

THE MINERAL INDUSTRY OF ECUADOR

By Pablo Velasco

The mineral industry of Ecuador in 1995 continued to be dominated by the petroleum sector, which contributed 36% of the country's total export revenues and accounted for nearly 12% of the GDP. According to statistics released by the Ecuadorian Central Bank in 1995, the value of crude oil and refined products was about \$1.5 million.¹ Although mining was considered unimportant, the Government was committed to transforming this sector into an important contributor to the country's economic development. Progress so far has been limited. However, 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.

Metal mining was oriented toward gold. Nonmetallic mining was oriented toward cement and industrial minerals, contributing less than 1% of the country's GDP and export revenues. In 1995, the gross value of mineral production—mainly industrial minerals—was about \$120 million.

The mining industry which is currently oriented toward gold, is still small in size and largely informal and unregulated. About 40,000 miners involved in artisanal gold production use primitive mining and processing techniques, including mercury for amalgamation, recovering about 30% to 50% of the gold. Mercury amalgamation creates health hazards in the mining Districts near Nambija, Portovello-Zaruma, and Ponce Enriquez Districts and pollutes nearby rivers in southern Ecuador. Collectively, these small freelance miners accounted for most of value of Ecuador's gold production, smuggling most of it out of the country.

The Ecuadorian economy grew by 3.0% in real terms during 1995, led by trade, manufacturing, foodstuffs, and mineral production. The inflation rate declined to about 23%, compared with 25.4% in 1994.

Government Policies and Programs

The apparently endless chain of crises in 1995—war with Perú, power cuts, and measures to overcome existing economic problems to create a favorable and positive environment to attract both domestic and foreign investments—has taken a toll on the economy. A reduction in inflow of short-term capital and a weak currency discouraged

investors. On December 20, Congress agreed to the country's membership in the World Trade Organization (WTO). Under WTO rules, Ecuador became a full member on January 20, 1996. Government officials hoped that membership in the WTO would attract foreign investment and stimulate exports. During a recent summit of South American countries in Quito, Ecuador, Andean Pact members Ecuador, Colombia, Perú, Bolivia, and Venezuela announced initiatives to transform the Andean Pact into an organization that encourages greater trade and integration. Ecuador and Colombia signed a bilateral trade agreement. The Government of Ecuador extended to 24 private banks the right to administer Ecuador's import/export licensing programs in order to reduce bureaucratic red tape on trade. Traders can choose the bank that offers the best service at the lowest cost. According to the Constitution, all subsurface resources are property of the state. Petroleum is the basis for Ecuador's external economy, with average daily production approaching 400,000 barrels per day (bbl/d) of crude oil in 1995. In June, the Government announced an eighth round of bidding for nine blocks in the Amazonian Oriente. Oil producers in the Oriente rely on the Trans-Ecuadorian oil pipeline, with a capacity of 325,000 bbl/d, to move crude to the Esmeralda's oil refinery. Because of the capacity limits of the pipeline, the volume of crude evacuation by private contractors is being rationed and export volume will not increase this year. The Government was in the process of awarding a \$600 million build-operate-transfer concession to expand pipeline capacity to 450,000 bbl/d.

Ecuadorian mining policy is undergoing fundamental changes, based on presidential decrees. These changes include, (1) reforms to mining laws and regulations, (2) guarantees and security for mining investment, (3) organization and technical support for artisanal mining activities, (4) restructuring and strengthening of the state mining institutions, and (5) a national mining plan. By mid-1995, the administration had decided to postpone reforms to the mining law and regulations because of an unfavorable political situation in the National Congress.

National bank of promotion, Banco Nacional de Fomento (BNF), officials announced that the bank had suspended its privatization schedule for Chimborazo Cement Co. set for Sept. 20, because of the limited time to meet all of the legal requirements set by the Government. BNF owns 95.2 % of the company's shares, the remainder is owned by National

Financing Corp. 4 foreign companies from (Chile, Colombia, Spain, and Mexico), along with several Ecuadorian firms, have expressed interest in the sale. Ecuador will pay about \$225 million in interest in 1995 under a debt-restructuring agreement with private banks. Under the agreement, Ecuador will receive a 45% discount on capital debt, which will reduce the Nation's debt from \$4.471 billion to \$2.460 billion over a 30 years period.

Environmental Issues

A loan agreement with the World Bank was completed in June 1994 for a Mining Development and Environmental Control Technical Assistance Project. Financing provided by the World Bank to the Ecuadorian Government, will be \$14 million and \$1.9 million respectively. Cofinancing by the Swedish Government's Agency for International Technical and Economic Cooperation (BITS) and the Overseas Development Agency, UK (ODA), with \$5.1 million and \$3 million respectively, will complement the project, for a total of \$24 million over a 5-year period.

The Ministry of Energy and Mines (MEM) through its Subsecretariat of Mining, and the National Directorate of Mining (DINAMI), National Directorate of Environment (DINAMA), Corporation for Geological-Mining-Metallurgical Research and Development (CODIGEM), administered, coordinated and enforced the new environmental laws and regulations on behalf of the ministry. Environmental concerns are the major focus of a mining project design. While industrial-scale mining must undertake strict environmental control measures, the primitive methods used by small miners escape such controls and are leading to serious environmental degradation. Most of the gold mining occurs in the El Oro, Azuay, and Zamora-Chinchipec Provinces, including six major mining sites, three of which have been mined for long periods of time--Portovelo-Zaruma, Nambija, and Ponce Enriquez--and have created the greatest environmental damage and threats.

Erosion is being caused by the cutting of forests and the opening of mine shafts in mountain slopes. Mining communities involving over 40,000 people, may be affected by mining-related health problems, such as mercury poisoning. The intensive use of mercury by miners and its subsequent discharge are serious problems. The ratio of mercury use to gold production is as high as one to one. Discharge of mercury and heavy metals--including cadmium, copper, lead, and zinc,--into the nearby river systems appears to be affecting downstream fishing activities and drinking water sources.

The Government has included an environmental component in the seventh and eighth rounds of oil and natural gas concessions, and has invited environmental consulting firms to apply for approval to conduct environmental studies for the seventh and eighth rounds of concessions. The studies will include initial inventories of the

concession areas and subsequent exploration and exploitation studies. Additional opportunities for environmental firms are expected once the Government and Texaco reach agreement on environmental cleanup efforts in the Oriente.

Production

According to the Constitution, all subsurface resources are the property of the state. Petroleum was the basis for Ecuador's external economy, with production in 1995 accounting for 12% of GDP, 36% of export earnings, and 30% of public sector revenues. Total crude production for 1995 was 143 million barrels (bbl), up 3.6% compared with that of 1994. Ecuador has extensive, but underdeveloped, deposits of gold and other minerals. In 1995, gold production increased to more than 15 tons valued at more than \$200 million, of which 80% was produced by artisanal mining concentrated in the mining-districts of Nambija, Zaruma-Portovelo, Ponce Enriquez, and other areas in the south. The mining sector's primary output was industrial minerals, which, with the exception of some pumice stone and marble, were consumed by the domestic construction industry.

Trade

Despite of ongoing problems with European Union import restrictions, total exports increased 12.5% in value to \$4.3 billion in 1995 and oil and derivatives increased 17.2% to \$1.5 billion when compared with 1994. Imports jumped 23.2% to \$4 billion because of increased spending on fuels and military hardware. The price of Ecuadorian light crude oil increased from an average of \$13.68 per barrel in 1994 to over \$16.00 in 1995. Increased sales to members of the Andean Pact and other countries worldwide accounted for much of the increase in nonpetroleum exports.

The United States continued as Ecuador's principal trading partner. During 1995, the value of exports to the United States increased 10%, reaching \$1.6 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 \$1.2 billion in 1995.

The diversification of Ecuador's markets was reflected in export growth of 41% to the European Union and 35% to Colombia and Peru in 1994. Ecuador has free trade agreements with Chile, Colombia, and Venezuela.

Structure of the Mineral Industry

The Ecuadorian Government regulated the mineral industry through the MEM Subsecretaria de Minas, which administered the mineral industry through its three agencies: CODIGEM, DINAMA, and DINAMI.

CODIGEM, the Corporation for Geological, Mining and Metallurgical Research and Development, was responsible for development and maintenance of geologic, mapping, and

mining data bases. CODIGEM also provided technical assistance to miners, in addition to supporting mining, geology, metallurgy, and seismic research. DINAMA, the National Environmental Directorate, was concerned with environmental aspects of resource development. DINAMI, the National Mining Directorate, granted mineral concessions and appropriate exploration and exploitation permits. Petroecuador, the state-owned petroleum holding corporation, reorganized in 1992, and its subsidiaries produced, refined, stored, transported, and sold crude oil and petroleum products. Petroecuador's operating subsidiaries, Petroamazonas and Petroproducción, were combined to form Petroproducción .

International petroleum companies produced crude oil and natural gas under contract with the Government and were involved in downstream trade. According to the 1995 membership list of the Ecuadorian Chamber of Mines, more than 150 small mining companies and cooperatives operated in the country. Additionally, more than 40,000 small-scale and informal artisanal miners were active, primarily in the gold sector. Much of the Nation's gold output was being produced by these small, commonly illegal, operations. Informal miners either worked individually or in small groups. Cooperatives were formed, principally because they could obtain legal rights to the mining operation. Cooperatives were concentrated in the south in the El Oro, Azuay, and Zamora-Chinchiipe Provinces, particularly around the areas of Nambija, Zaruma-Portovelo, and Ponce Enriquez.

More than 200 gold production plants used gravitational, amalgamation, cyanide-based, and some floatation techniques in the country in 1995. The total ore treating capacity was about 2,500 t/d. About 400 registrations for artisanal miners and about 1,800 applications for exploration covering 6.6 million hectares (ha) were filed, demonstrating an increasing interest in exploration. Indeed, the presence of major multinational mining companies, including Newmont Overseas Explorations Ltd. (Newmont), of the United States; Gold Fields of South Africa Ltd.; RTZ Corp. Plc, of the United Kingdom; Gencor of South Africa; Cogema 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.

Commodity Review

Metals

Copper.—Toronto, Canada-based junior Ecuadorian Minerals Corp. (EMC), has negotiated an option to acquire up to 65% interest in the Chaucha property held jointly by Ag Armeno Mines and Minerals Inc. and Ecuadorian Copperfields Inc. (ECI). The property comprises 5,100 ha in two exploration concessions and is located in the Chaucha copper-gold property that lies southeast of Guayaquil in Ecuador, approximately 32 km northeast of Ecuadorian's wholly owned Gaby gold deposit. Several areas of gold mineralization have recently been identified by Armeno/ECI from stream sediment sampling programs. Follow-up soil sampling in the Naranjos copper zone included gold values ranging up to 6 g/t gold. Under the terms of the letter of intent, EMC will be the operator and acquire an initial 55% interest in the property over a 4 year period, by paying Armeno/ECI \$505,000 in cash, by issuing 250,000 common shares of EMC, and by incurring \$3 million in exploration expenditures. EMC can increase its interest in the property to 65 % by issuing another 200,000 shares and by paying Armeno/ECI \$1.5 million within 180 days of earning the initial 55% interest. In the 1970's and 1980's, Japanese and Belgian interests drilled out 130 million to 140 Mmt of geological resources grading 0.39% to 0.41% copper. About 12,300 m of core were drilled, but to date none has been analyzed for gold.

Newmont reported earning a 60% interest in the Fierro Urco copper-gold property, jointly owned by Ag Armeno and Trans Atlantic Enterprises Inc. of Canada. Ag Armeno operated the underground San Bartolome silver mine. Ag Armeno also owned the large Peggy copper-gold property, optioned to Curlew Lake Resources Inc. of Canada, which could acquire 50% interest of the property, and the Chaucha copper-molybdenum property. RTZ suspended work at the San Jose de Salinas prospect and has focused on two other copper-gold prospects: El Pueblo and La Victoria, both in the Western Cordillera. RTZ has found interesting results at the El Corazón property in northwestern Ecuador. A possible epithermal gold and silver mineralization .

Gold.—Small-scale, intermittently producing gold- mining operations were spread throughout the country. Unofficial reports indicated that Ecuadorian gold production totaled approximately 15.5 t/yr. Ore was extracted from diggings and processed in small gravitational, amalgamation, and cyanide-based plants. The primitive ore treatment plants only recovered between 30% to 50% of the gold.

Alluvial gold operations also were numerous. The Australian company, Odin Mining & Investing Co. Ltd., reportedly was the largest formal gold producer in the country, recovering more than 600 kg of gold from its placer operations, the Biron Mine, and the Río Chico Mine.

EMC, reported that drilling had resumed in November 1995 at its Gaby gold property in Ecuador. EMC recently announced an expanded gold resource estimate of 108,862 kg on the main Gaby deposit. The drilling program was expected to be completed in April 1996, forming part of the prefeasibility study that was scheduled to be completed by summer 1996. This study would provide a preliminary evaluation for the Gaby deposit to start production, including an assessment of tonnage, grades, optimal process flow-sheet, and capital and operating costs. Funding for this drilling program was being provided by the exercise of share purchase warrants from previous private placement. To date, about \$1.1 million has been received and an additional \$3 million was expected before yearend.

Canada's TVX Gold Corp. has approved the development of the Pachicutza gold mine in Ecuador, following 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 to delineate close to 1 million ton of proven, probable, and possible reserves assaying some 12 to 13 g/t of gold. Zamora Gold Corp. continues exploring its 90,000-ha land package in the Province of Zamora Chinchipe. The package includes blocks surrounding Nambija. Initial work has focused on the Mina Real concession, adjacent to Nambija's artisan workings. The concession's geologic setting was described by the company as a large porphyry-skarn system, with a later epithermal gold overprint at the Tumi d'Oro Zone. Zamora estimates the total length may extend beyond 1 km. The first phase of drilling tested 250 m of strike length in the northwestern extension of the zone. A further seven holes are planned at the Mina Real concession. Four holes will test the Tumi d'Oro structure, while three will test the Guaysimi Sur Breccia target. Northfield Minerals will acquire its second gold property in Ecuador. The company has signed an agreement to gain a 65 % interest in the Nambija Uno mining concession, which comprises 627 ha in the Zamora-Chinchipe Province. Previous work by Goldfields of South Africa and Northfield's joint-venture partner, 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 estimates the target may contain a resource of more than 124,414 kg of gold. To earn the 65% interest Northfield must pay \$6.5 million to Gribipe and the mining cooperative over 5 ½ years. It must also issue to Gribipe 1 million common shares of Northfield and options to buy another 1 million shares.

Since its rediscovery in 1980, Nambija, an ancient Inca mine site, has been Ecuador's principal gold mining center. Approximately 2,000 to 3,000 informal miners worked the area. Although this unstructured, unregulated, and untaxed mining activity relieved unemployment, it had serious environmental and social drawbacks. The denuded mountainside was honeycombed by a profusion of ditches

and tunnels (some to a depth of 300 m), which severely undermined the ground beneath the mining areas and the town. Government safety intervention could put thousands of informal miners out of work. In 1993, a landslide destroyed part of Nambija and buried an estimated 300 people. Concerned that the rest of the town would cave in, the Government requested that all mining activity cease. The Government also recommended that the miners move 8 km away to a safer area. The miners rejected the request, remained on location, and continued to mine, claiming the need to defend continuously their small pits and shallow tunnels from claim jumpers. Miners also accused the Government of selling out their interest to foreign mining companies.

Gold Fields of South Africa Ltd. 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 firms would swallow all of the region's operations, instead of working only on its concession area. TVX Gold Inc. has entered into a contract with the Ecuadorian Army's Industry Division (DINE), to explore the Pachicutza gold property. Pachicutza lies approximately 60 km southeast of Loja and consists of three claim blocks totaling 120 square km. Prior work by other companies has 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.

Industrial Minerals

Similar to metallic mine potential the economic potential of industrial minerals was being investigated and considered as a way to satisfy the National demand for building materials, thus saving importation expenditures. Of great importance, because of their volume, are the limestone deposits found in 15 provinces of Ecuador, which supply the raw material for the four main cement factories in the country. In the south, an important ceramic industry was using considerable kaolin and feldspar reserves. In the east, the country has great extensions of siliceous sands in the Sub-Andean Zone. Actually, important deposits are being mined to supply small glass bottle factories, ceramic and Ph (degree of acidity or of basicity of a solution) correctors of the limestone for the production of cement. Gypsum's production is concentrated in the southern part of the country, in the Loja Province. 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 countries of Latin America, the United States and Eastern Asia. Technical economic support are required to transform this resource into a large-scale operation. Construction materials are available in all provinces, representing 90% of the industrial materials needed in the country. The most significant industrial mineral

operations were the cement and cement-related industries involving limestone and clays. 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.; Charasól's bentonite mines; and the barite pit of Mineral Bomboiza.

Mineral Fuels

Since Ecuador left the Organization of Petroleum Exporting Countries in January 1993, oil production had been increasing sharply by 6% to 365,000 bbl/d in 1994 and by another 7%, to 390,000 bbl/d, in 1995. The country also continued to increase its reserves. By yearend 1994, reserves were 2 billion barrels, or about 43% more than in 1990. Despite an environmental damage suit brought against Texaco by Ecuadorian Indian organizations and the threat of another suit by the Government, a fairly good response was received to the seventh bidding round that concluded in June 1994, a keystone in the Government's effort to increase reserves to 4.2 billion barrels by the end of this decade. Bids were received from 21 companies for 8 of the 13 blocks being offered. The first awards were announced in June. Still pending in mid-1995 was a decision on the \$600 million expansion of pipeline capacity, offered to private investors under a 15-year contract. The Trans-Ecuadorian pipeline was a main bottleneck, transporting 325,000 bbl/d of the country's 390,000 bbl/d output. Another 30,000 bbl/d flowed through the Trans-Andean pipeline via Colombia. The Government planned to expand the main crude oil line of 463 km by adding another section totaling 172 km, increasing total capacity to 400,000 bbl/d. Some 20 foreign companies were reportedly interested in the venture.

Reserves

Ore reserves of both metallic and industrial minerals were small in world terms but considered significant in Latin America. Ecuador was believed to have significant undelineated gold resources, as gold mining essentially stopped during the colonial era (16th and 17th centuries).

Ecuador produced crude oil, mostly from fields in the Amazon basin operated by Petroecuador, the State oil company. Of the remaining proven reserves of 21 billion barrels, 3.5 billion barrels could be extracted using current methods and 11.8 billion barrels could be extracted using advanced technology. The country's proven crude oil reserves should last well into the next century at the present rate of production.

Infrastructure

Ecuador's infrastructure was cited by Government officials

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

Petrocommercial, a subsidiary of Petroecuador, was responsible for the transportation of oil. Crude oil was transported from the oilfields in the Oriente region through the Ecuadorian Transandean oil pipeline system via Quito to Esmeraldas or Guayaquil for export or processing and domestic distribution. This pipeline repeatedly exceeded design capacity during the year. Additional production was shunted through the Transandean pipeline in southern Colombia to the export terminal at Tumaco. A new 150,000-bbl/d capacity pipeline, parallel to the existing Ecuadorian pipeline, from Lago Agrio to Esmeraldas was proposed. Maxus Energy Corporation of Dallas, Texas, also had 352 km of product pipeline under construction in the east.

Outlook

The mining sector, especially gold, silver, and base metals, could supplement petroleum as an important source of national income. However, significant foreign investment would be needed to create adequate infrastructure and the Government would need to boost investor confidence by maintaining and improving the fiscal and legal environment for mineral exploration and development.

Measures implemented by the current administration under the Ministry of Energy and Mines are being viewed with much optimism. New mining policies could stabilize the National economy and provide the right atmosphere for foreign investment. The optimism was temporarily shaken by the recent border dispute with Perú, although Ecuador has largely regained the trust of the international financial community. The process of modernization and privatization of inefficient government institutions and industries has continued, seeking to reduce public spending, holding down inflation and building a more vigorous national economy. Ecuador, which has long ignored its potential as a minerals producer, could be the site of important investments in the medium term. However, interest in gold projects, with their associated quicker return on investment, should dominate the short-term horizon. Junior and major multinational companies already have begun intensive exploration programs. A moderate increase in poly-metallic mining is also envisioned, together with strong development of industrial-minerals mining and an increased level of industrialization. The mining activities envisioned for the year 2000 are no longer traditional nor will they use obsolete technologies. Foreign investment, together with state policies and strategies, and the support of the World Bank will no doubt achieve the development of mining projects in Ecuador, by means of a modern, mechanized mining industry.

Upgrading the recovery rate and discharge and emissions

from primitive gold recovery operations also must be addressed. Environmental awareness and activism should become more entwined with natural resources development 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. However, Petroecuador's mandated domestic sale of refined products at steeply subsidized prices was expected to continue to encourage product smuggling and eventually enervate Petroecuador's competitive stance.

The Government and the private sector oil executives disagreed about the prospects for the expansion of the Transecuadorian oil pipeline. Government officials insisted the president was committed to the pipeline expansion project and would shortly award the contract. The private sector oil executives agreed the president supported the project, but maintained his administration lacked the political will and strength to face down opposition to the project within the Ecuadorian military and labor unions. With the recent departure of the Vice President, the project's most influential advocate, the administration's ability to keep the project on track may have weakened.

¹Where necessary, values have been converted from Ecuadorian sucres (S/) U.S.dollars at the rate of S/2.930 = US\$1.00.

Major Sources of Information

Ministerio de Energía y Minas
Subsecretaría de Minas
Santa Prisca 223 y Manuel Larrea
Quito, Ecuador
Telephone: 593-2-570-376
Facsimile: 593-2-570-350

Corporación de Desarrollo e Inversión Geológico-Minero
Metalúrgica (CODIGEM)
Casilla 17-03-23, Av. 10 de Agosto 5540 y
Villalengua
Quito, Ecuador
Telephone: 593-2-240-209
Facsimile: 593-2-463-861

Cámara de Minería del Ecuador
Ave. Rep. del Salvador #525
Edif. Rosania, Ofic. 14
Quito, Ecuador

Major Publications

Banco Central del Ecuador-Division Tecnica; Boletin
Anuario.

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

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

(Metric tons unless otherwise specified)

Commodity	1991	1992	1993	1994 e/	1995 e/
METALS					
Cadmium: Mine output, Cd content e/ kilograms	200	260	260	250	200
Copper: Mine output, Cu content e/	100	100	100	100	100
Gold: Mine output, Au content kilograms	12,200	12,300 r/	12,500 r/	13,000 r/ 3/	15,500
Iron and steel:					
Steel, crude	20,500	20,000 e/	26,600	21,800	21,400
Semimanufactures	202,000	19,000 e/	189,000	214,000	200,000
Lead concentrate, Pb content e/	200	200	200	200	200
Silver: Mine output, Ag content e/ kilograms	60	60	60	60	60
Zinc: Mine output, Zn content e/	50	35	33	100	100
INDUSTRIAL MINERALS					
Cement, hydraulic e/ thousand tons	2,300 e/	2,250 e/	2,098 r/	2,164 r/ 3/	2,300
Clays:					
Bentonite	135	393	350	300	300
Common:					
For cement thousand tons	3,660	3,100	1,820 r/	2,000	2,000
Other	283,000	278,000	267,479 r/	42,099 r/ 3/	350,000
Kaolin	12,000	6,380	12,000 r/	6,883 r/ 3/	6,000
Feldspar	2,254 r/	3,250	2,015 r/	2,200 r/	2,000
Sand:					
Silica (glass sand)	23,200	35,500	48,751 r/	33,535 r/ 3/	30,000
Ferruginous e/	23,200	15,000	10,000	10,000	10,000
Stone, sand and gravel:					
Limestone (for cement manufacture) thousand tons	3,660	3,100	3,709 r/	6,229 r/ 3/	4,000
Marble	1,712 r/	1,960	8,620	9,500 r/ 3/	8,500
Pumice	33,500	20,600	12,230	8,665 r/ 3/	9,000
Sand and gravel thousand tons	--	363	164	170	170
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	239	195	200 e/	200	200
Marketed e/ do.	90	90	90	90	90
Liquefied natural gasoline thousand 42-gallon barrels	364	397	400 e/	400	400
Petroleum:					
Crude do.	109,000	117,000	126,000	138,000 r/ 3/	143,000
Refinery products:					
Liquefied petroleum gas do.	2,230	2,550	2,550 e/	2,550	2,600
Gasoline do.	11,200	11,500	11,500 e/	11,500	11,700
Jet fuel do.	1,420	1,530	1,500 e/	1,530	1,560
Kerosene do.	1,140	786	800 e/	787	800
Distillate fuel oil do.	10,300	10,500	10,500 e/	10,600	10,700
Lubricants do.	208	256	260 e/	260	300
Residual fuel oil do.	18,000	16,600	16,700 e/	16,600	16,900
Unspecified do.	458	374	400 e/	374	400
Total do.	44,900	44,200	44,200 e/	44,200	45,000

e/ Estimated. r/ Revised.

1/ Estimated data and totals are rounded to three significant digits; may not add to totals shown.

2/ Includes data available through May 1996.

3/ Reported figure.