

THE MINERAL INDUSTRY OF

TURKEY

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Turkey's mineral industry in 1994 in general showed higher output levels and sales revenues compared with the lackluster performance of the previous year. This partially reflected an improved world economy and thus a return to more normal export demand for many Turkish mineral commodities. In contrast, the domestic economy was at times in crisis owing to a combination of factors, such as high levels of public sector debt, unemployment, inflation, tight credit, and rapid devaluation of the Turkish lira.² Accordingly, domestic demand for mineral commodities, most notably cement and steel, was very low, which forced producers to turn increasingly to the export market. Exports were aided by the devalued currency; most mineral imports were slightly lower, generally because of reduced demand.

The country's domestic economic problems were reflected in an almost 26% drop in the gross domestic product (GDP) for 1994 to only \$131.2 billion (current prices).

According to Government data, the primary mineral sector's (reported as "mining and quarrying") contribution was 1.3% of GDP, up from the 1.2% of GDP in 1993. Data for the important value-added or secondary mineral sector were included within "manufacturing" (22% of GDP), but it was estimated that secondary mineral commodities, including refined petroleum products, steel, cement, glass, and certain chemicals, accounted for about 70% of this. Refined petroleum product revenues alone were equivalent to almost 10% of GDP. Overall, (primary plus secondary) mineral sector revenues were estimated at about 15% of GDP.

Total mineral commodity exports in 1994 were estimated at almost \$3.8 billion, up almost 27% from 1993 levels, and about 21% of total exports. Estimated imports of mineral commodities dropped almost 16% to slightly less than \$8 billion in 1994, equivalent to about 35% of total imports.

The geology of Turkey is extremely complex and is reflected in the diversity of its mineral deposits. Best known for its industrial minerals, Turkey was the world's largest producer of boron minerals in 1994, and was a major producer of barite, celestite (strontium), emery, feldspar, limestone, magnesite, marble, perlite, and pumice. Among secondary industrial mineral commodities, Turkey continued to be a major world producer of refined borates and related chemicals, cement, ceramics, and glass. A wide variety of metallic minerals was produced as well, but output generally was not considered large by world standards; chromite was relatively the most significant metallic mineral in this respect. Among secondary metallic mineral commodities, Turkey in

1994 was a significant producer of ferro-chromium and steel. Except for lignite, output of energy minerals was modest.

Much of Turkey's primary mineral production, overall, was from a very large number of mostly small mines. Capacity expansion projects continued at many secondary mineral production facilities, particularly those in the private sector. The pace of expansion, however, slowed in 1994 because of poor domestic sales revenues and tight credit.

Mineral exploration by foreign companies in Turkey continued to be largely for gold, copper, and zinc.

Government Policies and Programs

The Government continued to be a major player in most sectors of the Turkish minerals industry in 1994 through various state-owned (parastatal) industrial corporations, banks, and shareholdings in a number of private companies. The private sector component has grown, especially since the passage of a new mining law in 1985, and was expected to increase substantially as Government privatization programs, begun in 1989, gained momentum. Drafts of a new mining law continued to be in preparation in 1994, but had not yet passed Parliament as of yearend.

The Turkish economy has become burdened by high inflation, in part stemming from Government policies to encourage economic growth, especially of exports. Price rises for some industrial goods have reduced their competitiveness in foreign markets. Reductions of Turkey's import tariffs and of certain subsidies since 1990, in line with Turkey's targeted achievement of customs union in 1996 with the European Union (EU), have resulted in a flood of cheap imports. These imports have constrained domestic price increases, commonly to below inflation levels. This has been a particular problem for the Turkish steel sector.

The many Government-controlled or parastatal corporations are considered greatly overstaffed, and long have been maintained through high levels of Government borrowing and spending. Losses by parastatals have mounted—for 1994, these totaled an estimated \$2.5 billion. In the minerals sector, the Government has been planning the privatization of its holdings in cement, coal, petroleum refining, petrochemicals, and steel, and has been transferring its shares in these parastatals to a privatization administration for sale. Also, privatization of the general minerals group, Etibank, has been proposed, but planning for this was less advanced. General aspects of, and some specific

sales within, the overall privatization program have been delayed and/or thwarted by legal challenges from trade union and political entities; these delays were anticipated to continue in 1995. Despite a major push during 1994 to sell two parastatal steel companies, as of yearend, significant progress with privatization in the minerals sector had been made only with cement and some related companies. In addition, certain idle or undeveloped mineral properties held by the Government were being offered to the private sector on a purchase or lease option.

Environmental Issues

Rapid growth of industry and increasing urbanization of the population have led to increased environmental awareness. A major issue was the use of lignite for domestic heating and for thermal powerplants that provide more than 50% of the country's electricity; these plants lacked scrubbers. In response to growing local opposition to the plants and pressure from international lending agencies, the Government, despite the general economic crisis in the country, was proceeding with an expensive program to install flue-gas desulfurizers at the powerplants. For several years, imported natural gas and, beginning in 1994, liquefied natural gas (LNG), has been piped to the Ankara and Istanbul metropolitan areas, where it has replaced lignite for domestic heating in those cities, thereby greatly reducing wintertime air pollution. The gas pipeline network was being extended to other cities in western Anatolia. Environmental considerations were affecting the Government's plans to address the growing electricity shortages in the country through the construction of 187 new powerplants, including 24 lignite-fired and 21 hard-coal-fired thermal plants, and 2 nuclear reactors. Public opposition to the reactors, to be sited on the Mediterranean coast southwest of Mersin, has been formidable.

Environmental issues have become a factor in Turkey's foreign relations. Proposed energy mineral developments in Kazakhstan and other landlocked Turkic republics risk oil spills or other shipping hazards if the fuels are shipped by supertankers via the Black Sea and the narrow Bosporus and Dardanelles straits. Turkey has proposed routing the fuels overland from the Black Sea, or entirely overland, via pipeline through Turkey to the Mediterranean oil port at Yumurtalık.

In 1994, there continued to be organized local opposition to the development by foreign companies of three gold mines near the Aegean coast. The controversy was over the proposed gold extraction method, namely leaching with sodium cyanide in a closed-circuit system. There has been no opposition to the use of cyanide at a Government-owned silver mine in the same general region. One of the proposed mines received its environmental permits late in the year, but still needed further permits to begin mine development.

Production

As shown in table 1, Turkey produced a wide variety of mineral commodities. For most commodities, reported output levels in 1994 were about the same or higher than those in 1993. Among metallic mineral commodities, perhaps the most significant increase was that reported for chromite. Low world prices had led to severely reduced chromite output levels and closed mines in 1992-93. In 1994, market conditions were much improved and some Turkish chromite mines were able to reopen. Ferrochromium production, constrained by technical problems and international market conditions in 1992-93, increased significantly in 1994. Output of copper and zinc ores increased during the year owing to the opening of a large copper-zinc mine; the traditional producers continued to experience difficulties. Concentrates from the new mine were exported and consequently did not affect domestic output of smelted and refined copper and zinc. Smelter output declined, largely because of domestic ore supply problems. The decline in refined copper was due to reduced demand in the domestic construction sector and higher costs for imported anode and blister resulting from the devalued lira. Steel production increased yet again, reflecting ongoing expansion projects at a number of private sector electric arc furnace (EAF) mills. However, the pace of output expansion slowed because of poor domestic market conditions.

For industrial minerals, relatively few significant production increases were projected for the year. Output of many minerals was affected by poor domestic demand in the construction sector and apparent stagnant demand in the glass and ceramics sector. However, data traditionally have been incomplete for many industrial minerals, either owing to output being kept proprietary or the minerals being unreported, captively produced, raw materials for reported finished products such as cement. Barite production appeared to have increased modestly in response to strong 1993 exports to support petroleum exploration in the neighboring Turkic republics. However, domestic petroleum exploration remained at low levels during the year and, overall, barite output remained well below pre-1993 levels. Estimated output of boron minerals (and derived chemicals) improved significantly in 1994, reflecting improved international demand for fiberglass. Magnesite production increased sharply, apparently reflecting higher domestic and international demand for refractory brick. Because strong exports only partially compensated for weak domestic construction sector demand, Turkey's major output of cement declined in 1994—the first decline since 1983. In the energy mineral sector, hard coal production returned to normal low levels and lignite production was projected to have increased but very slightly. Civil unrest in the main producing region contributed to a significant decline in crude petroleum output. Natural gas production fell as well, but partly a result of declining reserves.

Trade

Turkey had a well-developed trade in industrial commodities with many regions of the world, and its mineral trade was compositionally diverse. In general terms, Turkey in 1994 was a net exporter of only a limited amount of metallic ores—notably chromite—and of most refined metals. Exceptions were steel and ferrochromium, of which Turkey was a major exporter. In contrast with metalloids, Turkey exported a wide variety of industrial minerals and derived chemicals, most importantly of boron. Its cement, glass, and ceramics exports were among the world's largest. Turkey's mineral imports were dominated in value by crude and refined mineral fuels, as well as a variety of metallic ores, steel, and other smelted and refined metals. The country was a net importer of manufactured fertilizers.

In 1994, Turkey's total exports were reported as \$18.1 billion. This was a 22% increase compared with exports in 1993, and reflected a healthier world economy, the devalued Turkish lira, and poor domestic demand that forced Turkish manufacturers to aggressively pursue export sales. Further, in line with the targeted customs union with the EU, the Government in mid-1994 began to eliminate transportation cost subsidies on goods carried by Turkish-flagged ships, with full elimination scheduled for yearend. This led exporters to speed the processing of orders to ship as much as possible while subsidies were still in effect.

Detailed data were unavailable for 1994, but it is estimated that total mineral commodity exports during the year were worth about \$3.8 billion, about 30% higher than in 1993. Secondary or value-added mineral commodities accounted for about 90% of total mineral exports. Dominant among these were steel, exports of which were worth about \$2.3 billion, followed by refined petroleum products (\$235 million); glass (\$199 million), and cement (\$145 million). Various other processed mineral commodity exports, notably of refined boron chemicals, fertilizers, and ferrochromium, aggregated \$377 million. Exports of so-called primary minerals were reported at \$374 million and were dominated by borates (\$133 million), marble (\$47 million), magnesite (\$40 million), and chromite (\$34 million).

Imports in 1994 totaled about \$22.5 billion, down only 0.9% despite the devalued lira. Total mineral commodity imports were estimated at almost \$8 billion, down about 16% from 1993 levels. As in past years, mineral fuels dominated mineral imports: crude oil imports were \$2.4 billion; refined petroleum products, almost \$1 billion; natural gas, \$410 million; and coal, \$378 million. Steel imports totaled \$2.4 billion, including ferrous scrap imports worth \$849 million. Gold imports were \$470 million. Imports of other refined metals totaled \$444 million. Manufactured fertilizer and related chemical imports totaled \$170 million, and cement imports were \$12 million. Among primary minerals, imports of metallic ores totaled \$55 million, and imports of industrial minerals totaled \$89 million. Although details are lacking, many of these import values were lower than those in 1993—some dramatically so. Generally, this

was because of reduced demand related to poor domestic economic conditions and/or increased domestic output. Thus, the gold imports noted were down 75% in value from 1993 levels; fertilizers were down 63%, and cement was down 34%. In contrast, although steel (including scrap) imports fell 21% in value, this mostly reflected low prices rather than reduced tonnages.

Structure of the Mineral Industry

Traditionally, several sectors of the Turkish minerals industry have been dominated by large parastatals. (*See table 2.*) Owing to the rapid growth of private investment in the minerals sector since the mid-1980's, private companies cumulatively have become the dominant producers of a number of commodities, notably chromite, several industrial minerals, cement, and steel. However, parastatals remained the largest individual producers of these commodities in 1994, and were still the largest cumulative, and sometimes the only, producers of several others.

Based on 1991 data, it was estimated that the mining sector had about 850 mining "establishments"—a term roughly equivalent to "company" or "company division." These owned and/or operated about 3,000 mines. Most of the mines, in both public and private sectors, were small by world standards. Apart from the mining establishments, the minerals industry also had, according to 1993 data, about 46 cement plants (41 private), 22 steel mills (mostly private sector), 5 petroleum refineries (1 private) and a number of private base metals refineries, glass factories, and fertilizer plants.

Among the state-owned minerals corporations, the various subsidiaries of Etibank dominated or produced the country's entire output of aluminum, blister copper, boron minerals and chemicals, ferrochromium, and zinc. Etibank remained the largest individual chromite producer in Turkey (39% of total in 1993 and 26% in 1994). Turkish hard coal mining was all by Türkiye Taşkömürü Kurumu, and almost 90% of Turkey's total lignite output was accounted for by Türkiye Komur İşletmeleri. Türkiye Demir ve Çelik İşletmeleri (TDCİ) and the partially private Ereğli Demir ve Çelik Fabrikaları T.A.Ş. (Erdemir) continued to be the only integrated steel producers and had 36% of total crude steel output in 1994. About 80% of Turkey's total output of crude petroleum, all of its natural gas, and virtually all pipeline transport of these fuels was by Türkiye Petrolleri Anonim Ortaklı (TPAO). Türkiye Petrol Rafinerileri A.Ş. was by far the largest oil refiner in the country. Until recently, cement production was dominated by the parastatal Türkiye Çimento ve Toprak Sanayii T.A.Ş. (ÇİTOSAN), but by yearend 1993 and in 1994, privatization had reduced its sectoral share to about 20%.

The Government's major privatization program has been greatly delayed by various court challenges brought by trade unions and opposition political parties. The privatization process was put on firmer footing in late 1994 with the passage in Parliament of new enabling legislation. Although

two parastatal steel mills had been targeted for privatization during 1994, as of yearend, the major privatizations in the mineral sector to date remained those in the cement sector concluded in the preceeding 2 years.

Maden Tetkik ve Arama Genel Müdürlüğü (MTA) remained the state agency responsible for geologic exploration and research in Turkey.

Commodity Review

Metals

Chromium.—The international chromium market was stronger in 1994, attributed, in part, to higher world demand for stainless steel, EU antidumping tariffs imposed on ferrochromium from Russia, Ukraine, and Kazakhstan in late 1993, and reduced supplies to the market of chromite and ferrochromium from Kazakhstan. Turkey's output of both chromite and ferrochromium increased significantly in response. Chromite production returned to pre-1992 levels, and ferrochromium output was the highest to date. Chromite exports rose 77% in value to \$34.3 million and 87% by mass to 679,355 metric tons (mt). However, in contrast, ferrochromium exports reportedly fell 2.1% in value and 2.6% by mass to \$44.7 million and 91,715 mt, respectively. No explanation for the drop was available, but it could have been due to wintertime shipping difficulties from Etibank's Elazığ smelter.

Turkish chromite production was almost all of metallurgical grade ore and virtually all output was directly or indirectly export-driven. The improved market allowed a number of Turkish chromite mines to reopen during the year. The only major domestic consumption of chromite was by Etibank, which used essentially all of its own production for conversion to ferrochromium at its two smelters. Otherwise, domestic consumption of chromite was restricted to very small amounts for the manufacture of refractories, particularly furnace brick, and for leather-tanning chemicals. Turkish consumption of ferrochromium in 1994 remained insignificant owing to the negligible domestic production of stainless steel.

Copper and Zinc.—Karadeniz Bakır İşletmeleri A.Ş. (KBİ), a subsidiary of Etibank, remained Turkey's largest producer of copper ore and concentrates and was the only producer of blister copper. Copper concentrate feed for the Samsun smelter came mainly from the company's mines and concentrators in the Murgul district near Artvin. At times, KBİ's own concentrate deliveries have left unused capacity at the smelter, and this has allowed the company to do some toll smelting. The Samsun smelter has been proposed for privatization. Pyrite output from the KBİ mines, and from those directly operated by Etibank, is cupreous (0.7% Cu), but in Turkey has only been used to produce sulfuric acid. The main customers for pyrite for this purpose were Turkish fertilizer manufacturers. Some pyrite was exported.

Except for about 4,000 metric tons per year (mt/a) capacity

at the parastatal Makina ve Kimya Endüstrisi Kurumu (MKEK) facility at Kirikkale, all of Turkey's copper refining in 1994 was by the private sector. The larger producers are shown in table 2. Total refining capacity in 1994 was about 170,000 mt/a. Sarkuysan Elektrolitik Bakır Sanayii T.A.Ş. produced most of Turkey's refined copper output for the year; the company's output was about 68,000 mt. Blister and/or anode requirements for the copper refineries were met partly through imports. These imports, and refined copper output during the year, were constrained by the devalued lira and modest domestic demand.

The most significant development in the copper sector during the year was the coming on-stream in August of the Çayeli copper-zinc underground mine, near the Black Sea coast, 23 kilometers (km) northeast of Rize. In its annual report, majority owner Metall Mining Corp. of Canada reported that the Çayeli mill processed 68,000 mt of ore during the year, grading 4.42% copper and 8.09% zinc. Resulting mill output was of two concentrate products, containing 2,400 mt of copper and 3,700 mt of zinc, respectively. The concentrates were all exported. The company was expecting the mine to reach its full ore production capacity of 600,000 mt/a by yearend 1995. Capacity mill output would be 110,000 mt/a copper concentrates (22% Cu), plus 70,000 mt/a zinc concentrates (52% Zn). The mine had an unusual and environmentally benign tailings disposal system, in which the material was piped 11 km offshore in the Black Sea and deposited at 350-meter (m) depth, well into the anoxic zone.

Proven plus probable reserves for Çayeli at yearend 1994 were reported by Metall Mining as about 12.7 million metric tons (Mmt) grading 4.4% copper, 6.2% zinc, 45 grams per metric ton (g/mt) silver, and 0.93 g/mt gold. Possible reserves were listed as 4.1 Mmt grading 4.1% copper and 8.4% zinc.

A feasibility study was conducted by Cominco Resources International Ltd. of Canada for the Cerattepe copper-gold property on the outskirts of Artvin. The economics of the deposit appeared to hinge on its gold resources. Cominco reported measured plus indicated reserves, as of yearend 1994, for the property of 1.0 Mmt grading 9.4% copper, plus 1.6 Mmt grading 4.8 g/mt gold and 190 g/mt silver. In addition, there were possible resources listed of 1.8 Mmt grading 2.7% copper and 2.0 Mmt grading 3 g/mt gold and 120 g/mt silver.

Gold and Silver.—In recent years, Turkey's precious metals output has all been as credits in base metal (particularly copper) refinery slimes and/or smelted metals exported to Europe, plus silver mined at one site. Most Turkish copper ores grade 1 to 2 g/mt gold, along with more variable silver. No precious metals were refined in Turkey. The country was liberalizing its laws on gold importation and a gold bourse (exchange) was expected to be opened in İstanbul in 1995. The purpose of establishing the bourse was to stimulate the country's major gold jewelry industry and to attract large stocks of hoarded gold. A gold refinery also has

been proposed. Imports of gold in 1994 fell dramatically because of the lira devaluation and a generally weak domestic economy; imports were 38.1 mt for the year.

In 1994, three gold properties were awaiting development into mines. The Ovacık (Dikili) gold deposit, about 12 km west-southwest of Bergama, was held by Eurogold Madencilik Ticaret ve Ltd. A.Ş., a joint venture of ACM Gold Ltd. of Australia (66.67%) and Metall Mining (33.33%). The Ovacık deposit is an epithermal auriferous quartz-adularia-calcite veins system hosted within Tertiary andesites. Mining is planned for a rate of about 300,000 mt/a to produce about 3,100 kilograms per year (kg/a) of gold and a similar amount of silver. Proven plus probable reserves as of yearend 1994 for this deposit were reported by Metall to be 1.3 Mmt grading 11.7 g/mt gold and 20 g/mt silver. Possible reserves were given as 1.7 Mmt grading 7.0 g/mt gold and 20 g/mt silver.

The Küçükdere deposit, geologically similar to Ovacık, is about 10 km southeast of Edremit. The deposit was owned by Tüprag Madencilik Ticaret ve Ltd. Şti., a subsidiary of Gencor Ltd. of South Africa. A 250,000-mt/a open pit operation was planned, to recover about 3,100 kg/a of doré grading about 33% gold and 67% silver. The deposit's proven reserves, according to Tüprag, are 1.5 Mmt grading 5.2 g/mt gold.

Tüprag also held the Kaymaz property, about 145 km west-southwest of Ankara. Kaymaz reportedly is an epithermal system hosted by altered serpentinites. Tüprag has indicated that its reserves are somewhat smaller than that of Küçükdere.

All three gold properties, after lengthy delays, received environmental permits for mining late in the year. However, still more permits were needed prior to commencing mine preparation, receipt of which was anticipated. All three projects were facing strong, organized, local opposition over the proposed use of sodium cyanide for gold extraction, albeit in closed-circuit systems.

Gold exploration continued to be mostly in the Aegean and eastern Black Sea coastal regions. Cominco Ltd. of Canada continued its feasibility study of the Cerattepe gold-copper deposit at Artvin, where the gold exists mostly in an oxide cap to an underlying cupreous massive sulfide deposit. Cominco announced a number of favorable drill intercepts at the Saray deposit, near the coast about 120 km east of Samsun, and for some other deposits nearby. Metall Mining reported favorable results for a 1994 drilling program at the Mastira deposit, near the eastern Black Sea coast; more drilling was planned for 1995.

Steel.—The Turkish steel industry faced a number of difficulties in 1994. Sharp cutbacks in Government-financed construction projects contributed to poor steel demand on the domestic market in 1994. As in 1993, reduced tariffs led to intense competition on the domestic market from cheap eastern European and former Soviet Union steel imports. The devalued lira made imports of ferrous scrap, iron ore, coal, and other inputs more expensive, and energy costs rose as

well. Credit was tight. Accordingly, although the steelmakers attempted to compensate for poor demand at home by increasing exports, they were forced to raise their prices to less competitive levels. Export competitiveness was hurt further by the loss at midyear of one-half of an approximately \$40-per-metric-ton transportation subsidy and its elimination altogether at yearend. This made sales, especially to the important Asian market, more difficult.

Difficulties notwithstanding, aggressive marketing by Turkish steelmakers led to an overall increase (26% by tonnage, 20% by value) in steel exports to 7.7 Mmt, worth \$2.3 billion. This commerce allowed an increase in total crude steel production, albeit at a much slower pace than in recent previous years. One favorable outcome of the poor market conditions was that Turkish steel mills were able to negotiate low prices for imported ferrous scrap and thus contain rising production costs to some degree. Total scrap imports were 5.9 Mmt, down 7%. Turkey was the United States' third largest customer for ferrous scrap in 1994, buying 1.18 Mmt, worth \$150 million.

The Turkish steel industry remained characterized by an imbalance of products: flat products accounted for only about 1.8 Mmt of total production and long products the rest. Erdemir was the sole flat products producer, but was near completion of an expansion program to 3 million metric tons per year (Mmt/a). However, this would still be far short of projected demand for flats. To partially address this shortage, a cold-rolling coil mill began trial operations in April and was opened officially in September. The mill, Borçelik, at Gemlik, 30 km north of Bursa, was a joint venture among local tubemaker Borusan, Erdemir, Usinor Sacilor of France, and others. The equity makeup had not been fully resolved at yearend. Borçelik would produce cold-rolled coil from hot-rolled feed sourced from Erdemir, Usinor Sacilor, and other mills. Given the poor demand for cold-rolled coil in 1994, largely due to low levels of domestic automobile manufacturing, a hot-rolled line was under consideration for the facility—perhaps to include a thin slab continuous caster.

EAF mills produced 7.68 Mmt of crude steel in 1994, up about 6%. Several mills were still undergoing programs to expand their meltshop and/or rolling capacities. One of the most significant developments in the EAF sector was Diler Demir Çelik's commissioning of its new 700,000 mt/a DC-current EAF at İskenderun. Ekinciler Demir ve Çelik commissioned a new 0.7 Mmt/a rolling mill at İskenderun to replace its old mill there.

The Government sought to privatize Erdemir during the year, but was prevented from doing so by a lawsuit. A court decision near yearend would allow the Government to try again in 1995. The Government had planned to close the historic Karabük integrated steel mill, operated by TDÇI, but faced with labor union and political opposition, put plans for closure into abeyance. At yearend, the Government was negotiating the transfer of the mill for a nominal sum to a coalition of millworkers and trade union and local community businessmen interests. The Government was also seeking to sell its 42.6% minority shareholding in the EAF

mill, Metaş İzmir Metalurji Fabrikası T.A.Ş., as well as shares in a second EAF mill, Sivas Demir-Çelik İşletmeleri A.Ş.

Mineral Fuels

Natural Gas.—Turkey has been boosting consumption of natural gas as a clean-burning substitute for lignite. However, its own declining production and reserves were inadequate to meet demand and the current and projected deficits were to be met through imports. For several years, Turkey has imported natural gas from Russia via a pipeline through Bulgaria, but Russian gas supplies by this route, too, were seen as inadequate for the long-term. A number of new pipeline scenarios were being discussed to bring in Russian, Iranian, and Central Eurasian gas in through the eastern borders. In addition, Turkey has made provisions to import 2 billion cubic meters per year (m^3/a) of LNG from Algeria and was negotiating similar contracts with other countries. The imported LNG was to be delivered to a new 6-billion- m^3/a -capacity storage and regassification plant at Marmaraereğlisi that opened in March. The first shipment of Algerian LNG was delivered in August.

Petroleum.—The largest oil producer in Turkey in 1994 continued to be the parastatal TPAO. As in 1993, production fell during the year owing to civil unrest in southeast Anatolia, the main producing area. Foreign producers were reportedly also affected, and at least one suspended operations during the year. Oil exploration continued in various parts of the country, with perhaps the most promising area being offshore Samsun.

Reserves

Turkey's mineral inventory is diverse and large, but many of the deposits, especially for metallic minerals, are small by world standards. Mining, as a result, has tended to be by a large number of generally small companies or operations, sometimes with significant cumulative output. Resources of metallic commodities minable by large-scale methods are known for bauxite, chromite, copper and copper-zinc, gold, iron, and silver. Turkey is better known for its deposits of industrial minerals, of which its most significant resources are of barite, boron, certain clays, limestone and marble, magnesite, perlite, pumice, strontium, and trona. The country has large lignite reserves, but those of hard coal are small. Turkey's crude oil reserves are cumulatively significant, but hosted in a large number of small fields. Natural gas reserves are small.

Many of Turkey's mineral deposits remain unevaluated in terms of current economic criteria, including the use of mechanized mining. The most complete official inventory of Turkish mineral resources continues to be that by MTA.³ Reserves for crude petroleum and natural gas are given in Petrol İşleri's annual reports.

Infrastructure

Turkey's extensive road and railroad infrastructure was heavily used in 1994 for the transport of mineral commodities. Data for 1994 were incomplete, but appeared comparable to 1993, wherein Turkish trains carried about 15.8 Mmt of freight, including about 8.9 Mmt of ores and mine supplies, about 1.7 million barrels (Mbbl) of refined petroleum products, and 524,4000 mt of fertilizers.

In 1994, Turkey had 2,092 km of crude petroleum and 2,321 km of refined petroleum products pipelines. The longest stretch of pipeline was the 641-km twin line connecting Iraq with the Turkish oil-shipping facility at Yumurtalık. This was also the terminus for a 447-km pipeline from the refinery in Kırıkkale. The oil port at Dörtyol, 28 km north of İskenderun, was the terminus of a 494-km pipeline from the oil refinery at Batman, with shorter spurs from this line to the oilfields near Batman (Şelmo) and around Adiyaman. The Dörtyol-Batman/Şelmo and Yumurtalık-Kırıkkale pipelines carried a total of 47.8 Mbbl of crude petroleum in 1993, the latest data year available. The Yumurtalık-Iraq pipeline remained full in 1994, but has transported no crude petroleum since the imposition of UN sanctions against Iraq in 1990. In 1990, prior to the sanctions, the pipeline carried about 340 Mbbl, and in 1989 the pipeline carried about 618 Mbbl.

Turkey had about 900 km of natural gas pipeline, which was used to import natural gas from Russia. The pipeline extended from the Bulgarian border to Ankara via İstanbul and Bursa, and was being extended. In 1993, the latest data year, the pipeline grid carried 4.72 billion cubic meters (m^3) of Russian natural gas as well as Turkey's own output.

Turkey had many ports capable of handling mineral commodity shipments. Refined petroleum products were handled at several ports, but crude petroleum was handled primarily at Aliağa north of İzmir and at Dörtyol and Yumurtalık—both of these ports were between Adana and İskenderun. Major coal-importing ports included İskenderun and Ereğli. Chromite was shipped from various Anatolian ports on the Marmara coast, as well as from Antalya and İskenderun; the latter two ports handled all of Turkey's ferrochrome exports. Steel, steel scrap, and iron ore imports also were handled at many ports, particularly Aliağa, Ereğli, İskenderun, Mersin, and various ports in the İstanbul-İzmit area. Turkey's boron minerals and chemicals were exported from Bandırma. Copper concentrates, ore, and blister were shipped from Samsun, and copper concentrates from Hopa near Artvin, from new facilities at Rize, and from İskenderun. Data for 1994 were incomplete, but in 1993, Turkish ports handled about 120 Mmt of cargo, including about 42 Mmt (294 Mbbl) of crude and refined petroleum, 10 Mmt of coal, 8 Mmt of other crude minerals, and 25 Mmt of construction materials.

Turkish electrical output totaled about 77,000 gigawatt-hours in 1994, of which 62% was from thermal plants and the rest from hydroelectric facilities. Of the thermal plant output in 1994, lignite-fired plants accounted for 55%;

natural gas, 30%; fuel oil, 11%; and hard coal, 4%.

Total electrical generating capacity in 1993 was 20,335 megawatts, of which about 52% was installed in thermal plants and almost all the remainder in hydroelectric plants. Turkey was in the process of greatly expanding its electrical generating capacity and was considering the construction of two nuclear reactors as part of this program.

Outlook

The health of Turkey's mineral economy is likely to hinge significantly on the success of the ongoing privatization program. The economy appears unable to support continued high levels of public spending, although this has benefitted the major steel and cement sectors and would likely continue to do so. At such time as customs union with the EU is achieved, Turkey should gain some measure of protection from cheap imports of steel from nearby non-EU countries and could increase its own exports to the EU. Competition on the remaining world market, particularly for steel, chromite, and ferrochromium, appears destined to increase. Increasing wage and other costs of production will be an added burden on exports. Turkey's value-added or secondary mineral sector would appear to be more resilient to future world market fluctuations than is the primary mineral sector. Environmental issues are likely to assume an increasing role in Turkey's domestic affairs. Lengthy mine-permitting procedures could lessen exploration interest in the country.

¹Text prepared Sept. 1995.

²Where necessary, values have been converted from Turkish lira (TL) to U.S. dollars at the rate of TL29,609=US\$1.00. The average exchange rate in 1993 was TL10,985=US\$1.00.

³Erseçen, N. Known Ore and Mineral Resources of Turkey. MTA Bull. 185, 1989, 108 pp.

Other Sources of Information

General Directorate of Mines

(Maden Genel Müdürlüğü)

Ihlamur Sokak No. 2, Maro Han

Sıhhiye, Ankara, Turkey

General Directorate of Petroleum Works

(Petrol İşleri Genel Müdürlüğü)

Ziya Gölkulp Cad. No. 41 Yenişehir
Ankara, Turkey

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İstanbul Mineral and Metal Exporters' Association

(İstanbul Maden ve Metaller İhracatçıları Birliği)
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Mineral Research and Exploration General Directorate (Maden Tetkik ve Arama Genel Müdürlüğü)

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State Institute of Statistics

(T.C. Başbakanlık Devlet İstatistik Enstitüsü)

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Turkish Iron and Steel Producers Association

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Turkish Ministry of Energy and Natural Resources

(T.C. Enerji ve Tabii Kaynaklar Bakanlığı)

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

(Thousand metric tons unless otherwise specified)

Commodity		1990	1991	1992	1993	1994 e/
METALS						
Aluminum:						
Bauxite 3/		773	484 r/	420	538 r/	445 4/
Alumina:						
Gross weight		177	159	156	169	155 4/
Al content		93	83	82	88	81 4/
Metal, smelter	metric tons	60,900	55,800	58,600	58,500	59,700 4/
Antimony:						
Ore, mine output:						
Gross weight	do.	9,000	5,650 r/	5,070	2,100	2,000
Sb content	do.	552 r/	288 r/	309	111 r/	100
Concentrates:						
Gross weight	do.	613	394	218	93	90
Sb content	do.	367	236 e/	131 e/	59 r/	55
Regulus e/	do.	84 4/	--	--	--	--
Cadmium	do.	46	22	23	31	22 4/
Chromite:						
Gross weight (34% to 43% chromic oxide)		1,200	1,370 r/	759	767 r/	1,120 4/
Salable product		836	940 e/	531	642 r/	800
Copper:						
Mine output (exclusive of pyrite):						
Gross weight		4,020	3,840 r/	3,160	3,340 r/	3,440 4/
Cu content of ore		40	42 r/	39 r/	39 r/	40
Cu content of pyrite e/	metric tons	1,000	920	620	500	500
Concentrates (exclusive of pyrite):						
Gross weight		179	178 r/	143	140	140
Cu content		33	29 r/	27 e/	24 r/	23
Metal:						
Smelter output	metric tons	25,200	32,400	31,600	39,600 r/	36,000 4/
Refined e/	do.	84,200	80,800	104,000 r/	92,400 r/	83,000 4/
Gold, byproduct of base metals refining e/ 5/	kilograms	1,010	970	1,250 r/	1,110 r/	996
Iron and steel:						
Iron ore:						
Gross weight		4,930	4,960 r/	5,920	6,480 r/	6,650 4/
Fe content e/		2,690 4/	2,400 r/	3,200	3,320 r/	3,400
Metal:						
Pig iron and ferroalloys:						
Ferrochromium	metric tons	62,040	84,700	85,800	90,000	97,600 4/
Ferrosilicon	do.	5,230	1,740	1,250	4,680 r/	5,000
Pig iron and other ferroalloys		4,830	4,590	4,510	4,350	4,600 4/
Steel, crude including castings		9,320	9,340	10,300	11,800 r/	12,100 4/
Lead:						
Mine output, Pb and Pb-Zn ores:						
Gross weight		398	276 r/	234	180 r/	230 4/
Pb content		18	12 r/	11 e/	11	15
Concentrates:						
Gross weight		34	24 r/	28 e/	8 r/	9
Pb content		11	8 r/	7 e/	3 r/	3
Metal, refined e/		9	9	9	5	5
Manganese ore, gross weight 6/	metric tons	--	500	10,000 r/ e/	37,500 r/	40,000
Mercury	kilograms	59,700	25,100	5,000	--	--
Silver, mine output, 7/ Ag content e/	do.	52,500	63,800	103,000	103,000	65,000

See footnotes at end of table.

TABLE 1--Continued
TURKEY: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Thousand metric tons unless otherwise specified)

Commodity		1990	1991	1992	1993	1994 e/
METALS--Continued						
Zinc:						
Mine output, Zn and Pb-Zn ore:						
Gross weight		450	349 r/	307	232 r/	297 4/
Zn content		39	33	33	21 r/ e/	26
Concentrates:						
Gross weight		42	34 r/	37 e/	23 r/ e/	30
Zn content e/		16 4/	13	13	8 r/	10
Metal, smelter, primary	metric tons	20,100	17,400	18,800	18,500 r/	18,500
INDUSTRIAL MINERALS						
Abrasives, natural: Emery	metric tons	10,800	23,800 r/	41,500	11,000 r/	15,000
Barite, run of mine		367	249 r/	311	118 r/	116 4/
Boron minerals:						
Run of mine		2,060	1,810	1,800	1,890 r/	2,090 4/
Concentrates		1,250	1,210	1,060	1,080 r/	1,200
Cement, hydraulic		24,400	26,100	28,600	31,200 r/	29,400 4/
Clays:						
Bentonite	metric tons	97,500	67,600 r/	124,000	457,000 r/	400,000
Kaolin		251	219 r/	134	210 r/	220
Other		464	400 r/	500 r/ e/	665 r/	650
Feldspar, run of mine		182	235 r/	465	366 r/	400
Fluorspar e/		10	5	3 4/	4	4
Glass, crude		1,160	1,130	1,170	1,300 e/	1,400
Graphite, run of mine	metric tons	18,700	26,600 r/	21,000	20,000 e/	20,000
Gypsum, other than that for cement		172	324 r/	278	493 r/	500
Lime 8/		1,410	1,580	1,580	1,770 r/	1,800
Magnesite, run of mine		845	1,320 r/	1,220	526 r/	1,470 4/
Meerschaum 9/	kilograms	4,000	3,500 r/	3,000 r/	3,050 r/	3,000
Nitrogen: N content of ammonia		373	357	344	326	350
Perlite, run of mine		139	134 r/	281	148 r/	150
Phosphate rock (salable product)		87	4	65	78 r/	80
Pumice 10/		438	682 r/	736	1,220 r/	1,200
Pyrites, cupreous, gross weight		146	80 r/	89	50 e/	50
Salt, NaCl, all types		1,890	1,440	1,420	1,530 r/	1,500
Silica sand, washed product		469	592 r/	510 e/	350 r/ e/	415
Sodium compounds, n.e.s.:						
Soda ash (trona) e/		385	385	385	385	385
Sulfate, concentrates		110	115 e/	75	171 r/	170
Stone:						
Dolomite		184	312 r/	255	377 r/	375
Limestone, other than for cement		4,220	6,780 r/	6,940	10,900 r/ e/	11,000
Marble e/		170	405 r/	550	730 r/	750
Quartzite		997	943 r/	1,310	1,210 r/	1,500
Strontium minerals: Celestite:						
Run of mine		117	105	59	68 e/	45
Concentrates		74	70	38	44 e/	25
Sulfates, n.e.s.: Aluminum sulfate (alunite)	metric tons	14,100	19,800	9,280	13,500 r/	13,500
Sulfur:						
Native, other than Frasch		20	24 r/	23	17 r/ e/	18
S content of pyrites		65	43 r/	40	27 r/	27
Byproduct:						
Petroleum		14 r/	17	17	21	25
Other e/		7	5	5	5	5
Total e/		106 r/	89 r/	85	70 r/	75
Talc	metric tons	5,560	3,190 r/	3,920	4,000 e/	4,000

See footnotes at end of table.

TABLE 1--Continued
TURKEY: PRODUCTION OF MINERAL COMMODITIES^{1/ 2/}

(Thousand metric tons unless otherwise specified)

Commodity	1990	1991	1992	1993	1994 e/
MINERAL FUELS AND RELATED MATERIALS					
Asphalt, natural	270	139 r/	250	309 r/	88 4/
Carbon black e/	25	30	35	35 4/	35
Coal:					
Hard coal, run of mine	5,630	5,210	5,230	4,610 r/	5,520 4/
Lignite, run of mine	46,900	50,800 r/	50,400	51,400 r/	56,900 4/
Coke and semicoke	3,440	3,380	3,260	2,900 r/	3,030 4/
Gas:					
Natural, marketed	million cubic meters	212	203	198	200 r/
Coal, manufactured	do.	40	43	39	35 e/
Petroleum:					
Crude 11/	thousand 42-gallon barrels	26,600	31,900	30,700	27,900 r/
Refinery products:					
Liquefied petroleum gas	do.	7,850	7,740	7,760	8,200 r/
Gasoline	do.	22,300	22,500	23,800	27,800 r/
Naphtha	do.	12,500	9,500	10,600	10,600 r/
Jet fuel	do.	4,950	4,430	5,500	9,020 r/
Kerosene	do.	1,290	1,140	1,130	1,280 r/
Distillate fuel oil 12/	do.	49,100	47,700	49,600	54,100 r/
Lubricants	do.	1,980	1,800	1,990	2,000 e/
Residual fuel oil	do.	56,500	56,900	57,700	58,000 r/
Asphalt	do.	4,370	5,280	5,660	7,810 r/
Refinery fuel and losses	do.	4,810	4,910	5,690	5,700 e/
Unspecified	do.	961	505	1,320	1,000 e/
Total	do.	167,000	162,000	171,000	186,000 r/ e/
					179,910

e/ Estimated. r/ Revised.

1/ Previously published and 1994 data are rounded by the U.S. Bureau of Mines to three significant digits; may not add to totals shown.

2/ Table includes data available through Aug. 15, 1995. Large quantities of construction materials (clay, sand and gravel) are quarried, as are limestone and gypsum for cement manufacture; however, information is inadequate to make accurate estimates of output levels.

3/ Data are for public sector only. Data for private-sector production are not available, but production was believed to have been about 30,000 mt/a only and was reported to have ceased after 1991.

4/ Reported figure.

5/ Data are estimated content of Turkish copper refinery tankhouse slimes.

6/ Does not include manganeseiferous iron ore from the Deveci Mine, production of which amounts to several hundred thousand tons annually and has a manganese content of 3% to 5%.

7/ Includes estimated content of base metals refinery tankhouse slimes.

8/ Data are lime produced for steel production and do not include the widespread artisanal production of lime for whitewash and for sanitation purposes.

9/ Data are based on reported units of 50-kilogram boxes.

10/ Turkish pumice production is officially reported in cubic meters and has a density reported to range from 0.5 to 1.0 ton per cubic meter. Values in this table have been converted using 1 cubic meter=0.75 ton.

11/ Data are reported in metric tons and have been converted to barrels using 7.161 bbl/mt.

12/ Diesel fuel and special heating oil.

TABLE 2
TURKEY: STRUCTURE OF THE MINERAL INDUSTRY FOR 1994

(Thousand metric tons unless otherwise specified)

Major commodities	Major operating companies and major equity owners ^{1,2}	Location of main facilities	Annual capacity
Aluminum and bauxite	Etibank Milas Boksit İşletmeleri Müdürlüğü (Etibank, 100%)	Open pit mine at Milas, 127 kilometers southwest of Denizli	150 diaspore.
Do.	Etibank Seydişehir Alüminyum Tesisleri Müessesesi Müdürlüğü (Etibank, 100%)	Doğankuzu and Mortaş bauxite mines at Madenli, 25 kilometers south of Seydişehir	450 bauxite.
Do.	do.	Alumina refinery and aluminum smelter at Seydişehir	200 alumina, 60 aluminum.
Barite	Barit Maden Türk A.Ş.	Mines near Sivas and Adana	220 ground barite.
Do.	Baser Maden Sanayi ve Ticaret A.Ş.	Mines at Isparta and Konya	90 ground barite
Do.	Emas Endüstri Mineralleri A.Ş.	Mine at Muş	100 ground barite
Do.	Etibank Beyşehir Barit İşletmesi (Etibank, 100%)	Mine at Beyşehir, 72 kilometers southwest of Konya	70 barite ore.
Do.	Etibank Antalya Elektrometalurji Sanayi İşletmesi Müessesesi Müdürlüğü (Etibank, 100%)	Grinding plant at Antalya	100 ground barite.
Do.	Polbar Barit Endüstrisi A.Ş.	Mine near Antalya	120 ground barite.
Boron minerals	Etibank Bigadiç Madencilic İşletmeleri (Etibank, 100%)	Bigadiç, 38 kilometers southeast of Balıkesir	200 colemanite concentrate, 115 ulexite concentrate.
Do.	Etibank Emet Kolemanit İşletmeleri (Etibank, 100%)	Espey and Hisarcık Mines near Emet, 62 kilometers west- southwest of Kütahya	500 colemanite concentrate.
Do.	Etibank Kestelek Kolemanit İşletmeleri (Etibank, 100%)	Kestelek, 80 kilometers west southwest of Bursa	100 colemanite concentrate.
Do.	Etibank Kırka Boraks İşletmeleri Müessesesi Müdürlüğü (Etibank, 100%)	Kırka, 61 kilometers north of Afyon	500 tincal concentrate.
Cement	Adana Çimento Sanayii T.A.Ş. (Army Mutual Fund), 48.74%, other Government, ³ 47.28%)	12 kilometers east of Adana	1,850 cement.

See footnotes at end of table.

TABLE 2—Continued
TURKEY: STRUCTURE OF THE MINERAL INDUSTRY FOR 1994

(Thousand metric tons unless otherwise specified)

Major commodities	Major operating companies and major equity owners ^{1 2}	Location of main facilities	Annual capacity
Cement--Continued:	Akçimento Ticaret A.Ş.	Büyükkemce, 30 kilometers west of İstanbul	2,750 cement.
Do.	Aslan Çimento A.Ş. (Lafarge Coppée, 86%)	Darica, 40 kilometers southeast of İstanbul	1,300 cement.
Do.	Baştaş Başkent Çimento Sanayii ve Tic. A.Ş.	Elmadağ, 35 kilometers east of Ankara	1,320 cement.
Do.	Bati Anadolu Çimento Sanayii A.Ş.	Bornova, 10 kilometers northeast of İzmir	2,550 cement.
Do.	Çanakkale Çimento Sanayi A.Ş.	Near Ezine, 40 kilometers south of Çanakkale	2,000 cement.
Do.	Lafarge Coppée-Yibitaş Holdings JV (50% each)	Çorum, Sivas and Yozgat plants	2,000.
Do.	Denizli Çimento Sanayi A.Ş.	Denizli plant	764.
Do.	Rumeli Çimento Sanayi ve Tic. A.Ş.	Bartın, Gaziantep, Trabzon, and Şanlıurfa plants	2,215
Do.	Sabancı Group	İskenderun, Mersin and Niğde plants	2,500
Do.	Set Group Holding (Soc. des Ciments Français, France, 100%)	5 plants in Marmara and Aegean coast regions	3,300 cement.
Do.	Türkiye Çimento ve Toprak Sanayii T.A.Ş. (ÇITOSAN) (Government, ⁴ 100%)	9 plants	5,015 cement.
Chromium:			
Chromite ores and concentrates	Etibank Şark Kromları İşletmesi Müessesesi Müdürlüğü (Etibank, 100%)	Mines at Güleman, 40 kilometers southeast of Elazığ	150 lump ore, 70 concentrate.
Do.	Etibank Üçköprü Maden İşletmesi Müessesesi Müdürlüğü (Etibank, 100%)	8 mines in Göcek District, west of Fethiye	15 lump ore, 30 concentrate.
Do.	Birlik Madencilik Ticaret ve Sanayi A.Ş.	Mines in Kayseri, Erzurum, and Erzincan Provinces	240 lump ore.

See footnotes at end of table.

TABLE 2—Continued
TURKEY: STRUCTURE OF THE MINERAL INDUSTRY FOR 1994

(Thousand metric tons unless otherwise specified)

Major commodities	Major operating companies and major equity owners ^{1,2}	Location of main facilities	Annual capacity
Chromium—Continued:			
Chromite ores and concentrates—Continued:	Akpaş Madencilik ve Paz. ve Ticaret A.Ş.	Mines in Erzurum, Erzincan, and Kayseri Provinces	200 lump ore, 70 concentrate.
Do.	Bilfer Madencilik A.Ş.	Mines in Kayseri and Sivas Provinces	100 lump ore, 45 concentrate. ⁵
Do.	Türk Maadin Şirketi (AŞ)	Mines at Köyceğiz, 56 kilometers northwest of Fethiye, and at Eskişehir	24 lump ore, 88 concentrate.
Do.	Dedeman Madencilik Turizm Sanayi ve Ticaret A.Ş.	Kayseri Province	56 lump ore.
Do.	Egemen Madencilik A.Ş.	Mines in Bursa, Mersin, Eskişehir, and Erzurum Provinces	35 lump ore, 40 concentrate.
Do.	Pınar Madencilik ve Turizm A.Ş.	Mines in Kayseri and Adana Provinces	25 lump ore, 14 concentrate.
Do.	Akdeniz Madencilik Ticaret ve Sanayi A.Ş.	Adana	25 lump ore. ^e
Do.	Other (9) private producers	Mines in Köyceğiz, Bursa, Adana, İskenderun, and Eskişehir Provinces	114 lump ore, 12 concentrate.
Ferrochrome	Etibank Elazığ Ferrokrom İşletmesi (Etibank, 100%)	Ferrochrome plant, 50 kilometers east of Elazığ	150 high-carbon ferrochrome.
Do.	Etibank Antalya Elektrometalurji Sanayi İşletmesi Müessesesi Müdürlüğü (Etibank, 100%)	Ferrochrome plant at Antalya	11 low-carbon ferrochrome.
Coal:			
Hard coal	Türkiye Taşkömürü Kurumu Genel Müdürlüğü (TTK) (Government, 100%)	Mines on 5 coalfields near Zonguldak	7,000. ^e
Lignite	Türkiye Kömür İşletmeleri Kurumu (TKİ) (Government, 100%)	38 mines throughout Turkey	45,000. ^e
Do.	Private-sector producers	About 200 small mines throughout Turkey	8,000. ^e

See footnotes at end of table.

TABLE 2—Continued
TURKEY: STRUCTURE OF THE MINERAL INDUSTRY FOR 1994

(Thousand metric tons unless otherwise specified)

Major commodities	Major operating companies and major equity owners ^{1,2}	Location of main facilities	Annual capacity
Copper	Etibank Küre Bakırlı Pirit İşletmesi Müessesesi Müdürlüğü (Etibank, 100%)	Open pit copper and pyrite mine at Küre, 14 kilometers south of İnebolu	90 copper concentrate, 460 pyrite concentrate.
Do.	Etibank Ergani Bakır İşletmesi Müessesesi Müdürlüğü (Etibank, 100%)	Open pit mine and smelter at Ergani, 59 kilometers southeast of Elazığ	16 blister copper. ⁵
Do.	Karadeniz Bakır İşletmeleri A.Ş. (Etibank, 99.91%)	Mine and concentrator at Murgul near Artvin; mines at Sürmene and Espiye near Trabzon	175 copper concentrate, ^e 20 blister copper. ^{e, 5}
Do.	do.	Open pit Kutlular Mine near Trabzon	15 copper concentrate. ^e
Do.	do.	Underground mine near Küre	95 ore. ^e
Do.	do.	Smelter and acid plant at Samsun	38 blister copper.
Do.	Rabak Elektrolitik Bakır ve Mam. A.Ş.	İstanbul	35 refined copper.
Do.	Sarkuysan Elektrolitik Bakır Sanayii ve Ticaret A.Ş.	Gebze, 40 kilometers west of Izmit	70 refined copper.
Do.	Er-Bakır Elektrolitik Bakır Mam. A.Ş.	Denizli	18 refined copper.
Iron and steel:			
Iron ore	Türkiye Demir ve Çelik İşletmeleri Genel Müdürlüğü (TDÇI) (Government, 100%)	Divriği Mines, 115 kilometers northwest of Elazığ	3,000 run of mine ore; ^e 1,100 pellets; 600 concentrate; 500 lump ore.
Do.	do.	Deveci Mine at Hekimhan, 112 kilometers west of Elazığ	750 ore. ^e
Do.	Bilfer Madencilik A.Ş.	Mines near Divriği	1,500
Steel	Türkiye Demir ve Çelik İşletmeleri Genel Müdürlüğü (TDÇI) (Government, 100%)	İskenderun	2,200 crude steel.
Do.	do.	Karabük	680 crude steel.

See footnotes at end of table.

TABLE 2—Continued
TURKEY: STRUCTURE OF THE MINERAL INDUSTRY FOR 1994

(Thousand metric tons unless otherwise specified)

Major commodities	Major operating companies and major equity owners ^{1 2}	Location of main facilities	Annual capacity
<u>Iron and steel—</u>			
Continued:			
Steel-Continued:	Makina ve Kimya Endüstrisi Kurumu (MKEK) (Government, 100%)	Kırıkkale, 62 kilometers east of Ankara	60 crude steel.
Do.	Ereğli Demir ve Çelik Fabrikaları T.A.Ş. (Erdemir) (Government, ³ 46.53%, others, 53.47%)	Ereğli	2,000 crude steel.
Do.	Çolakoğlu Metalurji A.Ş.	Gebze, 40 kilometers west of İzmit	650 crude steel, 1,050 semi- finished steel.
Do.	Çukurova Çelik Endüstrisi A.Ş.	Aliaga, 40 kilometers north-northeast of İzmir	2,000 semi- finished steel.
Do.	Diler Demir Çelik Endüstri ve Ticaret A.Ş.	İzmit	310 semifinished steel.
Do.	Ekinciler Demir ve Çelik Sanayi A.Ş.	Arc furnace and 1 rolling mill at İskenderun. Rolling mills at Adana, Karabük, and near İskenderun (Payas)	600 semifinished steel.
Do.	Habaş Sinai ve Tibbi Gazlar İstihsal Endüstrisi A.Ş.	Aliaga	600 semifinished steel.
Do.	İzmir Demir Çelik Sanayi A.Ş. (İDÇ) (Is-Bakansi, 60%, others, 30%)	do.	550 semifinished steel.
Do.	Kroman Çelik Sanayii A.Ş.	Gebze, 40 kilometers west of İzmit	420 semifinished steel.
Do.	Metaş İzmir Metalurji Fabrikası T.A.Ş.	İzmir	450 special and semifinished steel.
Do.	Sivas Demir-Çelik İşletmeleri A.Ş.	Sivas	450 semifinished steel.
Do.	Other (8) private-sector companies.	Plants near Bursa, İzmir, and İstanbul	1,448 semi-finished steel.
Magnesite	ÇİTOSAN Konya Krom Magnezit Tuğla Sanayii A.Ş. (Government, 100%)	Konya	40 dead-burned magnesite, 38 bricks, 12 mortar.

See footnotes at end of table.

TABLE 2—Continued
TURKEY: STRUCTURE OF THE MINERAL INDUSTRY FOR 1994

(Thousand metric tons unless otherwise specified)

Major commodities		Major operating companies and major equity owners ^{1,2}	Location of main facilities	Annual capacity
Magnesite—Continued:		ÇİTOSAN Kümaş Kütahya Manyezit İşletmeleri A.Ş. (Government, 100%)	Kütahya	144 dead-burned magnesite, 46 bricks.
Do.		Comag Continental Madencilik Sanayii Tic. A.Ş.	Mines at Tavşanlı, 40 kilometers northwest of Kütahya, and near Bursa	40 dead-burned magnesite.
Do.		Magnesit A.Ş. (Veitscher Magnesitwerke AG, Austria)	Mine at Margı, 50 kilometers northeast of Eskişehir	60 dead-burned magnesite.
Mercury	metric tons	Etibank Haliköy Maden İşletmesi (Etibank, 100%)	Mine near Ödemiş, about 70 kilometers southeast of İzmir	190 mercury. ⁵
Do.		Etibank Konya Çiva İşletmesi (Etibank, 100%)	Mine at Sarayıönü, 47 kilometers north of Konya	100 mercury. ⁵
Petroleum and natural gas:				
Crude petroleum thousand 42-gallon barrels		Türkiye Petrolleri Anonim Ortaklığı (TPAO) (Government, 100%)	Production from 34 fields, mostly in Diyarbakır, Gaziantep, and Siirt Provinces	25,000. ^c
Do.	do.	N.V. Turkse Shell (Royal Dutch/Shell)	Production from 20 fields, all in Diyarbakır and Siirt Provinces	5,000. ^c
Do.	do.	Other producers (private sector and in joint venture with TPAO)	Production from 9 fields, mostly in Diyarbakır, Gaziantep and Siirt Provinces	3,500. ^c
Refined petroleum	do.	Türkiye Petrol Rafinerileri A.Ş. (TÜPRAŞ) (Government, ³ 100%)	Refinery at Batman	7,700 crude input.
Do.	do.	do.	Refinery at Aliağa	70,000 crude input.
Do.	do.	do.	Refinery at İzmit	91,000 crude input.
Do.	do.	do.	OAR refinery at Kırıkkale	35,000 crude input.
Do.	do.	Anadolu Tasfiyehanesi A.Ş. (ATAŞ)	Refinery at Mersin	30,800 crude input.

See footnotes at end of table.

TABLE 2—Continued
TURKEY: STRUCTURE OF THE MINERAL INDUSTRY FOR 1994

(Thousand metric tons unless otherwise specified)

Major commodities		Major operating companies and major equity owners ^{1,2}	Location of main facilities	Annual capacity
<u>Petroleum and natural gas—Continued:</u>				
Natural gas thousand cubic meters		Türkiye Petrolleri A.O. (TPAO) (Government, 100%)	Çamurlu Field, Siirt Province	800. ^e
Do.	do.	do.	Hamitabat Field in Thrace	205,000. ^e
Do.	do.	do.	Umurca Field in Thrace	10. ^e
Phosphate rock		Etibank Güneydoğu Anadolu Fosfatları İşletmesi (Etibank, 100%)	Open pit mine at Mazıdağı, 30 kilometers northwest of Mardin	125 concentrate.
Silver kilograms		Etibank 100. Yıl Gümüş Madeni İşletmeleri Müessesesi Müdürlüğü (Etibank, 100%)	Aktepe Mine near Gümüşköy, 20 kilometers west-northwest of Kütahya	75,000. ^e
Strontium		Barit Maden Türk A.Ş.	Mine at Akkaya, 25 kilometers south of Sivas	100 celestite concentrate. ^e
Sulfur		Keçiborlu Küükürt İşletmesi Müessesesi Müdürlüğü (Etibank, 100%)	Mine at Keçiborlu, 30 kilometers northwest of Isparta	55.
Do.		Türkiye Petrol Rafinerileri A.Ş. (TÜPRAŞ) (Government, ³ 100%)	Recovery plants at company oil refineries	23.
Zinc, smelter		Çinko Kurşun Metal Sanayii A.Ş. (ÇINKUR) (Etibank, 99.91%)	Zinc-lead smelter at Kayseri	34 zinc, 125 tons cadmium.

^eEstimated.

¹Turkish private-sector ownership unless otherwise noted.

²Etibank refers to the 100% Government-owned group administered by Etibank Genel Müdürlüğü.

³Shares are held by the Public Participation Fund Administration (PPFA) for eventual privatization.

⁴ÇİTOSAN operated all plants in 1994, but five were held by the PPFA for privatization.

⁵Facilities were idle in 1994.