TURKISH MINERS ASSOCIATION

2000 Annual Report

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FOREWORD BY THE PRESIDENT
(The Year 2000 : A General Evaluation)

The year 2000 has not been a productive one for the Turkish mining industry. As was the case throughout the last decade, we again spent a great part of our energy in ceaseless effort to explain our facts to the administrations.

In January 2000, a cabinet committee was established in order to list and abolish the practices which were hindering the mining sector. We also participated in the proceedings and a report was produced and submitted to the Council of Ministers in July 2000. A separate commission was formed for implementation and is still active in this respect.

In the present situation we can hardly see any reason to be hopeful. We even come to rely on the present crisis to indicate the administrators the importance of our natural resources.

Despite all difficulties our miners continued to produce with great sacrifices. We must note with special care the producers of industrial minerals (with the exception of marble and boron) who were able to realise exports exceeding 150 million dollars each.

Our coal production of 60 million tons is still too low when compared to our reserves of 9 billion tons.

We also feel much behind in the production of chromium ore, again with a mere 300.000 tons. Our ferrochrome plants did not operate as they should. The output of aluminum and copper were also far from the desired quantities. Our exports of boron monopolised by the Eti Holding was again near the level of 220 million dollars which has almost become traditional.

The only fortunate development was in the trona mining. We were able to prepare a project for operation and implement it without mishap.

Another remarkable development took place in underground mining of coal in Çayırhan mines. International production norms were reached for the first time in this recently privatised mine when the daily production per worker increased from 1.62 tons to 12.6 tons.

Privatisation is another matter in which no progress was made in 2000. Presently, Turkey has the greatest public share in the mining sector all over the world. In recent months the Eti-Gümüş (silver), Eti-Elektrometalurji (chromium, ferrochrome) and Eti-Bakır (copper) establishments were transferred to the Privatisation Administration. Yet we have observed no progress so far. The privatisation of Eti-Bor (boron) establishment created a great debate in the country. Though it is understandable that the labor unions are against privatisation, the attitude of the journalists and the Chambers of Commerce who share the same views is quite incomprehensible. We believe that if Turkey has a 20% share in the market with 63% of the world boron reserves, something new has to be done in order to create a domestic industry for boron. It is essential that private capital must be drawn to this sector.

The most important development of the year 2000 is the full membership of the Turkish Miners Association to the Euromines. I hope that this will contribute greatly to the Turkish mining industry. I am glad to be provided with an opportunity to thank Mr. Stewart president of Euromines who has warmly supported our membership and also to Director Mrs. Hebestreit and Mr. Nicoletopoulos the Secretary-General of the Greek Miners Association.
I hope that 2001 and the following years will bring greater opportunities to our mining industry.

Ismet Kasapoğlu
President

TURKISH MINERS ASSOCIATION

The Turkısh Miners Association was established in 1948 in order to represent Turkish mining, both public and private.

The mining exportation of our country was controlled for many years by our association and the Chromium Producers Association, a subsidiary of the same body.

When the control of our mining exports was assigned to the Istanbul Mineral Exporters' Association which was founded in 1976, our Association begun to function as a civil organisation for our sector.

Today we are continuing our contacts with the public establishments in line with the benefits of our members and also trying to create an informed public in mining matters.

KUTMAN A.Ş.
Rehabilitation area
(İstanbul)

TURKISH MINERS ASSOCIATION STEERING COMMITTEE

May 2000 - May 2002

President	: İsmet KASAPOĞLU Eti Soda Co.
Vice President	: Mustafa SÖNMEZ ÖKTEN Mining Co.
Secretary General	: Atılgan SÖKMEN MADKIM Co.
Member	: Cemil ÖKTEN MİL-TEN Co.
Member	: Selim ÇİÇEK MATEL Co.
Member	: Ahmet ALTINTIĞ Geomining Co.
Member	: Dr. Dündar RENDA

MINING SECTOR IN TURKEY

Turkey is well endowed with a range of industrial minerals, including boron minerals, magnetite, chromate, ferrochrome, barite, feldspar, celestite, pertilite, pumice, bentonite and marble.

Boron minerals, concentrates and chemicals are produced and marketed by a state owned enterprise namely "Eti Holding A.Ş." which was formely known as Etibank, Eti Holding A.Ş. is one of the principal producers and exporters of boron minerals in the world with the mines in Bigadiç (Balıkesir), Emet (Kütahya), Kestelek (Bursa) and Kırka (Eskişehir). Borates and boron products produced by Eti Bor A.Ş. which is one of the subsidiaries of Eti Holding A.Ş., Eti Holding A.Ş.'s production of other minerals is diverse, The company is a significant producer of diasporite and chromite for metallurgical uses.

Crude, caustic and dead burned grades of magnesite are produced mainly for export markets. Kümaş Kütahya Manyezit İşletmeleri A.Ş. which is Turkey's largest deadburned magnesia producer has been privatized. The main private sector dead-burned producer is Magnesit A.Ş., a subsidiary of the Austrian refractory giant Veitsch-Radex-Didier Group. The major Caustic calcined producer is Comag, part of the large Çukurova conglomerate. The company operates mines of Tavşanlı and Eskişehir.

Turkey has always been among the main chromium ore and concentrate producer and exporter countries. There are substantial amount of chromium ore deposits in various parts of Turkey. These deposits are placed in Elazığ, Guleman, Erzincan, Erzurum, İskenderun, Sivas, Kayseri, Eskişehir, Bursa and Fethiye (Uçköprü) region. Turkish chromite production mostly comprises metallurgical lumpy ore. Turkey is also best known for ferrochrome. Ferrochrome is produced and exported solely by Eti Holding A.Ş.

Turkey also has one of the world's Largest natural stone reserves which are considered to be excellent quality wise due to great variety of colors and textures. There are extensive marble deposits in these reserves. Turkey's annual raw marble production reached about 2,5 million tons in 2000 and the capacity of the plants to produce finished products is around 23,1 million square meters of slabs and tiles in total.

PARK TEKNİK A.Ş. (Çayırhan)

Turkey is also rich from the point of pumice stone reserves. The main pumice stone deposits are placed in Central Anatolia (Kayseri, Nevşehir, Niğde) and Eastern part of Turkey (Bitlis, Van, Ağrı, Kars).

Turkey has abundant reserves of feldspar in the Manisa, Muğla, Bilecik, Balıkesir, Kütahya and Aydın provinces. Production mostly albite (sodium feldspar), has grown rapidly in recent years. As with ball clay and kaolin, the main feldspar producers are those with a connection to ceramic manufacturers. The main producers are; Esan Eczacıbaşı Industrial raw materials Co., Matel Hammadde Sanayi A.Ş., Toprak Mad. Sanayi A.Ş., Kale Madencilik, Kaltun Madencilik and Çine Akmaden Madencilik.

The bulk of Turkey's kaolin production comes from the Balıkesir Duvertepe region. Reserves can be variable in quality with koalinite content between

40-80%. The main kaolin producers are Söğüt, Esan, Toprak, Matel and Kale Madencilik.

MAGNESIT A.Ş. (Eskişehir)

Over half of the world perlite reserves are situated in Turkey. Perlite is found in huge quantities in western (İzmir, Manisa, Balıkesir, Çanakkale) eastern (Erzincan, Erzurum, Kars, Bitlis, Van) and inner parts (Ankara, Eskişehir, Nevşehir, Çankırı) of Turkey. The main markets for Turkish perlite are filtration, in construction industry, the foundry industry, the textile industry, markets where perlite can replace pumice and the horticulture/agriculture industry.

Major Turkish perlite producers and exporters located Menderes-İzmir region (Eti Holding), Bergama region (Perlisan, Perlitaş, Harborlite Aegean) and İstanbul region (Persa).

Celestite (strontium sulphate) is produced only by a private firm in Sivas in central anatolia region. Barit Maden Türk is one of the leading celestite producers worldwide, producing high quality celestite from its operation at Sivas.

Baryte is produced in various districts of Turkey and ground to comply with OCMA or API Specifications. The most significant Barite reserves are located in Muş, Bitlis, Giresun, Konya, Adana, Hatay, Isparta and Antalya.

Turkish mining exports were US $ 577,50 million in 1999 and decreased to US $ 569 million in 2000. Marbles are the most important export items of the Turkish mining industry. In 2000 export of marbles were realized as US $ 188,73 million. Export of boron minerals and concentrates were US $ 108,14 million, copper ores were US $ 51,36 million and feldspar was US $ 41,92 million. Chromite ores US $ 38,71 million and Magnesite US $ 35,41 million are the other important export products.

The major markets for overall minerals are; primarily USA, Italy, Spain, Japanese, Austria and Belgium.

Marbles play an important role in Turkish mining export. In 2000 approximately 250 types of marble are extracted in Turkey and over 100 different varieties are exported. Of Turkey's total stone export, 91,3% is marble, 8,7% is granite and the other amount is hard stone. The marble exports reached to US $ 172,4 million in 2000 and the volume of exported marble were realized in processed marble which have the 82,3% share in overall marble export.

The value of exported raw marble (Block and Slabs) was US $ 30,54 million while it was US $ 141,91 million for processed marble. In processed marble, USA was the biggest export market of Turkey with US $ 54 million. On the other hand, Turkey's granite and other similar stone exports reached to US $ 16,28 million, so, total marble and other stone exports was about US $ 188,73 million.

The major markets for overall stones (marble, granite and other stones) are Europe primarily; Italy, Spain, Germany, England, Netherlands and Belgium, Middle East Countries; Israel, Saudi Arabia, Kuwait, Syria and Iraq, Far East Countries; Taiwan China, Hong Kong and Singapore.

MINING EXPORTS OF TURKEY 1998-2000

	1998		1999		2000	
	Q (kg)	V ($)	Q (kg)	V ($)	Q (kg)	V ($)
SALT	20.035.827	1.155.412	20.122.850	1.243.841	28.073.880	1.422.473
QUARTZ and QUARTZITE	15.620.605	1.216.746	14.824.789	1.519.128	22.229.629	1.981.677
KAOLINE	145.933.216	5.632.375	254.059.858	7.515.007	262.754.900	7.531.324
BENTONITE	90.582.948	4.214.775	104.671.727	4.585.976	126.566.898	5.466.100
BARYTE WHITHERITE	127.714.086	8.473.919	54.133.290	3.453.038	99.008.085	5.332.159
PUMICE	153.975.104	8.193.815	126.689.888	6.944.829	114.486.800	5.638.366
EMERY and ABRASIVES	13.764.274	1.092.141	14.991.902	1.423.716	16.086.214	1.589.356
MAGNESITE	206.470.078	38.155.761	222.178.536	37.556.200	233.963.810	35.410.829
GYPSIUM	48.585.839	5.539.645	65.350.314	6.143.401	81.649.415	8.445.676
BORON	650.318.131	128.967.524	666.105.723	122.601.890	576.915.688	108.141.455
FELDSPAR	1.355.265.289	24.969.633	1.984.905.168	36.112.072	2.145.440.580	41.920.356
PERLITE	169.886.980	3.787.055	149.969.019	3.548.138	143.477.127	3.332.688
CELESTINE	32.040.000	2.179.100	58.540.000	3.923.900	25.000.000	1.662.500
COPPER ORES	151.532.556	32.530.283	206.443.949	46.682.625	190.565.329	51.357.478
ZINC ORES	70.893.289	16.986.279	68.571.861	15.926.226	73.796.348	17.019.333
ZINC-LEAD ORES	8.270.000	1.711.815	9.800.000	1.960.000	7.534.500	1.661.199
CHROMIUM ORES	588.909.790	52.078.466	562.591.094	37.165.383	471.451.355	38.712.940
METALIC ASHES	1.290.802	13.410.392	1.617.839	4.322.557	4.206.092	6.950.567
MARBLE BLOCK	112.665.588	16.866.224	157.859.523	21.690.546	262.622.616	30.535.302
and PLATES	89.119.696	3.761.680	86.592.958	3.637.903	84.734.022	3.156.106
OTHER NATURAL STONES	55.437.387	2.942.729	26.928.156	1.965.003	27.612.741	1.640.222
PROCESSED MARBLE and TRAVERTEN	219.700.771	97.070.407	276.397.913	115.552.762	327.427.841	141.911.429
PROCESSED GRANITE	4.867.585	4.825.313	3.521.220	3.181.715	4.829.339	4.197.906
OTHER PROCESSED NATURAL STONES	50.021.773	2.209.461	11.782.689	2.102.288	19.387.668	4.592.684
OTHERS	107.666.148	7.414.634	168.716.198	10.221.333	233.242.855	13.026.353
TOTAL	4.490.567.762	485.385.584	5.317.366.464	500.979.477	5.583.063.732	542.636.478

CHROMIUM

Turkey occupies the third place in the world in chromium production after South Africa and Kazakhistan with a capacity of 1.000.000 to 1.500.000 million tons of ore. Although other (chemical and casting sand) types of are also produced, the production of metallurgical and refractor type of ore is dominant. Regarding the quality of ore, the production of metallurgical ore is especially important.
The tuvanon ore ise enriched and exported in rock piece or concentrated form. Some of the production is used in domestic production and primarily sent to ferrochromium plants.
There are 21 chromium concentrators in Turkey with an approximate capacity of 950.000 tons/year. 60% of this capacity belongs to the private sector.
As for the ferrochromium plants, the Eti Krom A.Ş. (Elazığ) has a capacity of 150.000 t/y of high carbon FeCr and Eti Elektrometallurji San. A.Ş. (Antalya) has a capacity of 12.000 t/y of low carbon FeCr. There are presently transferred to the Privatisation Administration.
The prominent Turkish firms producing chromium are the following: Dedeman Madencilik A.Ş., Bilfer Madencilik A.Ş., Türk Maadin Şti. A.Ş. and Birlik A.Ş.
The production of chromite ore in Turkey in the year 2000 has been in the environs of 600.000 tons due to the low demand in world markets.

MAGNESITE

The magnesite ore in Turkey has a white and crystaline structure low in iron content. There are also a limited amount of sedimentary deposits in the region of lakes.
The magnesites which are purified from the serpantine and the gang minerals of opalised silisium and calcite are very pure and clean. The calcines and sinter magnesites derived from these clean magnesites are products highly valued and demanded all over the world due to their superior chemical qualities alongside their very pertinent burning techniques.
When the geological map of Turkey is analised, the Anatolian peninsula which is also named as Asia Minor is full of mineral deposits as arteries or netzwerk-stockwerk type deposits in alternating serpantine formations depending on basal and ultrabasal character of rocks, these spreading in all directions. The known reserves are 44 million tons with a probable reserve of another 55 million tons and also a possible reserve of 56 million tons, making a grand total of approximately 155 million tons.
There are many magnesite mines in Turkey. The production is generally made in open mines. When prices were high enough, underground mining was also practiced in gang and artery type formations.
In the revolving and vertical furnaces there is a capacity for 370.000 tons/year of sinter and 35.000 tons/year calcine magnesite. In the factories and other plants the production capacity is 120.000 tons/year for basal bricks and 25.000 tons/year for mortar both in pure and compound form.
Turkey has an average annual exportation of 130.000 t/y sinter magnesite, 20.000 t/y of calcine magnesite, 100.000 t/y of basal bricks, 5.000 t/y of mortar and 35.000 t/y of crude magnesite, against imports comprising 10.000 t/y of sinter magnesite of fresh and seawater processed types and 5.000 t/y of smelted magnesite.Magnesite production in Turkey is done primarily by private firms both national and international in character.
Magnesite A.Ş. (MAŞ), a subsidiary of the International RHI group is producing sinter magnesite and mortar, Magindag-Steirische Magnesit (Austria) is producing calcinated magnesite.
Kütahya Manyezit A.Ş. (KÜMAŞ) and Konya Krom Manyezit A.Ş. are private firms producing sinter magnesite, bazic refractor bricks and mortar whereas Comag is a firm producing calcinated magnesite. There are also a considerable number of private firms producing unprocessed magnesite for domestic and foreign markets.

COAL

Among the world energy resources, coal is still the most reliable one. Coal takes the first place in the production of electrical energy in OECD countries with 37% share. Also, with the present consumption values, coal is expected to last five times more than petroleum and natural gas, the other fossil resources. This global situation draws our attention to a very important reality for Turkey. The total petroleum reserves of Turkey are only two times the annual imports and the reserves of natural gas is half the annual import figure. Besides these, there is a lignite reserve of 8.3 billion tons and bituminous coal reserve of 1.1 billion tons. Considering that 60% of our geological areas have not been explored in a detailed way, a lot more of serious work remains to be done in the Turkish coal sector.

The Lignite Production for the Year 2000 (Tons)

Türkiye Kömür İşletmeleri (TKİ)	43.030.000
Sivas Kangal (private sector)	5.225.000
Afşin, Elbistan (TEAŞ)	10.800.000
Çayırhan (private)	2.000.000
Other private establishments	3.500.000
TURKEY TOTAL	64.555.000

Lignite is found in most regions of Turkey. The greatest reserve is in Elbistan (Southern Anatolia) with 3.4 billion tons. The other main reserves are in central and northwest Anatolia, and the Egean region. 13% of the lignite reserves has a heat value of over 3.000 k cal/kg, and only 4.3% has a heat value of over 4.200 k calories. On the other hand 58% of the reserve has a heat value below 1.200 k cal/kg.

Most of the lignite production in Turkey is used in electricity production and the 11 existing plants are eating up 55.8 million tons of lignite annually. There are also 17 thermic plants with a projected yearly lignite consumption of 119.1 million tons. If all of these will be realised Turkey will annualy consume 174.9 million ton of lignites in electricity production.

NATURAL STONES

Turkey has all four catagories of stones (metamorphites, plutonites, volcanites and sedimentary rocks) with a very rich variety of color and texture. Turkish natural stone industry can market over 80 different kinds which have proved their continuity in the markets.

The natural stone industry, although being concentrated in Western Egean, South Marmara and Southwest Mediterrenean regions, has also extended to all regions with the quarries and plants which have begun production in the last 10 years. In between the years 1985 to 2000, for which we have production data, yearly increase in production has been 13 % and the production of blocks has reached 1.050.000 m3 in 2000. In the same year the exports of this product has reached a figure exceeding 200 milion US dollars with a small margin.

In Turkey the number of quarries including those working with intervals is around 900 and the number of plants in factory scale and having at least two cutters is around 500. There are also approximately 5000 small establishments in workshop scale. This sector is directly employing 50.000 persons including those working in stone assembly and indirectly creating employment for 100.000 persons. This product is being exported to around 100 countries. The share of EU countries in these exports was over 60 % before 1990 but it has now declined to around 30 %. The natural stone exports to US has increased significantly in the last 5 years, exceeding 40 million dollars in the year 2000. On the other hand another development worth noting in the recent years is the increase in imports. This import which has exceeded 40 million dollars is primarily made from Spain and İtaly and is comprising the hard stones group.

Summing up, we can say that the natural stone industry of Turkey has an annual turnover of 600 million USD and 200 million USD of exports. It is estimated that in the next 5 years the annual production increase of 13 % will continue and the annual increase of exports will be 18 % and the yearly increase of imports will be 8 % and the domestic consumption will increase by 11 %.

GOLD

History of the gold mining in Anatolia goes back to the times of the ancient civilisations up to 2500 B.C., however there is not any gold mine operating in the recent times. Several gold deposits and occurrences are known to occur in different geological environments in Turkey. Due to its vary favourable geology for the formation of the gold mineralisation, it is expected to discover more reserves than the known ones. The gold potential of Turkey is estimated some 6500 tons by using the similarities between the Turkish geology and the gold geological resources models.

According to the available data, the proven reserves of the 7 known deposits are 250 tonnes of gold and 1100 tonnes of silver. The detailed data on these deposits are given in the following table. The increase of the proven reserves as 4 times in the past 5 years is the indicator for the discovery of the huge gold potential in Turkey. Ovacık Gold Mine that will be the first in Turkey is designed to utilize the Carbon-in-Pulp (CIP) cyanide leach method. Cyanide content of the tailings is breakdown by INCO SO2/Air process. The cyanide content of the sulury transported to the tailings pond will be < 1 mg/L. An average value of 0.2 mg/L CN has attained at the trial operation of the plant. Arsenic and antimony are precipitated as undissolved complexes by ferric sulphate process at the second stage. At the end, cyanates and thiocyanates that are formed during the process are breakdown by alkaline chlorination.

A 30 meter-high rock-fill dam with a 1,6 million m3 capacity was constructed in a 16 hectare area in order to store the treated process waste. The pond reservoir located on a dry creek bed is contained between two rock-fill dams on the upstream and downstream ends. The tailings pond was lined with a composite liner system consisting of clay-HDPE geomembrane-clay. The water deposited in the tailings pond is conveyed back to the process tank for reuse by the drainage system installed at the bottom of the pond. There will be no discharge from the tailings pond to the environment.

In terms of the environmental protection, the Ovacık Gold Mine is one of the safest mines in the world considering the treatment of the tailings, sealed tailings pond with a composite liner system and no water discharge to the receiving environmental media. The environmental measures taken at the mine site completely comply with and exceeds all of the national environmental regulations and international standards.

Fully constructed Ovacık Gold Mine once stalled for 2,5 years is now in the final phase of obtaining the necessary permits for operation.

Table - Known gold deposits in Turkey

Project	**Au (ton)**	**Ag (ton)**	**Project Position**
Uşak-Eşme	150		Exploration
Artvin-Cerattepe	30	1150	Feasibility
İzmir-Efemçukuru	30		Feasibility
Bergama-Ovacık	24	24	Ready to be mined
Gümüşhane-Mostra	12	8	Feasibility
Havran-Küçükdere	8	17	Delayed
Sivrihisar-Kaymaz	6	3	Delayed
TOPLAM	**260**	**1200**	

BARYTES

Since its first export in 1967 barytes have become a heavily export oriented mineral commodity for Turkey. Drilling activity in the neighbouring oil rich countries provided ample business two decades ago, while local consumption rarely exceeds few thousand tonnes a year. Turkish baryte producers numbered 14 at mid-eighties, in stark contrast to today's 4; namely, Başer, Ado, Barit Maden and Petma.
Strong competition from China and India, collapse of the ex-Soviet republics, the embargo imposed upon Iraq following the Gulf War are all major factors to explain dwindling production of early nineties. Exports have slightly risen in recent years. The figures could be anywhere between 125.000 to 150.000 tpa, of almost exclusively drilling mud grade, while few thousand tonnes are filler grade destined for paints, rubber, brake linings etc. There is no production of chemical grade baryte in Turkey.

CELESTITE

The booming demand for strontium carbonate in cathode ray tubes of colour TV sets was followed by the discovery of the world class celestite deposits near Sivas 1972. Although celestite deposits are scattered almost equidistantly around the world, they are confined to few countries. The sole turkish producer, Barit Maden quickly established a major share in global market in eighties, currently ranking third with 60.000 tpa. Virtually all turkish celestite is exported for the production of strontium carbonate in the Far East. This heavy dependence on a single outlet is tempting the turkish producer to move into downstream production of carbonate.

GYPSUM

This much neglected mineral abunds in Turkey. However, its use was practically confined to cement manufacturing until eighties when excessive demand for new housing lured companies into construction plasters business. Earlier plaster producers were located near the capital Ankara to source their raw material from the nearby deposits. Recent trend is to set up regional production centers. Today, six companies dominate the scene; ABS, Barit Maden, Dalsan, Doğan, Entegre and Tepe. Rapid urbanization in the last decade attracted european heavy-weights too; Tepe now belongs to Knauf, both Entegre and Dalsan were taken over by Lafarge, BPB operates its own import house. Total annual production of hemi-hydrate, including that for industrial applications and wallboard, is just over a million tonne, while cement industry consumes about 1,5 million tonne of raw gypsum. Wallboard has began to make inroads into building industry. Put together, four plants have an annual capacity of 60 million sq.m. Turkish Gypsum Producers Association is a member of the European Gypsum Association.

BENTONITE

Turkey has extensive bentonite reserves. Most of these are of the bleaching and casting quality. The white bentonite found in Ünye and Fatsa regions is especially suitable for use in paper and detergent industries as well as in the purification of oils. On the other hand it is possible to create new and advanced uses for Ca-bentonites.
The visible and probable reserves of 240.000.000 tons are in Ankara, Çankırı, Çorum, Edirne, Giresun, Konya, Ordu and Trabzon provinces.

BORATES

Turkey has the greatest borate formations in the world. These are deposited among clay, marn and gypsium layers. Emet and Eskişehir regions have the greatest reserves of boric salts. The total reserves of boron is estimated at 2.5 billion tons and the most important fields in B2O3 base are in Bigadiç-Balıkesir, Emet-Kütahya, Kırka-Eskişehir and Kestelek-Bursa. The most important reserves

of borates are in Kütahya and Balıkesir. Colemanite is the main ore in these deposits. Borax and Tincalconite are found only in Kırka deposits. Kırka has 21% of the total reserves of Borates in Turkey and due to its 25% concentration it is representing with a 16% level in B2O3 badreserves. The Turkish reserves of boron must be evaluated regarding the following information with respect to establishments.
There is an open mine in Kırka (Tincal) which has an ore dressing plant with a capacity of 600.000 t/y. The Kestelek open mine (Colemanite) has an ore dressing plant with a capacity of 100.000 t/y. In Bigadiç there are 3 open and 2 underground mines (Colemanite and Ulexite) with enriching plants of 400.000 t/y for colemanite and 130.000 t/y for ulexite. In Emet (Colemanite) there are 2 open mines and 2 enriching plants with a capacity of 800.000 t/y. Besides these plants, Eti Holding has a capacity of 320.000 tons for the production of borax penthydrate and 60.000 t/y for dry borax in Kırka alongside 50.000 t/y of borax dexhydrate, 5.000 t/y of borax penthydrate and 135.000 t/y of boric acid in Bandırma. Below are the basic facts about Etibor A.Ş., the main producer.

ETİBOR A.Ş.
It has been established for the purpose of operating boron mines and refining plants. There are five directorates for operation.

1. Emet Bor İşl. Md.
This plant is producing colemanite which is enriched from the ore of Espey and Hisarcık mines. Work is also in progress for a 100.000 t/y Boric Acid Plant.
Product & Capacity
Concentrated Colemanite: 500.000 t/y
Boric Acid: 100.000 t/y

2. Bigadic Bor İşl. Md.
This plant is producing concentrated colemanite and concentrate ulexite from The Ores of Bigadic Mines.
Product & Capacity
Concentrated Colemanite: 200.000 t/y
Concentrated Ulexite: 200.000 t/y

3. Kestelek Bor İşl. Md.
This plant situated in Kestelek county of Bursa province is producing concentrated colemanite.
Product & Capacity
Concentrated Colemanite: 100.000 t/y

4. Kırka Bor İşl. Md.
It is situated in The Kırka County of Eskişehir province. Some of its enriched ore is marketed as concentrated tinkal. Other boron derivatives are produced and some new production is in planning phase.
Product & Capacity
Tinkal concentrate: 800.000 t/y
Borax Pentydrate: 480.000 t/y
Borax Dekahydrate: 17.000 t/y
Dry Borax: 60.000 t/y
* Construction for 3 rd derivates with a capacity of 160.000 t/y is continuing

5. Bandırma Bor ve Asit Fab. İşl. Md.
It is producing The following products in The Bandırma County of Balıkesir province.
Product & Capacity
Borax Dekahydrate (if only BDH): 55.000 t/y*
Boric Acid: 85.000 t/y
Sodium Perborate: 20.000 t/y
Sulphuric Acid: 120.000 t/y
* Depending on market conditions some of this capacity is used for production of borax penthydrate.

ROCK SALT

The known visible reserves of rock salt in Turkey is around 1.595.000.000 tons. Of this total 800 million tons is in Çankırı, 613 million tons is in Kars/Tuzluca, 107 million tons is in Yozgat/Sekili and 75 million tons is in Nevşehir/Gülşehir. The probable reserve is 1.780 million tons. As for the total reserve, the greatest part of the 5.713 million tons is in Nevşehir/Gülşehir/Tuzköy with 2.411 milion tons. This is followed by Çankırı with 1.750 million tons. As for the others, Yozgat has 932 million tons, Kars/Tuzluca has 840 million tons, and Erzurum/Oltu has 300 million tons. There are also 60 million tons in Kars/Kağızman and 20 million tons in Kırşehir/Tepesidelik.

PUMICE

According to the research made by MTA General Directorate the pumice reserve of Turkey (Visible+probable+possible) is 2.8 billion tons. Of this total around 1.5 billion tons is in the Nevşehir/Avanos/Ürgüp region. The pumice with acid character is almost entirely in the provinces of Nevşehir, Kayseri, Ağrı, Van, Kars, Bitlis, İsparta, Burdur and Muğla. The pumice produced in these regions in open mines is primarily used in brick production. The greatest domestic demand is for the white pumice of Nevşehir region.

TALK

According to MTA research the total talk reserve of Turkey is 1.158.356 tons, 106.546 tons being the visible reserve. Of this total 480.000 tons is stated as having good quality. The greatest reserve is the metamorphic talk deposits in the Madran Mountain, near the Güvenli village of Balıkesir/İvrindi/Korucu. This ore which is estimated to have 7 million tons of visible+probable reserves is 50% talk, 40% magnesite and 10% hematite+magnetite compound. During the enrichment experiments for this ore in MTA, concentrates with 88% talk in 66% productivity level has ben attained (Fe2o3=0.7) with the magnetic seperator+flotation processes. Other talk deposits are found in Balıkesir, Bolu, Eskişehir, Sakarya and Sivas. Talk production is a newly developing sector and generally dry milling is implemented in order to produce in micronised dimensions.

FELDSPAR

Feldspar containing rocks are found in many regions of Turkey, yet deposits which have a commercial value with a small amount of alcaline feldspar and albite are in the regions of Çine-Aydın and Milas-Muğla. There is K-feldspar mining around Kütahya-Simav-Demirci and Akköy depending on small scale pegmatites.
The feldspar of Milas-Çine region is of very high quality with a marketable chemical compound. There are also some K-feldspar zones, and this is mined in Simav-Kütahya and Demirci-Manisa. These last two deposits are in a mountainous and steep ground at the northernmost part of the Menderes massif.
The albite (Na-feldspar) reserves of Turkey are 240 million tons and the K-feldspar reserves are around 11 million tons.
The world feldspar production has been doubles in the last decade. Turkish has been the country with the highest increase in production, reaching 2.000.000 t/y from 290.000 t/y, which indicates a sevenfold increase.

CLAY

Turkey has a total clay reserve (visible+probable+possible) of over 1.5 billion tons, excepting ball clay of which the visible reserves are 80.000.000 tons. Ball clay is the main material used in ceramics industry and the primary reserves are in İstanbul, Çanakkalę, Manisa, Kütahya, Kırklareli and Konya.
The flint and fire clay is used in the production refractor bricks and monolite and the standard clay (used in compounds) is used in the production of cement, bricks, tiles and light construction materials.

KAOLIN

The visible + probable reserves of kaolin in Turkey is 100.000.000 tons. These are located in Balıkesir, Giresun, Çanakkale, Eskişehir, Niğde and Bursa. Kaolin is a main ingredient in the production of paper, ceramics, paint, plastic, rubber, glass and white cement.

İSTANBUL MINERAL EXPORTERS' ASSOCIATION

Exporters' Associations are semi-governmental professional establishments affiliated to The Prime Ministry of Republic of Turkey Undersecretariat of Foreign Trade. As of the date, there are 57 Exporters' Associations in Turkey.

İstanbul Mineral Exporters' Association, which is one of these establishments, founded on February 2, 1976 with the 7/1 1385 numbered Decision of Council of Ministers. It started the activities on May 23, 1976 with Its first name, "Turkey Minerals Exporters Association". In 1986 its name was changed as "İstanbul Minerals Exportors' Association". At present, it has got nearly 1500 members and it deals with all of the mining export activities of its members. Basic aims can be summarized as;

- keeping export statistical data for the mining products
- following sectorial developments in mining industry and keeping informed its members on these developments
- providing current information on the world metal markets and keeping informed its members on the price changes
- organizing the national participation to international trade fairs in order to introduce Turkish marble export products in the world markets
- organizing trade mission and buyers mission programmes to/form many countries for expanding promoting trade volume of Turkey
- carrying out all documentary work concerning export operations, guidance for foreign importers to meet the right producers in Turkey
- supporting promotional studies of other persons/organizations that will affect popularity of Turkish mineral export products in world markets.
- helping members in their disputes with the importers, to make necessary attempts for protecting the rights of the members when it is proven that the exporter has suffered losses due to the fault or fraud of the importer
- establishing and developing relations with the international organizations to protect interests of the members and the country as a whole
- performing duties given by The Prime Ministry of Republic of Turkey Undersecretariat of Foreign Trade

In this frame of increasing exports; İstanbul Mineral Exporters' Association is performing researches, publications, advertisement at abroad, organization of trade fairs, seminars, meetings, collecting data and publishing mineral export statistics of Turkey and all kinds of activities to improve mineral exports.
İstanbul Mineral Exporters' Association, one of the unique examples of public and private sector cooperations, has built herself into a research, coordination, decision-making and implementing institution which works for and provides the smooth and functional running of the relationships between the exporters and the law-making bodies in a rational and dynamic way.

Günaydın YİRMİBEŞOĞLU
Şehit Muhtar Cad. No. 68/10
Taksim/İSTANBUL
Tel: (0212) 255 05 02
Fax: (0212) 255 06 57
Main Products: Marble

FİLİZ Madencilik
Bağdat Cad. No: 190/8
Selamiçeşme Kadıköy/İSTANBUL
Tel: (0216) 386 46 10
Fax: (0216) 385 51 71
Main Products: Marble

ÇAYELİ BAKIR A.Ş.
P.K. 42 Çayeli/RİZE
Tel: (0464) 544 64 30
Fax: (0464) 544 64 50
Main Products: copper

SOYLU Madencilik
Atatürk Cad. No: 174 K: 5/5
Alsancak/İZMİR
Tel: (0232) 425 94 10
Fax: (0232) 483 11 78
Main Products: marble

ŞAYAKÇI Madencilik
İzmir Yolu BALIKESİR
Tel: (0266) 221 10 50
Fax: (0266) 221 10 57
Main Products: marble

TÜPRAG A.Ş.
Tunus Cad. No: 76/5
Kavaklıdere/ANKARA
Tel: (0312) 468 45 36
Fax: (0312) 468 26 46
Main Products: gold

EUROGOLD A.Ş.
Arjantin Cad. No: 15/2
Gaziosmanpaşa/ANKARA
Tel: (0312) 466 19 42
Fax: (0312) 466 19 43
Main Products: gold, silver

ERMAD Madencilik
1469 Sok. No: 28/602 Alsancak/İZMİR
Tel: (0232) 463 77 40
Fax: (0232) 463 24 49
Main Products: feldspar, quartz sand

ERSOYLAR Madencilik
Piripaşa Mah. Hasfırın Sok. No: 26
SİLİVRİ
Tel: (0212) 727 34 90-727 47 07
Fax: (0212) 728 07 39
Main Products: industrial minerals

AKDENİZ MİNERAL A.Ş.
Aydede Cad. No: 32/4
Taksim/İSTANBUL
Tel: (0212) 254 64 04
Fax: (0212) 254 73 72
Main Products: magnesite

MAGNESİT A.Ş.
İnönü Cad. No: 26/9
Taksim/İSTANBUL
Tel: (0212) 245 06 38
Fax: (0212) 293 65 30
Main Products: magnesite

MADKİM Ltd. Şti.
Ethem Efendi Cad. Sefa Apt.
No: 110/12 Erenköy/İSTANBUL
Tel: (0216) 368 23 27
Fax: (0216) 368 07 29
Main Products: magnesite,
limestone, clay

KÜMAŞ A.Ş.
Eskişehir Yolu 9 km P.K. 134
KÜTAHYA
Tel: (0274) 225 00 50 Fax: (0274) 225 00 60
Main Products: magnesite

Mualla GÜNAY
Yeni Çarşı Cad. Demir Han
No: 58 K: 5 Galatasaray/İSTANBUL
Tel: (0212) 292 89 40
Fax: (0212) 292 89 42
Main Products: marble

SOMA KÖMÜR A.Ş.
Karanfil Sok. No: 28 Levent/İSTANBUL
Tel: (0212) 283 08 47
Fax: (0212) 283 08 46
Main Products: Lignite

CANEL Madencilik
Gümüşpala Mah. Zabit Sok.
No: 1/1 Avcılar/İSTANBUL
Tel: (0212) 593 14 83
Fax: (0212) 593 21 99
Main Products: Lignite, marble

MİL-TEN Ltd. Şti.
Kore Şehitleri Cad. No: 41
Zincirlikuyu/İSTANBUL
Tel: (0212) 288 72 80
Fax: (0212) 288 47 35
Main Products: Lignite

ÖKTEN Madencilik
Ferahevler Çarşıbaşı Sok.
No: 7 Tarabya/İSTANBUL
Tel: (0212) 223 21 55
Fax: (0212) 223 21 54
Main Products: Lignite

YILMAZ Madencilik
İnönü Cad. Benderli İş Merkezi
Kat: 3 No: 18 ÇORUM
Tel: (0364) 224 78 38
Fax: (0364) 225 08 92
Main Products: Lignite

TARHAN Madencilik
Yeni Mah. Ada Cad. TAVŞANLI
Tel: (0274) 614 82 50
Fax: (0274) 614 82 53
Main Products: Lignite

EMRE Madencilik
Otoyolcular Sitesi Konaklar Mah.
B-1 D.1-2 Yenilevent/İSTANBUL
Tel: (0212) 281 97 52
Fax: (0212) 281 84 59
Main Products: Lignite

GRANİTAŞ A.Ş.
E-5 Yanyol No: 34
Soğanlık Kartal/İSTANBUL
Tel: (0216) 309 19 29 Fax: (0216) 377 91 92
Main Products: Granite

TUNCERLER Madencilik
Hürriyet Mah. Dr. Cemil BENGÜ
Cad. No: 45 Çağlayan/İSTANBUL
Tel: (0212) 296 05 52
Fax: (0212) 224 12 50
Main Products: Lignite

AYDIN LİNYİT A.Ş.
Atatürk Cad. No: 44/5
Pasaport/İZMİR
Tel: (0232) 483 09 06
Fax: (0232) 425 89 36
Main Products: Lignite

GAGAT Madencilik
Çoban Yıldızı Sok.
No: 7 A/3
Çankaya/ANKARA
Tel: (0312) 426 67 50
Fax: (0312) 467 19 08
Main Products: Lignite

DEMİRCİ Madencilik
Konaklar Mah. Büyükdere Cad.
A-1 Blok Kat: 11 D: 41
Yenilevent/İSTANBUL
Tel: (0212) 282 44 21
Fax: (0212) 278 10 66
Main Products: Lignite

EKİN Maden A.Ş.
Büyükdere Cad.
Noramin İş Merkezi: K: 3/308
Maslak/İSTANBUL
Tel: (0212) 286 79 70
Fax: (0212) 286 79 76
Main Products: Zinc, Lead

BER-ONER Madencilik
Büyükdere Cad. 3. Yol Mevkii
Noramin İş Merkezi K:3
No:304 Maslak/İSTANBUL
Tel: (0212) 286 74 60
Fax: (0212) 286 74 64
Main Products: Lead, Zinc

GEO Maden
Büyükdere Cad.
Noramin İş Merkezi K: 1
No: 108 Maslak/İSTANBUL
Tel: (0212) 286 95 40
Fax: (0212) 286 95 49
Main Products: Zinc, lead, copper

RASİH-İHSAN Madencilik
Kemeraltı Cad. Balkanhan
No: 69/6 Karaköy/İSTANBUL
Tel: (0212) 249 95 16
Fax: (0212) 249 62 95
Main Products: Lead, Zinc

OREKS Madencilik
Kemeraltı Cad. No: 4
Bankalar Han 3/37
Karaköy/İSTANBUL
Tel: (0212) 243 12 55
Fax: (0212) 245 11 16
Main Products: Lead, Zinc

DEMİR EXPORT A.Ş.
İzmir Cad. Koç Han No: 25/7
06140 Kızılay/ANKARA
Tel: (0312) 417 23 36
Fax: (0312) 418 01 51
Main Products: Iron ore, lignite

BARİT Maden T.A.Ş.
Cumhuriyet Cad. No: 6/14
Elmadağ/İSTANBUL
Tel: (0212) 234 12 06
Fax: (0212) 234 12 14
Main Products: Celestite, CO_2, baryte

SARKUYSAN A.Ş.
Şişhane Meydanı Okçu Musa Cad.
No: 1 Beyoğlu/İSTANBUL
Tel: (0212) 252 60 00
Fax: (0212) 251 23 04
Main Products: electrolitic copper

BİRLİK Madencilik A.Ş.
Giz 2000 Plaza Kat: 14-15
Maslak/İSTANBUL
Tel: (0212) 290 62 62
Fax: (0212) 290 62 50
Main Products: chromium

AKPAŞ Maden Pazarlama
Giz 2000 Plaza Kat: 14-15
Maslak/İSTANBUL
Tel: (0212) 290 62 62
Fax: (0212) 290 62 50
Main Products: chromium

TÜRK MAADİN A.Ş.
Caddebostan Gökçe Sok.
No: 10/1 Erenköy/İSTANBUL
Tel: (0216) 302 42 66
Fax: (0216) 302 42 69
Main Products: chromium

DEDEMAN Madencilik
Yıldız Posta Cad. No: 52/1
Esentepe/İSTANBUL
Tel: (0212) 275 76 00
Fax: (0212) 275 76 05
Main Products: chromium

SITKI KOÇMAN
Bankalar Cad. No: 17-19
Kat: 5 Karaköy/İSTANBUL
Tel: (0212) 251 33 80
Fax: (0212) 251 52 57
Main Products: chromium

ESAN A.Ş.
Kısıklı Cad. Ak İş Merkezi No: 1/3
Altunizade-Üsküdar/İSTANBUL
Tel: (0216) 343 19 19
Fax: (0216) 333 40 70
Main Products: Clay, kaoline

MATEL A.Ş.
Dragos, Çayırlar Mevkii No: 5
81540 Maltepe/İSTANBUL
Tel: (0216) 441 22 84
Fax: (0216) 441 22 87
Main Products: clay, kaoline

KEÇECİLER Madencilik
Ataşehir Gardenya 3/13 K:11
D: 68 Küçükbakkalköy/İSTANBUL
Tel: (0216) 455 49 61
Fax: (0216) 455 49 62
Main Products: seramic clay

MORTAŞ Madencilik
Cumhuriyet Cad. Kervansaray Apt.
No: 28/1 Harbiye/İSTANBUL
Tel: (0212) 246 60 40
Fax: (0212) 232 38 82
Main Products: industrial minerals

KALE Maden A.Ş.
Semedeli Köyü Çan/ÇANAKKALE
Tel: (0286) 437 13 30Fax: (0286) 437 13 40
Main Products: clay, kaoline

ASET Madencilik
İstiklal Cad. No: 258/50
Beyoğlu/İSTANBUL
Tel: (0212) 252 80 11
Fax: (0212) 252 80 14
Main Products: Dolomite, quartz sand

BUYURGAN Madencilik
Gayret Sok. Yıldırım Apt.
No: 3/8 Gayrettepe/İSTANBUL
Tel: (0212) 275 79 42
Fax: (0212) 356 82 10
Main Products: mining equipment trade

GLENCORE A.Ş.
BJK Plaza Spor Cad. No: 92
K: 4 Akaretler/İSTANBUL
Tel: (0212) 259 65 13
Fax: (0212) 259 85 52
Main Products: importer

ETİ HOLDİNG A.Ş.
Sıhhiye Cihan Sok. No: 2 ANKARA
Tel: (0312) 231 70 20
Fax: (0312) 229 21 32
Main Products: Boron,
chromium, trona, aluminium

TKİ Genel Müdürlüğü
Hipodrom Cad. 12
Yenimahalle/ANKARA
Tel: (0312) 384 17 20
Fax: (0312) 384 16 35
Main Products: Lignite

TTK
TTK Genel Müdürlüğü
ZONGULDAK
Tel: (0372) 252 40 00
Fax: (0372) 251 19 00
Main Products: coal

Toprak Mermer San. A.Ş.
Şair Leyla Sok. No: 26/4
Beşiktaş/İSTANBUL
Tel: (0212) 261 94 40
Fax: (0212) 260 22 30
Main Products: marble

KUTMAN
Kore Şehitleri Cad. 15
Zincirlikuyu/İSTANBUL
Tel: (0212) 275 15 50
Fax: (0212) 266 78 03
Main Products: Lignite

COMİNCO A.Ş.
Farabi Sok. No: 3/5
Çankaya/ANKARA
Tel: (0312) 468 48 41
Fax: (0312) 468 48 43
Main Products: Gold

RİOTUR A.Ş.
Sancak Mah. 249. Sok.
No: 47/9 Yıldız/ANKARA
Tel: (0312) 441 71 04
Fax: (0312) 441 71 05
Main Products: Gold

AKÇANSA A.Ş.
Ebulula Cad. Maya
Meridyen İş Merkezi K:7-10
Akatlar/İSTANBUL
Tel: (0212) 352 24 22
Fax: (0212) 352 24 46
Main Products: cement

PARK TEKNİK A.Ş.
Kehribar Sok. No: 19
Gaziosmanpaşa/ANKARA
Tel: (0312) 441 46 36
Fax: (0312) 441 39 77
Main Products: Lignite, trona

BAYINDIR A.Ş.
Tunus Cad. No: 24
Kavaklıdere/ANKARA
Tel: (0312) 447 30 17
Fax: (0312) 447 30 29
Main Products: Trona

ÖZDOĞU A.Ş.
Turan Güneş Bulvarı 71.
Sok. No: 3/1
Yıldız/ANKARA
Tel: (0312) 438 17 48
Fax: (0312) 441 17 23
Main Products: contractor

MİNSAN A.Ş.
Karanfil Sok. No: 28
Levent/İSTANBUL
Tel: (0212) 283 08 47
Fax: (0212) 283 08 46
Main Products: chromium

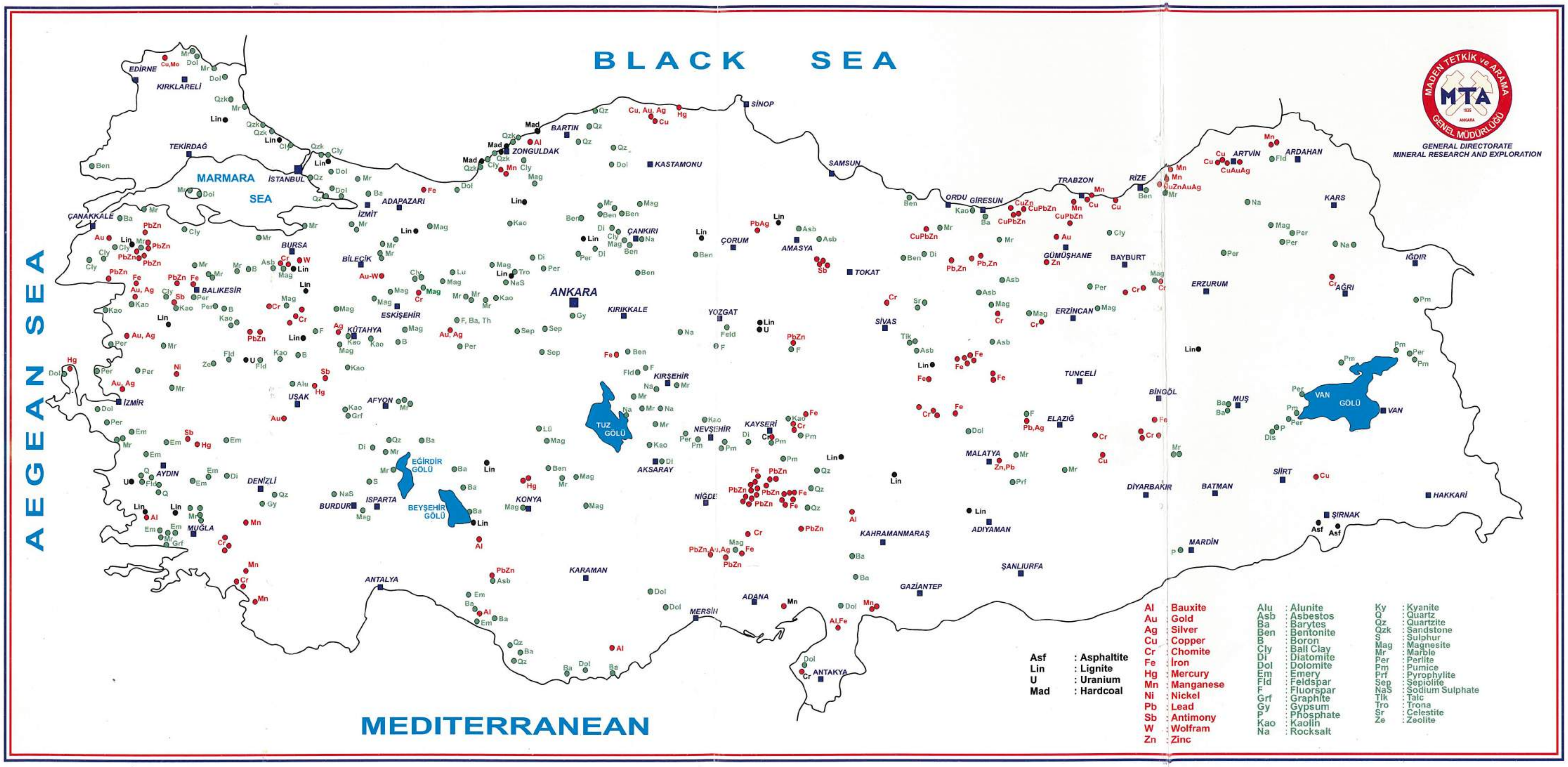
Technical and Academic Members

Prof. Güven ÖNAL
Prof. Işık ÖZPEKER
Prof. Bedri İPEKOĞLU
Dr. Güngör TUNCER
Fikret ÖZBİLGİN
Tayfun ÖZUSLU
Murat TURAN
Dr. Nijat GÜRSOY

Selim AKYILDIZ
Melih TURHAN
Dr. Dündar RENDA
Dr. Özer ÖLÇER
Ahmet ALTINTIĞ
Salih ÖZEN
Asım KUTLUATA
Orhan BAYKARA

✓ Zeki YAVUZTÜRK
Ömer YENEL
Mustafa SÖNMEZ
Attila YALÇIN
Cahit ÖZDEN
Aydın GÖKTAN
Ahmet GÖKTAN

MINERAL DEPOSITES OF TURKEY



PARK HOLDİNG

Employing about 6000 persons, Park Holding is one of the leading companies in Turkey, especially in energy and mining sector with its annual turnover of USD 700 million. Its main activities are in energy and mining, followed by textiles and apparel, finance, service and transportation.

Park entered the energy sector as an extension of its mining activities, and regards energy and mining as priorities. Park Enerji was established in 1992 on BOO base coal benefication plant in Tunçbilek as the first mining activity of Park Holding. Park Enerji Soma Plant, which was established 1994 is the biggest private coal benefication plant of Turkey with a capacity of 4 million tons raw coal per year. Dodurga Plant, which was established in 1997, is the other coal benefication plant of Park Enerji. Park in Çayırhan establishes another coal benefication plant with a capacity of 2.5 million tons of raw coal per year for Çayırhan Thermal Power Plant. This is the first coal benefication application to increase the thermal efficiency of the power plant, which is achieved with great success. Park Enerji is in the negotiation stage to transfer its technology to India and very close to sign contracts for the two different coal benefication plants with a total capacity of 8 million tons per annum for the Indian thermal power stations. Park Maden, which was established in 1996 for enrichment of 5 million tons of fine iron ore on BOT basis for 15 years.

Park Teknik, which was established in 1995 on BOT base within the structure of Park Holding, has started to produce 4.5 million tons of lignite coal from the underground mine with fully mechanised long wall system. Park Teknik has become the biggest private company with in this sector with its expert staff amounting a number of over 1000. In 1999 the operational right of a 620 MW lignite coal fired power plant located in Çayırhan has been transferred to Park Termik on TOR basis for a period of 20 years. Park Termik is the first and only priv ate company, which has been operating the power plant.

In 1998 Park Holding and Eti Holding, which is a public company have together founded a company named Eti Soda A.Ş. to produce natural soda ash. In the beginning of 2001 trona production has started and the samples has been send to the Europe and USA for analysis for determining the process. Approximately 1.8 million tons of trona per year from underground and subsequently approximately 1 million tons of Soda Ash will be produced. The investment cost is around USD 200.000.000 are expected brut sales are USD 175.000.000 per year for a period of 30 years.

Park Demir, which was established in 2000, may start to extract 750.000 tons iron ore from underground mine in March 2001. Contract in between Park Demir and the DİVHAN has been already signed.

Park Holding, Vakıfbank and the International Power is part of the consortium for the transfer of operational right of Yeniköy, Kemerköy and Yatağan Thermal Power Plants, which have total capacity of 1470 MW with nearby open pit mining areas. Consortium is in the stage of signing contract and till June 2001 the realization of transfer is expected.

By means of his successful past, Park Holding will continue to invest in mining & energy sector and aimed to do everything on his account to eliminate the power shortage faced by Turkey by using high efficient and environmental friendly technologies. Our main aim is to be the biggest company in the energy sector on long-term basis.

PARK HOLDİNG ANONİM ŞİRKETİ

Merkez: Aziz Bey Sok. No: 4 Kuzguncuk, Nakkaştepe 81200 İSTANBUL **Tel:** (0216) 492 41 75/5 Hat **Fax:** (0216) 492 41 81-82
Şube: Şehit Muhtar Cad. No: 56 Taksim 80090 İSTANBUL **Tel:** (0212) 254 71 00 **Fax:** (0212) 255 01 87 - 235 98 77
Ankara Büro: Kehribar Sok. No: 19 Gaziosmanpaşa 06700 ANKARA **Tel:** (0312) 441 46 36 **Fax:** (0312) 441 39 77

TURKISH MINERS ASSOCIATION

İstiklal Cad. Tunca Apt. No: 471/1-1
Beyoğlu -İstanbul
Tel: +90 212 245 15 03
Fax: +90 212 293 83 55
e-mail: turkiyemaden@ixir.com