Department of Mines, written commun., July 10, 2003).

Salt.—From 1993 to 1997, national production of salt was more than 200,000 metric tons per year (t/yr); Eritrea was the largest exporter of salt to Ethiopia. Since the war disrupted commerce between the two countries in 1998, Eritrea's salt production has not recovered fully. In 2002, salt production rose to 116,268 t from 77,853 t in 2001; the value of salt output amounted to \$323,000 (Alem Kibreab, Eritrea Department of Mines, written commun., July 10, 2003).

Stone, Dimension.—In 2001, postwar rebuilding efforts spurred a recovery in Eritrea's construction sector. Numerous projects were underway or under active consideration, including repairs to the country's airports, bridges, dams, railways, and roads; expansion and improvements to ports and water and sewage networks; and construction of housing units and commercial and industrial buildings. Rising demand for construction materials led to sharp increases in the production of basalt, granite, gravel, marble, pumice, and sand. In 2002, granite and pumice production rose, and basalt, gravel, marble, and sand output fell (table 1). The value of gravel produced in 2002 amounted to \$565,000; sand, \$459,000; marble, \$323,000; basalt, \$102,000; and granite, \$82,000 (Alem Kibreab, Eritrea Department of Mines, written commun., July 10, 2003).

Mineral Fuels

Since the closure of the Assab Oil Refinery in 1997, all of Eritrea's demand for petroleum products has been met through imports. In 2002, imports of petroleum products amounted to \$48.5 million, which was 9% of total imports. In May 2001, CMS Oil and Gas (a subsidiary of CMS Energy Corp. of the United States) signed an agreement with the Government to explore for natural gas and petroleum in the Dismin block in northeastern Eritrea. In late 2002, CMS sold its exploration interests to Perenco S.A. of France (Business Council for Sustainable Energy, 2003, p. 79; International Monetary Fund, 2003a, p. 107).

Infrastructure

The state-owned Eritrean Electricity Authority (EEA) was responsible for the generation, transmission, and distribution of electricity. In 2002, the production of electricity increased to 249.1 GWh from 224.4 GWh in 2001 and 179.2 GWh in 1997. From 1997 to 2002, sales of electricity rose to 194.2 GWh from 143.7 GWh (International Monetary Fund, 2003a, p. 90).

National capacity for generating electricity amounted to about 160 MW in 2002, all of which was thermal. The EEA owned and operated numerous power stations, including the Hirgigo plant near Massawa with a capacity of 88 MW and the Beleza with 30 MW. Hirgigo was badly damaged in the war with Ethiopia; the plant was producing at 51% of capacity in 2002. In November, a consortium of development funds agreed to provide Eritrea with \$19.6 million to repair the Hirgigo

plant. The funds involved were the Abu Dhabi Fund, the Arab Bank for International Development in Africa, the Kuwait Fund, the Organization of the Petroleum Exporting Countries Fund for International Development, and the Saudi Fund for Development (Africa Energy Intelligence, 2002; Gebrezgheir, 2002§).

Eritrea's transportation network comprised about 4,000 km of roads, of which nearly 900 km was paved. The railway linking Ak'ordat and Asmara with the Port of Massawa was 317 km; only a 5-km stretch in Massawa was operational. Rehabilitation of the remainder was under way. Ports and harbors were Assab and Massawa.

Outlook

The outlook for Eritrea's mineral industry is for gradual recovery from the war. Demand for such construction materials as basalt, granite, gravel, limestone, marble, and sand is likely to increase. Further development depends upon favorable global market conditions, the continuation of peace with Ethiopia, and landmine clearing. The International Monetary Fund (2003b, p. 180) predicted that the GDP would increase by 5% in 2003 and by 8% in 2004.

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ETHIOPIA

Ethiopia has been a producer of such minerals, rock products, and semimanufactured goods, as brick clay, cement, diatomite, feldspar, gold, gypsum and anhydrite, kaolin, lime, pumice, salt, scoria, silver, soda ash, sand, stone, and tantalite (table 1). Ethiopia's main mineral export was gold. Other metal deposits included iron ore, manganese, nickel, and platinum. Other industrial minerals included apatite, bentonite, dolomite, granite, potash, quartz, and talc.

In 2002, Ethiopia's GDP amounted to about \$41.4 billion at purchasing power parity. The GDP grew by 1.2% in 2002 after growing by 7.7% in 2001, 5.4% in 2000, and 6% in 1999. In fiscal year 2000-01, manufacturing accounted for 6% of the GDP; construction, 2%; electricity and water, 1%; and mining and quarrying, less than 1% (International Monetary Fund, 2002, p. 5; 2003, p. 180; 2003a§, b§).

Commodity Review

Metals

Columbium (Niobium) and Tantalum.—The Ethiopian Mineral Resources Development Enterprise (EMRDE) operated the Kenticha open pit niobium and tantalum mine near Borena. In fiscal year 2001-02, exports of niobium and tantalum concentrates amounted to 61,219 kg at a value of \$4.1 million, which was a decrease from 86,982 kg at a value of \$6.9 million in fiscal year 1999-2000 (Addis Tribune, 2002§).

Gold.—The Ethiopian investment company Midroc Gold (a subsidiary of Midroc Ethiopia Ltd.) operated the Lega Dembi gold mine, where production capacity was recently increased to 4,000 kilograms per year (kg/yr) of gold from 3,000 kg/yr of gold. During fiscal year 2001-02, Midroc produced 3,365 kilograms (kg) of gold. Other gold mines operating in Ethiopia included the Adola and Sakaro. In December 2001, the Government issued a placer gold mining license to a joint venture between Norwegian and Ethiopian companies. The license, which was effective for 20 years, was in southwestern Ethiopia bordering the Gambela and Maji regions (Gebre-Selassie, 2002; Mining Journal, 2002).

National exports of gold amounted to 4,400 kg at a value of \$32.1 million in fiscal year 2001-02. Substantial gold exports were undeclared; artisanal gold production was estimated to be more than 3,000 kg/yr (Gebre-Selassie, 2002; National Bank of Ethiopia, 2002a§).

In January, the Government issued an exploration license to Cortel Proprieter Ltd. of South Africa. Cortel planned to spend \$1 million from 2002 to 2004 on exploration for gold, base metals, and associated minerals. Sheba Exploration Ltd. was exploring for gold at Mereto in northern Ethiopia, where the company held four other properties. Two other companies had licenses in the eastern Tigre goldfield (African Mining, 2002; Gebre-Selassie, 2002).

Iron and Steel.—The Zuquala Steel Rolling Mill Enterprise produced steel cable and wire from imported steel. The cost of steel accounted for 74% of the factory's total operational costs. Ethiopia's demand for steel products was expected to rise to 148,000 t in 2005 from 105,000 t in 2000 (U.S. Department of State, undated a§, b§).

Industrial Minerals

Clay and Shale.—The EMRDE operated a small mine at Bamba Wuha. The pilot plant had a processing capacity of 15,000 t/yr of kaolin (table 2). Ethiopia had no paper factories.

Consumers of kaolin that produced at Bamba Wuha included the Melkasa Aluminum Sulfate and Sulfuric Acid Factory, Nazret Aluminum Sulfate Industries, and the Tabor Ceramics Factory. Kaolin was also found at Kombelcha (Mengistu and Fentaw, 2000; Ethiopia Ministry of Mines, 2002b, p. 8, 10, 14).

Diatomite.—Proven resources of the diatomite mines in the Wonji area near Addis Ababa amounted to 430,000 t. Less than 2,000 t/yr was consumed by Ethio-Tyre and Rubber Private Ltd. Co. as a filler. Diatomite was also reported to be used in local plastics factories and pesticides (Mengistu and Fentaw, 2000; Ethiopia Ministry of Mines, 2002b, p. 3).

Gemstones.—Opal was mined in northern Shewa at Mezezo; most of the production was exported in semiprocessed form. Almandine garnet was produced at Harshitmi, and peridot was mined from numerous localities near Mega. Resources of peridot were estimated to be 2,457 kg (Ethiopia Ministry of Mines, 2002a).

Gypsum.—Modest amounts of gypsum were produced for domestic consumption in the Mughher Valley, at Filikik, and at Dewelle near Dire Dawa. Most of Ethiopia's gypsum was used in cement and stucco production (Mengistu and Fentaw, 2000).

Salt.—In northwestern Ethiopia, artisanal miners produced rock salt in the Assal, Badda, and Gabro areas of the Denkali depression. Total resources of rock salt in the Denkali depression were estimated to be more than 3 billion metric tons (table 3). In the area of Assal, production was about 30,000 t/yr. Salt was also produced from brine lakes in the areas of Assal, Afdera, and Badda in the Denkali depression and from ponds at Emi and Krime in southern Ethiopia. Large-scale salt production was expected to commence at Afdera in the near future. Salt resources at Afdera were estimated to be 290 Mt. This project and two others of a similar scale were expected to eliminate Ethiopia's dependence upon imported salt. National salt consumption amounted to about 250,000 t/yr; a substantial portion was imported from Djibouti and Yemen (Ethiopia Ministry of Mines, 2002b, p. 7, 12).

Silica.—In the Mughher Valley, deposits of silica sand were found at Chembere, Kuffim, and Tulu; combined resources amounted to about 3.4 Mt. These deposits were the main supply of silica sand for a Government-run glass and bottle factory in Addis Ababa. Production amounted to about 6,000 t/yr (tables 1, 3); mining was limited by the glass factory's modest capacity. In recent years, the development of Ethiopia's infrastructure has led to rising demand for flat glass (Mengistu and Fentaw, 2000; Ethiopia Ministry of Mines, 2002b, p. 15).

Deposits in the Abay Valley and the Mekale and Ogaden Basins were reported to have resources at higher grades than those being mined in 2002. Summit Partners plc held an exploration license for silica sand in northern Shewa (Ethiopia Ministry of Mines, 2002b, p. 15).

Soda Ash.—The state-owned Abiyata Soda Ash Enterprise produced small amounts of soda ash at Lake Abiyata, which

were used to manufacture caustic soda at the company's plant in Ziway. Production has been limited in recent years by import competition and shortages of lime needed as raw material. Lime has been sourced from the Dire Dawa cement plant (Ethiopia Ministry of Mines, 2002b, p. 14; U.S. State Department, undated b§).

Stone, Crushed.—Deposits of dolomite were known to occur at Galleti and Hula-Kuni, where resources were estimated to be 1.4 million metric tons (Mt) and 250,000 t, respectively. In Awash, Modern Building Industry plc processed dolomite for use as a filler material. The company was expected to supply filler to paint factories in Addis Ababa. National demand for dolomite as a filler material was estimated to be a couple of tens of thousands of metric tons per year (Mengistu and Fentaw, 2000; Ethiopia Ministry of Mines, 2002b, p. 14-15).

Stone, Dimension.—Basalt and scoria were used in road construction. National Mining Corp. (NMC) (a subsidiary of Midroc Ethiopia) mined and polished calcitic marble from the Dalleti area in western Ethiopia. Saba Stones produced calcitic marble in Tigre. Ethiopian Marble Industry (EMI) mined marble at Harar in eastern Ethiopia and at various sites in the western part of the country. EMI processed its raw materials in Addis Ababa. Deposits of pumice occurred at the Gari Baldi Pass and at Kimbibit in the Rift Valley; pumice was used in domestic cement production. NMC produced amphibolite, granite, and limestone. Ethiopia had a total of at least 34 deposits of dimension stone, with 10 operating quarries, and 4 processing plants (Mengistu and Fentaw, 2000; Mining Journal, 2002).

Sulfur.—The Melkasa Aluminum Sulfate and Sulfuric Acid Factory was Ethiopia's only producer of sulfuric acid. Domestic sulfur deposits at Cherebet Ale, Dofan, Dallol, and Zariga have not been mined in recent years; sulfuric acid was produced using imported sulfur. Production has been below the plant's capacity; domestic demand was limited by Ethiopia's low level of industrialization (Ethiopia Ministry of Mines, 2002b, p. 6, 16).

Mineral Fuels

Natural Gas.—The Gasoil Ethiopia Project (GEP) was a joint venture to develop the Calub and Hilala gasfields for use in a gas-to-liquid plant in Awash. In early 2002, Sicom Inc. of the United States held 80% of the GEP; the remaining 20% was held by the state-owned Calub Gas Shares Co. (CGSC). In December, the Russian state-owned companies Methanol and Sroytransgas were negotiating with the Government to buy 50% of CGSC (Africa Energy Intelligence, 2002a, c).

Petroleum.—At the end of 2002, Ethiopia was totally dependent upon imports to meet its demand for petroleum. In fiscal year 2001-02, Ethiopia imported 8.53 million barrels (Mbbbl) of petroleum products, which was an increase from 8.33 Mbbbl in fiscal year 2000-01 and 7.81 Mbbbl in fiscal year 1999-2000. In fiscal year 2001-02, automotive diesel oil accounted

for 54% of petroleum imports; jet fuel, 22%; gasoline, 13%; and residual fuel oil, 10%. The value of imported petroleum products amounted to \$282.2 in fiscal year 2001-02 (National Bank of Ethiopia, 2002a§, b§).

Infrastructure

In fiscal year 2001-02, Ethiopia produced 1,993 GWh of electricity, which was an increase from 1,812 GWh in fiscal year 2000-01 and 1,689 GWh in fiscal year 1999-2000. Hydroelectric sources accounted for 99.1% of power generated; thermal sources, 0.8%; and geothermal sources, 0.1% (National Bank of Ethiopia, 2002b§).

In December, the state-owned Ethiopian Electric Power Corp. (EEPCO) had a generating capacity of 470 MW; in 2003, capacity was expected to rise to 654 MW with the commissioning of the Gilgel Gibe Dam. Other new capacity in the near future would include the Gojeb and Tekeze hydroelectric plants, with a capacity of 150 MW and 300 MW, respectively. Tekeze was to be built by China National Water Resources and Hydropower Engineering Corp., and Gojeb, by the Midroc Ethiopia Group. By 2025, EEPCO's capacity was expected to reach 1,330 MW (Africa Energy Intelligence, 2002b).

Demand was expected to consume 528 MW of capacity in 2003 and to exceed supply in spite of the Gojeb and Tekeze plants by 2010. In 2025, demand was expected to consume 2,335 MW of capacity. To alleviate the large and growing shortages in the future, EEPCO has been considering additional hydropower projects, including Chemoga-Yeda, with a capacity of 440 MW; Halele-Werabesa, 374 MW; and Beles, 195 MW (Africa Energy Intelligence, 2002b).

Ethiopia's geothermal resources have been estimated to be more than 1,000 MW, which included the Central Afar with 260 MW; the Lakes District, 170 MW; the Denkali depression, 150 MW; and the Southern Afar, 120 MW. EEPCO operated the Aluto-Langano geothermal plant in the Lakes District that had a capacity of 7.3 MW. Production has been inhibited by low wellhead pressure and a lack of spare parts. Other areas of geothermal exploration include Corbetti, Gedemsa, and Tulu (Business Council for Sustainable Energy, 2003, p. 64, 67-69).

At the end of 2000, Ethiopia's transportation network comprised 29,799 km of roads, of which nearly 3,890 km was paved, and 25,909 km, gravel. The Ethiopian segment of the Addis Ababa-Djibouti railroad was 681 km.

Outlook

The International Monetary Fund (2003b, p. 180) predicted that the GDP would fall by 3.8% in 2003 and rise by 6.7% in 2004. Ethiopia's plans to expand infrastructure may increase the economic viability of its metals and industrial minerals deposits. Favorable conditions in the world minerals markets and the continuation of peace with Eritrea are also important. Columbium (niobium) demand is driven primarily by the steel and aerospace industries. Global consumption of finished steel was predicted to increase by about 1.3% in 2003 and rise by

2.2% per year from 2004 to 2007. Global tantalum demand was expected to decline until mid-2003, when the market would start to recover (Metal Bulletin, 2002; MEPS (International) Ltd., 2003§).

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SOMALIA

Somalia was an East African country on the Gulf of Aden and the Indian Ocean that produced small quantities of gypsum, salt, and sepiolite (meerschaum). Recent discoveries and artisanal mining of gemstones included amethyst, aquamarine, emerald, sapphire, and zircon. The country also had deposits of feldspar, iron ore, kaolin, limestone, natural gas, quartz, silica sand, tantalum, tin, and uranium. The minerals industry makes a small contribution to Somalia's exports and the economy in general.

Officially reported mineral and trade data have been unavailable because of a lack of a central Government from 1991 to 2000. Somaliland (a region in northern Somalia) declared its independence in 1991, and Puntland (which was to the east of Somaliland) declared autonomy in 1998. In April 2002, the Rahanwein Resistance Army declared independence in southwestern Somalia, but the Puntland Province in the southeast was annexed in July by the Transitional National Government (ArabicNews.com, 2002§; BBC News, 2002§). None of the declarations of independence have been internationally recognized. Somalia's civil war has had considerable adverse consequences for the economy, which included the minerals sector. The war forced the closure of Somalia's cement plant and oil refinery and has halted exploration for natural gas and other resources.

Somalia imported all of its cement, most of which was believed to be sourced from Kenya, Jordan, and Saudi Arabia. International Cement Review (2003) estimated that Somalia's cement consumption remained unchanged at 100,000 t in 2002. The Berbera cement plant had a capacity of 200,000 t/yr but needed substantial upgrade work to resume production.

Such gemstones as aquamarine, emerald, garnet, opal, red spinel, ruby, sapphire, and tourmaline were known to be produced in Somaliland. Gem-quality emerald was produced at Alihiley and Simodi in western Somaliland. Aquamarine has been produced at Darburuq and Lafarug. Gem-quality almandine, grossular, and pyrope garnets were found in varying colors; deposits of garnet occurred near Alihiley, Boroma, and Darburuq. Ruby was found in the Molis area, and high-quality blue sapphire was being mined east of Gebiley (Henricus, 2001b).

Mining of Somaliland's gemstones has been limited by civil strife, damaged infrastructure, and a lack of modern equipment. The European Community-funded nongovernmental organization Progressive Interventions was working with the authorities of Somaliland to develop local gemstone resources. Issues under consideration included investment in exploration and mining equipment; training of local miners; organizing the miners and dealers into a mining and trade association; marketing the gemstones; and adding value through cutting and polishing (Henricus, 2001a, b).

Since the closure of Somalia's oil refinery, all the country's demand for petroleum products has been met through imports. In 2001 and 2002, the authorities of Somaliland signed agreements with China Petrochemical Corporation, Continental Petroleum Engineering Company Ltd., Inverse International

Ltd., Rovagold Ltd., and Zarara Energy Ltd. of Dubai to explore for oil. None of these agreements have been implemented; Zarara Energy may be the only company listed that actually exists. Chinese firms have been reported to be involved in oil exploration in Puntland (Africa Energy Intelligence, 2003; Somaliland Times, 2002§; U.S. Energy Information Administration, 2002§).

In addition to import dependence, Somalia's energy sector also faced the problem of deforestation. Charcoal was the primary domestic source of energy as well as one of the country's largest exports. In 1992, the United Nations estimated that 14% of Somalia was covered with woodland; this figure may have fallen to as low as 4% by 2002. In 2002, the authorities of Puntland banned the export of charcoal; enforcement of the ban caused Puntland's charcoal exports to fall by 80%. However, substantial amounts of charcoal were still exported to Saudi Arabia, the United Arab Emirates, and Yemen through Mogadishu (Lacey, 2002; Amosu, 2003§).

Somalia's installed electricity generating capacity amounted to 70 MW, all of which was diesel fired. Ente Nazionale Energia Elettrica of Italy was responsible for the generation, transmission, and distribution of electricity. Prior to 1991, the Government had planned to install wind energy systems in rural areas and turbines to connect to the electricity grid in Mogadishu (U.S. Energy Information Administration, 2002§).

Somalia's transportation network comprised about 22,000 km of roads, of which 2,600 km was paved. Oil pipelines were 15 km. Ports and harbors were Bender Cassim (Boosaaso), Berbera, Chisimayu (Kismaayo), Merca, and Mogadishu.

The outlook for Somalia's mineral industry is for little change in the short run. In early 2002, the Transitional National Government controlled only portions of Mogadishu and other pockets of territory. Other problems include weak infrastructure and a domestic market that is limited by severe poverty. In the long run, an end to the civil war; investment in education, health, and infrastructure; favorable world market conditions; improvements in mining technology; and other conditions amenable to private foreign investment could lead to greater development of Somalia's mineral resources.

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TABLE 1
ERITREA, ETHIOPIA, AND SOMALIA: PRODUCTION OF MINERAL COMMODITIES^{1,2}

(Metric tons unless otherwise specified)

| Country and commodity | 1998 | 1999 | 2000 | 2001 ^c | 2002 ^c |
|---|----------------------|------------------------|----------------------|------------------------|----------------------|
| ERITREA | | | | | |
| Basalt | 403,219 | 251,991 | 122,928 | 161,759 ^{r,3} | 148,424 ³ |
| Cement ^c | 45,000 ^r | 45,000 ^r | 45,000 | 45,000 ^r | 45,000 |
| Clays: | | | | | |
| Common | 80,000 ^e | 88,476 ³ | 63,427 ³ | 282,518 ^{r,3} | 225,504 ³ |
| Kaolin | 3,809 | 1,138 | 943 | 588 ^{r,3} | 250 ³ |
| Coral | 245,112 | 86,762 | 74,130 | 38,596 ^{r,3} | 49,297 ³ |
| Gold kilograms | 573 | 534 | 264 | 107 ^{r,3} | -- ³ |
| Granite | 249,829 | 162,146 | 122,017 | 145,193 ^{r,3} | 150,053 ³ |
| Gravel | 572,207 ^r | 1,215,579 ^r | 113,769 ^r | 339,692 ^{r,3} | 220,928 ³ |
| Gypsum | 56 | 1,075 | 330 | 985 ^{r,3} | 504 ³ |
| Laterite | 5,881 | 2,171 | 2,049 | 3,575 ^{r,3} | 5,200 ³ |
| Lime ^c | 40,000 | 40,000 | 40,000 | 42,610 ^{r,3} | 47,406 ³ |
| Limestone ⁴ | 4,077 | 5,069 | 2,690 | 2,830 | 2,900 |
| Marble blocks square meters | NA | NA | 1,990 | 17,656 ³ | 12,851 ³ |
| Pumice | 391 | 153 | 41 | 195 ^{r,3} | 212 ³ |
| Quartz | 731 | 730 ^e | 600 ^e | 350 ^{r,3} | 215 ³ |
| Salt | 114,137 | 9,368 | 47,498 | 77,853 ^{r,3} | 116,268 ³ |
| Sand thousand tons | 1,250 ^r | 466 ^r | 593 ^r | 685 ^{r,3} | 605 ³ |
| Silica sand | -- | 5,795 ^r | -- | -- ^{r,3} | 36 ³ |
| ETHIOPIA^{5,6} | | | | | |
| Cement, hydraulic | 750,000 | 638,266 | 879,962 | 950,000 | 1,000,000 |
| Clays: ⁷ | | | | | |
| Brick | 6,000 ^e | 80,865 ³ | 224,093 ³ | 242,000 | 242,000 |
| Kaolin (China clay) | 378 | 681 | 1,654 | 1,790 | 1,800 |
| Other clay cubic meters | NA | 23,750 | 23,000 ^e | 24,800 | 25,000 |
| Columbite-tantalite, ore and concentrate: | | | | | |
| Gross weight kilograms | 20,000 | 49,630 | 64,940 | 78,700 | 61,000 |
| Nb content do. | NA | 4,960 | 6,490 | 7,870 | 6,100 |
| Ta content do. | 6,500 | 29,300 | 38,800 | 47,000 ³ | 37,000 |
| Diatomite | 125 | 140 | 140 ^e | 1,500 ^r | 1,500 |
| Feldspar | 5,000 ^e | 391 | 285 | 310 | 310 |
| Gold, mine output, Au content kilograms | 2,500 | 4,905 | 5,177 | 5,200 | 5,300 |
| Gypsum and anhydrite, crude | 37,325 ^r | 35,983 | 46,798 | 50,500 | 51,000 |
| Lime | 3,000 | 2,991 | 3,769 | 3,800 | 3,800 |
| Pumice ⁷ | 325,000 ^e | 135,400 | 156,466 | 169,000 | 170,000 |
| Salt, rock | 1,000 ^e | 56,400 | 56,400 | 60,900 | 61,000 |
| Scoria ^c | 250,000 | 281,164 ³ | 287,000 | 310,000 | 310,000 |
| Silver, mine output, Au content kilograms | 500 ^e | 689 | 1,018 | 1,051 ³ | 1,100 |
| Soda ash, natural | 5,272 ^r | 4,409 ^r | 3,805 ^r | 7,543 ^{r,3} | 7,600 |
| Stone, sand and gravel: ^{c,7} | | | | | |
| Construction stone, crushed thousand tons | 1,000 | 3,407 ³ | 3,459 ³ | 3,740 | 3,800 |
| Dimension stone ⁸ | 130,000 | 130,000 | 100,000 | 108,000 | 108,000 |
| Granite | NA | 126 ³ | 140 | 150 | 150 |
| Limestone thousand tons | 3,400 | 846 ³ | 1,197 ³ | 1,300 | 1,300 |
| Sand ⁹ do. | 2,500 | 1,600 ³ | 1,853 ³ | 2,000 | 2,000 |
| Silica sand | 7,000 | 6,061 ³ | 5,601 ³ | 6,000 ^r | 6,000 |
| Other stone | NA | 10,162 ³ | 15,768 ³ | 17,000 | 17,000 |
| SOMALIA^{e,10} | | | | | |
| Gypsum | 1,500 | 1,500 | 1,500 | 1,500 | 1,500 |
| Salt, marine | 600 | 1,000 | 1,000 | 1,000 | 1,000 |
| Sepiolite (meerschaum) | 6 | 6 | 6 | 6 | 6 |

See footnotes at end of table.

TABLE 1--Continued
ERITREA, ETHIOPIA, AND SOMALIA: PRODUCTION OF MINERAL COMMODITIES^{1,2}

^cEstimated. ^rRevised. NA Not available. -- Zero.

¹Estimated data are rounded to no more than three significant digits.

²Includes data available through June 6, 2003.

³Reported figure.

⁴For other than cement.

⁵Data are for year ending July 7 of the year listed.

⁶In addition to the commodities listed, some lignite, semiprecious gemstones, steel semimanufactures, sulfuric acid, and talc reportedly were produced, and platinum was reportedly contained in gold ingots from the Lega Dembi Mine, but information is inadequate to estimate output.

⁷When reported as volume or pieces, conversions to metric tons are estimated.

⁸Includes marble. Production of marble was reported to be 6,014 t in 1999 and 6,662 t in 2000.

⁹May include gravel.

¹⁰In addition to the commodities listed, precious and semiprecious gemstones were reportedly produced, and various crude construction materials (for example, clays, sand and gravel, crushed and dimension stone) and lime are presumably produced, but information is inadequate estimate output.

TABLE 2
ERITREA, ETHIOPIA, AND SOMALIA: STRUCTURE OF THE MINERAL INDUSTRIES IN 2002

(Metric tons unless otherwise specified)

| Country and commodity | | Major operating companies | Location of main facilities | Annual capacity |
|----------------------------------|------------------|--|---|--------------------------------|
| ERITREA | | | | |
| Cement | | Eritrea Cement Plant | Massawa | 45,000 mill; 45,000 kiln. |
| Petroleum products ¹ | thousand barrels | Petroleum Corp. of Eritrea | Assab | 5,320. |
| ETHIOPIA | | | | |
| Caustic soda | | Abiyata Soda Ash Enterprise (Government-owned) | Ziway | 10,000. |
| Cement | | Messebo Building Materials Production Share Co. (Government-owned) | Mekele | 640,000 mill; 600,000 kiln. |
| Do. | | Mugher Cement Factory (Government-owned) | Mugher | 720,000 mill; 620,000 kiln. |
| Do. | | do. | Addis Ababa | 125,000 mill; 112,000 kiln. |
| Do. | | do. | Dire Dawa | 32,000 mill; 24,000 kiln. |
| Columbium (niobium) and tantalum | kilograms | Ethiopia Mineral Resources Development Enterprise (Government-owned) | Kenticha Mine near Borena | 112,000 tantalum. ^c |
| Gold | | Midroc Gold (subsidiary of Midroc Ethiopia Ltd.) | Lega Dembi | 1,500,000 ore processing. |
| Do. | kilograms | do. | do. | 4,000 gold. |
| Kaolin | | Ethiopia Mineral Resources Development Enterprise (Government-owned) | Bamba Wuha | 15,000. |
| Marble ² | | Ethiopian Marble Industries | Harar and various sites in western Ethiopia | NA. |
| Do. | | National Mining Corp. (subsidiary of Midroc Ethiopia Ltd.) | Mugher | NA. |
| Do. | | Saba Stones | Tigre Province | NA. |
| Soda ash | | Abiyata Soda Ash Enterprise | Lake Abiyata | 20,000. ^c |
| Steel, semimanufactured | | Zuquala Steel Rolling Mill Enterprise (Government-owned) | Debre Zeit | NA. |
| Sulfuric acid | | Melkasa Aluminum Sulfate and Sulfuric Acid Factory | Melkasa | NA. |
| SOMALIA | | | | |
| Cement ³ | | Berbera Cement Agency | Berbera | 200,000 mill; 200,000 kiln. |
| Petroleum products ⁴ | thousand barrels | Iraqsoma Refinery Co. | Mogadishu | 3,650. |

^cEstimated. NA Not available.

¹Has not operated since 1997.

²National capacity of marble is estimated to be at least 6,700 t/yr based on recent production data.

³Has not operated since 1996.

⁴Has not operated since 1991.

TABLE 3
ERITREA, ETHIOPIA, AND SOMALIA: MINERAL RESOURCES IN 2002

| Country and commodity | Deposit | Tonnage | Grade | Mineral content |
|--------------------------------|---------------------------------------|-------------------------|---|---|
| ERITREA | | | | |
| Copper and gold ¹ | Debarwa | 1.65 Mt | 5.1% Cu; 1.4 g/t Au | 84,000 t Cu; 2,300 kg Au. |
| Gold | Adi Nefas Doop | 2.92 Mt | 3.1 g/t Au | 9,100 kg Au. |
| Zinc, copper, gold, and silver | Emba Derho | 2.59 Mt | 2.36% Zn; 0.39% Cu; 0.1 g/t Au; 4.5 g/t Ag | 61,000 t Zn; 10,000 t Cu; 260 kg Au; 12,000 kg Ag. |
| Do. | Adi Nefas | 1.43 Mt | 9.3% Zn; 0.95% Cu; 3.28 g/t Au; 129 g/t Ag | 130,000 t Zn; 14,000 t Cu; 4,700 kg Au; 185,000 kg Ag. |
| ETHIOPIA | | | | |
| Diatomite | Lake Region, Shewa and Arsi Provinces | NA | NA | 85 Mt. |
| Dolomite | Galleti | NA | NA | 1.4 Mt. |
| Do. | Hula-Kuni | NA | NA | 250,000 t. |
| Feldspar | Kenticha | 1.14 Mt | 40% feldspar | 500,000 t. |
| Do. | Babile-Bombas | 0.3 Mt | 50% feldspar | 150,000 t. |
| Gold | Lega Dembi | NA | NA | 83,000 kg. |
| Do. | Adola | NA | NA | 4,500 kg. |
| Gypsum | Sodoble | NA | NA | 56 Mt. |
| Do. | Adigudom | NA | NA | 400,000 t. |
| Kaolin | Bombowha | 1 Mt | 30% kaolin | 300,000 t. |
| Do. | Kombelcha | 0.96 Mt | 31% kaolin | 300,000 t. |
| Limestone | Mossobo | NA | NA | 69.5 Mt. |
| Do. | Mugher | NA | NA | 50 Mt. |
| Do. | Dire Dawa | NA | NA | 46 Mt. |
| Marble | Mora | NA | NA | 46.5 Mt. |
| Do. | Baruda | NA | NA | 13.6 Mt. |
| Natural gas | Calub | 25 billion cubic meters | NA | NA. |
| Peridot | Bulgendo | NA | NA | 2,457 kg. |
| Salt | Denkali depression | NA | NA | 3,000 Mt. |
| Do. | Lake Afdera | NA | NA | 290 Mt. |
| Silica sand | Mugher | NA | NA | 3.4 Mt. |
| Soda ash | Lakes Abiyata, Chiltu, and Shala | NA | 1.1% to 1.9% Na ₂ CO ₃ | 460 Mt. |
| Talc | Anno | NA | NA | 120,000 t. |
| SOMALIA | | | | |
| Gypsum and anhydrite | Suria Malableh | 5 Mt | 80% gypsum | 4 Mt. |
| | | 2.5 Mt | 90% anhydrite | 2.3 Mt. |
| Sepiolite | Indho Qabyo | 20 Mt | NA | NA. |
| Do. | Other deposits in El Bur area | 80 Mt | NA | NA. |

NA Not available.

¹Sub-Sahara Resources NL reported that additional resources at Debarwa were 1.3 Mt; grades were not available.

Sources: Chakrabarti, 1988; Mengistu and Fentaw, 2000; Radler, 2001; Ethiopia Ministry of Mines, 2002a, b; Mining Journal, 2002; Sub-Sahara Resources NL, 2002.