

THE MINERAL INDUSTRY OF

ECUADOR

By Pablo Velasco

In 1997, the economy of Ecuador depended heavily on petroleum production, along with exports of agricultural commodities and seafood. The state petroleum industry, made up 10% of gross domestic product (GDP), generated 37% of the country's total exports, and provided about 30% of government revenue. The GDP reached \$20.0 billion¹ in real terms, representing a growth of 3.4% from that of 1996. The growth was led by trade, manufacturing, food-stuff, and mineral production (including oil). The per capita GDP was \$1,675 and the inflation rate increased to about 30% compared with 26% in 1996. (U.S. Department of State, November 1998, Ecuador, Listserv, accessed November 12, 1998, from e-mail DOSBACK@LISTSERV.UIC.EDU).

In 1997, the Ecuadorian Government announced a 4% rise in the value-added tax to counter an expected revenue short-fall caused by the sharp drop in world oil prices. The revenue would be used to meet a fiscal deficit targeted at 2.5% of GDP. The Government said that the measures were necessary to meet the cost of a drastic fall in world oil prices, the damage caused by El Niño, and a decline in international trade to Asian countries. Ecuador's ability to increase oil production and exports was limited because the State-owned pipeline, the Sote, was operating at capacity. The Government, therefore, was planning to sign a contract with the Argentinean oil company Yacimientos Petrolíferos Fiscales (YPF) to increase the number of pumps on the pipeline and to raise capacity by 25,000 barrels per day (bbl/d). The state owned petroleum holding corporation Petroecuador had agreed with Colombia's Ecopetrol to increase the amount of crude transported through a Colombian pipeline by 5,000 to 50,000 bbl/d. Once the YPF project is operating, Ecuador will be able to transport 405,000 bbl/d. (Financial Times, 1998, p.3).

Traditionally, petroleum has been an important element of the Ecuadorian economy. Since the early 1970's, the country has relied heavily on the income derived from the exploitation of this resource. The petroleum sector has not only been the main generator of foreign exchange and the main contributor to the state budget, it has been the main recipient of foreign investment and the major source of employment and technology transfer. Consequently, the identification of additional oil reserves has been the main objective of state-owned Petroecuador and the overseas companies operating in the country. With a 31.5-million-barrel (Mbbl) production shortfall anticipated in 1998, contributions to the state budget from oil revenues are likely to be seriously impacted.

The downturn in metal prices, has slowed the rate of

exploration in Ecuador, particularly the exploration undertaken by junior companies that were unable to secure adequate funding.

Despite the limited mining activity in the sector, some progress in exploration and mine development was made. Although mining was considered to be unimportant, the Government was committed to transforming this sector into an important contributor to the country's economic development and had almost completed a geologic and geochemical survey in the western Ecuadorian Andean Cordillera, which was funded by the World Bank and led by staff from the British Geological Survey. Given the country's mineral potential, the implementation of new mining policies, and the number of foreign mining companies already exploring in the country, this sector could become economically important in the near future. Nonetheless, unofficial gold production for 1997 was estimated to be 15.5 metric tons (t), by private producers and officially to be 3,070 kilograms. The most important Ecuadorian gold producer, Bira S.A., reported 9 t from operations in the Portovelo-Zaruma district.

According to the Undersecretary of Mines of Ecuador in 1997, metal mining was oriented towards gold. Nonmetallic production was oriented toward cement and industrial minerals. Minerals accounted for about 1.4% of the country's GDP, and export revenues accounted for about \$26 million (gold, about \$18 million; silver about \$3 million; and industrial minerals, about \$5 million). The sector employed about 60,000 workers, or about 2% of Ecuador's labor force. From 1991 to 1997, La Dirección Nacional de Minería (DINAMI) granted about 920,000 hectares (ha) of mining concessions, of which most were in the exploration stage. There were more than 2,700 applications for exploration of 7 million hectare. Despite the presence of prominent international mining firms, capital flow was still sparse, and high-level risk capital in exploration had not materialized.

The Mining Law offers important tax incentives, including: repatriation of profit without limitations; tax base of 25% over profits; speedy 4-year amortization system for exploration expenses; foreign investors are not compelled to have nationals as partners or counterparts; foreign investments may be made in cash, machinery or services; the law provides almost full exceptions on custom duties for imports of machinery, laboratories, equipment, and supplies of raw materials required in all the phases of mining activities; exemption from the value-added tax (VAT) on the imports of mining implements, as long as they are not domestically manufactured; no taxes are charged for the registration of foreign loans, regardless of the terms of the credit granted or its amount; foreign investors may own any proportion of company stock; formalities for the approval of foreign investments are swift and tax free; minerals sold to the

¹Where necessary, values have been converted from Ecuadorian sucres (S) at the rate of S/3,983=US\$1.00.

Central Bank of Ecuador shall be considered as exports; minerals exports made under the Mining Law need only to comply with the general requirements set forth to obtain the relevant export permit. Exemption from all taxes does not imply exemption from service fees.

According to Ecuadorean Law, there is no limit in the number of concessions for an operator company, although the law does limit the maximum surface area for each concession; the procedures for granting concessions are remarkably simplified; the Tariffs Committee could established lower tariffs for the importation of machinery, laboratories, equipment, utility vehicles, spare parts, and supplies required for mining activities in all their phases; exports of minerals are free from all taxes or duties, except the 0.5% tax on the f.o.b. export value; and compared with other countries in South America labor costs are low.

Labor laws enacted in July 1996 provide for a 40-hour work week (8 hours per day) and basic monthly wages of approximately \$160.

Ecuadorian Mining Law (law no.126), published in the Official Registry No. 695 on May 31, 1991, and reforms to the General Regulations of the Mining Law promulgated and published in the Official Registry No. 839 of December 11, 1995, form the specific legal context for mining activities in the country. This legal framework was designed to offer important incentives for foreign and national investments, and technology transfer processes. The Environmental Protection Regulations, which is part of law no. 126, established the following: Article 79.—Environmental Impact Studies (EISs).

The holders of mining, beneficiation, smelting, and refining concessions must prepare EIS and Plans of Environmental Management (PEM's) to prevent, mitigate, control, rehabilitate and compensate the environmental and social impacts resulted from their operations. EIS's and PEM's must be approved by the Environmental Secretariat of the Ministry of Energy and Mines. Article. 80.—PEM's

PEM's should contain the following: 1. Description of the project and the applicable measures to protect the environment, which should be oriented to: a) Protection: actions to protect the natural habitat of plants and animals, scenery, soil, and indigenous communities; b) Prevention control of contamination, deforestation, erosion and sedimentation; c) Follow up monitoring to control contamination, deforestation, erosion and sedimentation; d) Rehabilitation: reforestation, erosion control and restoration of the affected areas; e) Maintenance: programs to maintain platforms, pools, equipment, ducts, storage tanks, roads and civil works in general; f) Emergency and contingency: contingency plans for spillage of contaminants in the watersheds, oceans, and land to respond to accidents and unexpected events; g) Mitigation: cleaning up spillage of contaminants, recollection, procedures for final disposal of residues, trash, and junk; and other civil works; and h) Compensation: reposition to affected parties (communities, inhabitants, etc..) by the project developer.

According to DINAMI's minerals production statistics, as shown in table 1, production levels of Ecuador's main mineral commodities were mixed in 1997. Gold and silver declined by 57% and 73%, respectively compared with 1996 levels. Reported unofficial sales of artisanal gold production in 1997 were at about

the same level as that of 1995 when an unknown quantity of artisanal gold production was undocumented, owing to theft, internal consumption for jewelry, or alleged smuggling to neighboring countries. Gold mining was concentrated in the mining districts of Nambija, Ponce Enriquez, Portovelo, Zaruma and other areas in the south. Production of sand and gravel and pumice stone went up 60% and 59%, respectively. The exploitation of pumice was a very important activity that took place in the central provinces of the highlands. The entire production was long ago exported to several countries in America and Eastern Asia. Total crude production for 1997 was 144.5 Mbbl, an increase of 1% compared with that of 1996.

In 1997, Ecuadorian exports totaled \$5,300 million, with growth slowing to 8.4% compared with that of 1996. Most of the trade exports consisted of petroleum and petroleum products and agricultural products. Imports increased by 31.9% to \$4,600 million. On a balance of payment basis, the increase in imports resulted in lower trade barriers in the region, including a free trade agreement with Bolivia, Colombia, and Venezuela, helped manufacturers become export oriented. Major markets were the United States with 39%, Latin America, 25%, the European Union (EU) 22%, and Asia 12%. Major suppliers were Latin America 35%, the United States 31%, EU, 19%, and Asia, 11%. Ecuador reduced most tariffs between 5% and 20% and, in January, instituted a common external tariff with Colombia and Venezuela. Increased sales to members of the Andean Pact countries and other countries worldwide accounted for much of the increase in nonpetroleum exports.

The United States continued to be Ecuador's principal trading partner. During 1997, the value of exports to the United States increased by 2.9%, reaching \$1.85 billion. Crude oil and processed petroleum exports to the United States were valued at \$416.1 million. Imports from the United States, primarily machinery, increased slightly, to \$1.26 billion. Most Ecuadorian products enjoy duty-free access to the U.S. market under the Andean Trade Preferences Act.

Indeed, the presence of major multinational mining companies, including Newmont Overseas Explorations Ltd. of the United States, Gold Fields of South Africa Ltd., Rio Tinto Corp. Plc of the United Kingdom, Gencor of South Africa, Compagnie Générale de Matières Nucléaires of France, Odin Mining Co. of the United States, Echo Bay Mines Ltd. of Canada, Teck Corp. of Canada, TVX Gold Inc. of Canada, Ag Armeno Mines and Minerals of Canada, F.M.C. Corp. of the United States, Río Amarillo Mining Ltd. of Canada, Battle Mountain Gold Corp. of the United States, Canyon Resources Corp. of Canada, Zamora Gold Corp. of Canada, Ecuadorian Minerals Corp. of Canada, Cominco Resources International Ltd. of Canada, Northfield Minerals Inc. of Canada, Latin American Gold Field Ltd. of Argentina, Granges Inc. of Canada, Jersey Goldfields Corp. of Canada, Zappa Resources Ltd. of Canada, and Cambior of Canada, indicated a very promising mining outlook for Ecuador.

Toronto, Canada-based junior Ecuadorian Minerals Corp. (EMC), notified Armeno and Ecuadorian Copperfields Inc. (ECI) that it had elected to withdraw from the option agreement on their Chaucha property, in southern Ecuador, because further exploration expenditures were not warranted (Metal Bulletin, 1997, p. 1). Several areas of gold mineralization were recently

identified by Armeno/ECI from stream sediment sampling programs. Followup soil sampling in the Naranjos copper zone included gold values ranging up to 6 grams per ton (g/t) of gold. In the 1970's and 1980's, Japanese and Belgian interests drilled out from 130 million to 140 million metric tons (Mt) of mineralized resources grading 0.39% to 0.41% copper. About 12,300 meters (m) of core were drilled, but to date none has been analyzed for gold.

Intensive exploration drilling was carried out by Newmont during 1996 at the Quimsacocha and El Mozo properties, in southern Ecuador. Further drilling is planned for 1997 following encouraging results from several mineralized intercepts at both properties (Puig, 1997). Armeno operated the underground San Bartolomé silver mine and also owned the large Peggy copper/gold property. The Peggy optioned was to Curlew Lake Resources Inc. of Canada, which could acquire 50% interest in this property, as well as the Chaucha copper-molybdenum property.

Rio Tinto Zinc Corp. Plc, of the United Kingdom (RTZ) suspended work at the San José de Salinas prospect and has focused on two other copper-gold prospects; El Pueblo and La Victoria, in the Western Cordillera. RTZ has found interesting results at the El Corazón property in northwestern Ecuador, a possible epithermal gold and silver deposit. Its Ecuadorian subsidiary was intensively exploring a quartz-adularia epithermal system at its Llano Largo prospect in the southwest. An initial 2,950 m of drilling was completed to test the extension of the mineralization. North of Llano Largo, the company was exploring a second mineralized structure that hosts the well-known El Alumbre copper porphyry system and another mineralized porphyry deposit some 30 kilometers (km) north of El Alumbre. El Alumbre was never evaluated for its gold potential but most recent surveys outlined sufficiently widespread areas of gold mineralization.

Odin Mining Co., the largest formal gold producer in the country, recovered more than 600 kg of gold from its placer operations—the Biron mine and the Río Chico mines. TVX approved the development of the Pachicutza gold mine, following the completion of a successful exploration program. The company has conducted some 21,400 m of drilling and 8,100 m of drifting on the high-grade zone of Pachicutza mine to delineate almost 1 Mt of proven, probable, and possible reserves assaying some 12 to 13 g/t of gold.

The prefeasibility study on EMC's Gaby gold property in southern Ecuador, is on schedule to be completed by yearend. The main Gaby deposit showed all the classic characteristics of a major Andean gold/copper porphyry system with extensive, mineralized stockworks and breccias contained within an intrusive/volcanic complex. Approximately 34,000 m have been drilled on the property since 1990, with EMC's programs totaling more than 28,000 m of core and reverse circulation drilling. Drill spacing between holes ranged from about 70 to 100 m and the deepest holes reached 300 vertical meters. Gold mineralization in excess of 0.5 g/t of gold (0.015 ounces per ton) covers an area of about 1.8 km long by up to 300 m wide and was intersected over a vertical distance (allowing for topography) in excess of 500 m. This hypothesis will be tested with deep drilling as part of a final feasibility study.

During the first 2 years of production, the presence of three near-surface, higher grade gold centers with low waste-to-ore (strip) ratios amenable to mining will have a significant positive impact on project economics by accelerating capital cost payback. In addition, the timeframe high-grade, gold-bearing Tama Zone, located some 400 m to the east of the main Gaby deposit, contains gold values up to 24.0 g/t over 2-m drill intercepts in three holes over a 600 m strike length, and with mineralization still open to the north and south and at depth. Further drilling was planned to begin in February 1998, on the Tama Zone. Followup drilling was planned in the western portion of the main Gaby deposit, where one drill hole (CAL-3) intercept of 174 m at 0.74 g/t of gold. Metallurgically, the main Gaby deposit would use conventional cyanidation gold recovery technology in a large-scale milling operation followed by a carbon-in-leach recovery process. Based on work by McClelland Labs of Sparks, Nevada, U.S.A., recoveries are expected to be on the order of 87% for the sulfide ore, which represents 95% of the deposit, and 90% for the oxide ore.

EMC announced that a Letter of Intent had been signed with Newmont Mining Corporation on a portion of the EMC's large Beroen gold property in Ecuador. Newmont can acquire up to an 80% interest in the remaining part of the property that is not subject to an existing joint-venture agreement between EMC and RTZ signed in June 1996.

The Newmont joint-venture with EMC property included four exploration concessions totaling approximately 9,859 ha [99 square kilometers (km²)] and is located 45 km northeast of EMC's Gaby gold project and immediately north of RTZ's Canoas concession where drilling was reported to have begun. EMC's exploration program identified several large areas with anomalous precious and base metal values up to 0.5% g/t of gold in stream sediments and up to 0.12% copper and 0.22% molybdenum in rock samples of highly altered and stockworked intrusive.

Under the terms of the Letter of Intent, Newmont will be operator and can acquire an initial 60% interest by making cash payments to EMC of \$1.8 million over 6 years, including required payments to underlying property owners of \$1.5 million and by expending a work commitment of \$1 million, including a guaranteed minimum of \$150,000 in the first 2 years during the same period (Ecuadorian Minerals Corp., 1997a).

EMC's results of extensive surface rock sampling carried out by its joint-venture partner, Rio Tinto Mining and Exploration Ltd. (Rio Tinto) on the San Luis claim at the Beroen property, located 45 km northeast of EMC's Gaby gold deposit, were reported by Rio Tinto. (Ecuadorian Minerals Corp., 1997b).

Compañía Minera Gribipe outlined four major targets. The most advanced of these is the Diamante, in the northeastern sector of the concession. Based on the work done, Gribipe estimated that the target may contain a resource of more than 124 t of gold. To earn the 65% interest, Northfield must pay \$6.5 million to Gribipe and the mining cooperative within 5½ years and it must also issue 1 million common shares of Northfield and options to Gribipe to buy another 1 million share.

Gold Fields entered a joint venture on a cooperative's concession in the Nambija area. With the cooperative's consent, Gold Fields started exploration, but local citizens blocked access to the area because they were afraid that the international firm

would swallow the region's operations, rather than working only in its concession area. TVX Gold and the Ecuadorian Army's Industry Division entered into a contract to explore the Pachicutza gold property, which lies approximately 60 km southeast of Loja and consists of three claim blocks totaling 120 km². Prior work by other companies identified major gold-bearing structures and outlined an open-pit mine resource of several million tons of ore grading 2 to 3 g/t of gold. A detailed drilling program was planned.

The economic potential of industrial minerals was being investigated as a way to satisfy demand for building materials, thus saving importation expenditures. Limestone deposits in 15 provinces of Ecuador are important. Because of their volume, they supply the raw material for the four main cement plants in the country. In the south, the ceramic industry was using kaolin and feldspar reserves. In the east, the country has considerable deposits of siliceous sands in the Sub-Andean Zone. Actually, important deposits are being mined to supply small glass bottle factories and ceramic and acidity correctors for limestone in the production of cement. Gypsum production is concentrated in the Loja Province, in the southern part of the country. Exploitation of pumice stone has become an important activity, especially in the central provinces of the highlands. For years, this raw material has been exported to eastern Asia, Latin America, and the United States. Technical economic support is required to transform this resource into a large-scale operation. Construction materials, representing 90% of the industrial materials needed in the country, are available in all provinces. The most significant industrial mineral operations were the cement and cement-related industries involving clays and limestone. Other industrial mineral operations included the marble quarries of Industria Marmolera Ecuatoriana S.A., Mármoles Andinos Cía. Ltda., Mármoles Santa Rosa Cía. Ltda., and Marmolera Chimborazo; the calcium carbonate operations of Cecál S.A.; the bentonite mines of Charasól; and the barite pit of Mineral Bomboiza.

Petroecuador, the state-owned petroleum holding corporation, was reorganized in 1992, and its subsidiaries produced, refined, stored, transported, and sold crude oil and petroleum products. Its operating subsidiaries, Petroamazonas and Petroproducción, were combined to form Petroproducción. Since Ecuador left the Organization of Petroleum Exporting Countries in January 1996, oil production increased to 396,000 bbl/d. The country also continued to increase its reserves. By yearend 1997, reserves amounted to more than 2 billion barrels.

The Ministry of Energy and Mines cleared the way for Arco-Agip to begin development of the Villano oilfield, in the Oriente area. The companies expect ultimate recovery of 160 million barrels of 21° gravity oil during 20 years.

In 1996, Pacalta Resources Ltd., Calgary, acquired 100% of City Investing Co. Ltd., which had the longest continual operating history in Ecuador's oil industry—more than 20 years. In early 1997, Pacalta completed Ecuador's first three-dimensional seismic survey on the City Block. In the Oriente basin, Pacalta operated the 89,000-acre City Block and the producing 494,000-acre Block 27.

Argentina's YPF SA dedicated a new southern production complex on Oriente Block 16 to handle 100,000 bbl/d of 16-20° gravity crude from five area fields by 1998. In 1998, Energy

Development Corp. (EDC) of the United States won rights to the 3,497-km² Block 3 in the Gulf of Guayaquil, which includes the Amistad gasfield. EDC's Samedan unit will start development with a \$104 million investment.

In early 1997, Ecuador called for an international tender for construction, operation, and transfer of a 514-km crude oil pipeline, Sistema de Oleoducto Centro Oriente, from Sacha oilfield in the Oriente oil province to Balao terminal on the Pacific. The 216,000 to 246,000-bbl/d line will transport 16-18° gravity crude from fields in the south central Oriente jungle and from future developments. Oriente production rates have been restricted since the late 1980's. In early 1997, the basin's capacity was 380,000 bbl/d. Of that, 335,000 bbl/d was shipped through the Trans-Ecuadorian pipeline, and 45,000 bbl/d was shipped on the Trans-Andean pipeline through southern Colombia.

In 1998, Arco-Agip won approval to build a 130-km, 80,000-bbl/d pipeline to transport Villano oil to the Trans-Ecuadorian pipeline near Baeza; startup will be in 1999. In 1997, Pacalta built a 72-km, 12 inch, pipeline to carry its crude to the Trans-Ecuadorian pipeline.

Amoco Ecuador BV signed a Participation Contract with the Government of Ecuador to explore for hydrocarbons on Block 18, a concession of about 108,000 ha (about 267,000 acres) in the north-central Oriente. In the 1990's, oil development in the Oriente evoked controversy and has been the focus of Ecuadorian and international environmental organizations, indigenous groups and organizations, government, and industry. Some environmental organizations and indigenous groups have vigorously protested hydrocarbon activities in the rain forests of the Oriente. Petroleum activities have been blamed for deforestation and the resultant loss of biodiversity for two reasons: First, small amounts of deforestation result from the clearing for seismic lines, wellpads, pipelines, flow lines, road rights-of-way, and production facilities. Second, and more important, access roads cut through the forest provide migration corridors for colonization and large-scale deforestation. Consequently, petroleum companies operating in the Oriente are challenged to address the following issues: biodiversity, indigenous people, colonization, deforestation, and public perception. Prior to beginning seismic operations, an EIS was completed for the exploration area. The Internationally known Ecuadorian and U.S. tropical scientists who participated in the field studies had several major goals—to develop an environmental baseline, including a survey of the plants and animals and analysis of surface water quality; to define key environmental sensitivities within the area of influence of the project; to predict potential environmental and social impacts of the exploration activities; and to define measures to minimize or eliminate impacts. Because environmental and social issues are intimately related in the Oriente, a sociocultural impact study was also performed as part of the EIS. (Oil & Gas Journal, 1997).

Petroecuador is to offer 10 Amazonian oilfields to foreign investors in an effort to secure the \$171m required for their development. Production will be increased by 12,000 bbl/d from the current 8,420 bbl/d. (Petroleum Economist, 1998).

For the mining sector, especially gold, silver, and base metals, to supplement petroleum as an important source of revenue,

significant foreign investment might be needed to create adequate infrastructure, and the Government might need to boost investors' confidence by maintaining and improving the fiscal and legal environments for mineral exploration and development.

Ecuador's infrastructure was cited by Government officials as being a restricting factor in mineral development. Mine production was transported by truck on the nation's 43,709 km of highways or on the 965 km of state-operated rail to processing plants and shipping ports.

Despite the problems that plague Ecuador's mining industry, Government officials were confident that revenue generated by mining will rise in coming years, provided that Ecuador remains committed to attracting foreign investment. Gold has already become a significant second-level export, ranking with such products as cocoa, fish, and cut flowers. Gold production would increase by titling concessions to the informal miners, who were responsible for 85% of Ecuador's gold production, and improving gold recovery from the current level of 40% to 90% by using modern technology. Ecuadorean mining officials envisioned that revenue generated by gold production could represent 3% of Ecuador's GDP and that minerals export could generate \$1 billion in revenues by 2006. Foreign investment, Government policies and strategies, and the support of the World Bank will, no doubt, achieve the development of modern mining projects in Ecuador.

Petroecuador was expected to expand its production and transport capacity, most notably the construction of a liquified petroleum gas terminal and petroleum product pipelines. Its mandated domestic sale of refined products at steeply subsidized prices was, however expected to continue to encourage product smuggling and eventually to enervate its ability to compete.

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Banco Central del Ecuador-Division Tecnica; Boletin Anuario.

U.S. Embassy-Quito: Country Commercial Guide, annual.

TABLE 1
ECUADOR: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity	1993	1994	1995	1996	1997 e/
METALS					
Cadimium: mine output, Cd content e/ kilograms	260	250	200	200	200
Copper: mine output, Cu content e/	100	100	100	100	100
Gold: mine output, Au content kilograms	12,500	13,000	7,410 r/	7,208 r/	3,070
Iron and steel:					
Steel, crude	27,426	32,451	34,641 r/	34,800 r/	35,000
Semimanufactures	20,802 r/	32,451 r/	26,566 r/	26,600 r/	26,610 2/
Lead concentrate, Pb content e/	200	200	200	200	200
Silver: mine output, Ag content e/ kilograms	60	60	-- r/	7,996 r/	2,134 2/
Zinc: mine output, Zn content e/	33	100	100	100	100
INDUSTRIAL MINERALS					
Cement, hydraulic thousand tons	2,098	2,164	2,616 r/	2,677 r/	2,688 2/
Clays:					
Bentonite	268	420 e/	511 r/	431,758 r/	205,400 2/
Common:					
For cement e/ thousand tons	1,820 2/	2,000	2,000	2,000	2,000
Other	267,479	42,099	53,822 r/	836,000 r/	185,000 2/
Kaolin	12,000	6,883	45,054 r/	86,541 r/	7,300
Feldspar	8,015	5,692	10,297 r/	10,321 r/	60,328 2/
Gypsum, crude	104,900	108,000 e/	2,430 r/	2,038 r/	1,510 2/
Sand:					
Silica (glass sand)	48,751	33,535	26,486 r/	24,070 r/	43,240 2/
Ferruginous e/	10,000	10,000	10,000	10,000	10,000
Stone, sand and gravel:					
Limestone (for cement manufacture) thousand tons	3,707	6,229	4,089 r/	3,491 r/	4,261 2/
Marble	8,620	9,500	10,948 r/	17,225 r/	1,089 2/
Pozzolan	83,920	86,560	88,000 e/	88,000 e/	85,000
Pumice	12,230	8,665	9,000 e/	231,875	368,269 2/
Sand and gravel thousand tons	164	170	170 e/	3,318	5,338 2/
Salt (common)	67,419	70,000	224,309	110,000 e/	100,000
Sulfur: e/					
Native	4,000	4,000	4,000	4,000	4,000
Byproduct:					
From petroleum	5,000	5,000	5,000	5,000	5,000
From natural gas	5,000	5,000	5,000	5,000	5,000
Total	14,000	14,000	14,000	14,000	14,000
MINERAL FUELS AND RELATED MATERIALS					
Gas, natural:					
Gross million cubic meters	200 e/	204	193	190 e/	190
Marketed e/ do.	90	90	90	80	80
Liquefied natural gasoline e/ thousand 42-gallon barrels	400	400	455 2/	550	500
Petroleum:					
Crude do.	126,000	138,000	139,726	143,090 r/	144,463 2/
Refinery products:					
Liquefied petroleum gas do.	3,078 r/	2,965 r/	3,285 r/	3,285 r/	3,150
Gasoline do.	10,710 r/	11,144 r/	10,497 r/	10,780 r/	10,780
Jet fuel do.	1,343 r/	1,405 r/	1,602 r/	1,450 r/	1,450
Kerosene do.	1,314 r/	625 r/	594 r/	840 r/	840
Distillate fuel oil do.	19,624 r/	21,621 r/	20,721 r/	20,650 r/	20,650
Lubricants do.	260 r/	260 r/	210 r/	260 r/	260
Residual fuel oil do.	13,356 r/	9,976 r/	10,904 r/	11,410 r/	11,410
Unspecified do.	1,227 r/	2,883 r/	2,572 r/	2,230 r/	2,230
Total do.	50,912 r/	50,879 r/	50,385 r/	50,905 r/	50,770

e/ Estimated. r/ Revised.

1/ Includes data available through January 1998.

2/ Reported figure.