THE MINERAL INDUSTRY OF THE UNITED KINGDOM

By Harold R. Newman

Mine production of ferrous and nonferrous metals in the United Kingdom (U.K.) has been declining for the past 20 years as reserves became depleted. Because processing has become the basis of a large and economically important mineral industry, imports are required to satisfy metallurgical requirements.

Operations in the steel sector showed moderate increases as the demand for steel increased. The industrial minerals sector has provided a significant base for expanding the extractive industries, and the balance has shifted away from the metallic mineral sector. Companies had a substantial interest in the production of domestic and foreign industrial minerals, such as aggregates, ball clay, gypsum, and kaolin (china clay). (See table 1.)

The current statute regarding the development and working of mineral deposits is called the 1971 Act. This act consolidates all earlier planning legislation and has been amended by various statutes. Minerals are defined in section 209 of the 1971 act as including all minerals and substances in or under land of a kind ordinarily worked for removal by underground or surface workings; it does not, however, include peat cut for purposes other than for sale. Mineral development is specifically addressed in the Town and Country Planning (Minerals) Regulations, 1971, and the Town and Country Planning (Minerals) Act, 1981.

Mineral rights to mineral fuels, such as coal, petroleum, and uranium, belong to the state. The Coal Authority was authorized to license open pit and underground mines to the private sector subject to restrictions on size and the payment of a royalty on the amount of coal produced.

Most other mineral rights in Great Britain are privately owned. The exception is gold and silver, the rights to which are vested in the Royal Family and are referred to as "Crown Rights." A different situation regarding mineral rights applies to Northern Ireland where, under the Mineral Development Act (Northern Ireland), 1969, the right to work minerals and the right to license others to do so is vested in the state, as opposed to private ownership.

The Department of Trade and Industry (DTI) ensures a continuing supply of minerals for the country's industry. Its areas of responsibility include all nonenergy minerals, including metallic ores and industrial minerals, including barite, china clay, fluorspar, high-grade limestone, potash, salt, and silica sand. The industrial minerals sector, in particular, is important to the nation's economy. (See table 2.)

Through its Metals and Minerals Branch, the DTI is responsible for mineral fuels, including coal, natural gas, and petroleum, and for issuing licenses for the exploration, appraisal, and production of natural gas and petroleum. These activities had previously been overseen by the Department of Energy (DOE). The DOE is responsible for minerals that are used in the construction industry. These include aggregates, brick and brick clay, cement and its raw materials, dimension stone, gypsum for plaster, and sand and gravel. State and privately owned corporations produce minerals and mineral-based products. State ownership was mostly in the nuclear power industry. (See table 3.)

The Geological Survey of Northern Ireland noted that at the start of 1998, there were 12 mineral prospecting licenses in force in the province, together with 11 licenses for petroleum exploration. A total of nine companies held prospecting licenses covering diamonds, lignite, perlite and other mineral commodities, including gold and base metals. Investigation of the Tardee perlite deposit was in its final stages (Mining Journal, 1998b).

The United Kingdom's export trade was dominated by petroleum, and the economy benefited from net exports of crude oil and petroleum products at a level of about \$5 billion in 1998.¹ The majority of these exports went to European Union countries—76% of the total in 1997. To give some idea of the significance of the United Kingdom's crude oil exports, they equaled 4.6% of total world trade in crude oil in 1996, the latest year for which complete world data are available (Department of Trade and Industry, 1998).

Of the four primary aluminum smelters in the United Kingdom, three were owned and operated by British Alcan Aluminium Ltd., the U.K. subsidiary of Montreal-based Alcan Aluminium Ltd. The fourth smelter, operated by Anglesy Aluminium Ltd., was owned by Rio Tinto Ltd. (51%) and Kaiser Aluminum and Chemical Corp. of the United States (49%). All the aluminum smelters depended on imported alumina for feedstock.

The secondary aluminum metal industry treated recycled aluminum and low-grade aluminum scrap, such as swarf. The main consuming sector for secondary aluminum ingots was the automotive industry.

Avon Group was proceeding with the commissioning of its new chemical plant near Whitchurch. A three-stage crushing line was already operational. The plant will be a part of the group's new Total Reclamation Plan (TRP), which will treat 100,000 metric tons per year (t/yr) of drosses and salt slags produced as a byproduct of aluminum melting and smelting. The main products from the TRP will be secondary aluminum, an inert aluminum oxide called Wardal, which will be sold to the cement industry; salt, which will be sold to the secondary

¹ Where necessary, values have been converted from U.K. pounds (UK \pm to U.S. dollars at the rate of UK $\pm 0.64 = US \pm 1.00$.

smelting industry for flux; sulfate solution for the fertilizer industry; and ammonia for the cleaning products industry (Moreno, 1998).

The MIDAS project, a major investigation of gold mineralization at numerous deposits in the Caledonian and Hercynian orogenic belts of Europe, was completed under the leadership of the British Geological Survey (BGS). Evaluation of multidisciplinary earth science digital data for selected deposits allowed a classification of the types of gold mineralization to be established. On this basis, metallogenic models were presented in the final report, and the optimum exploration methodology for each deposit type was selected.

Activities in gold exploration and development in the United Kingdom increased in 1998. Northern Ireland, Scotland, and Wales continued to be the three main areas of exploration by companies. Scotland was the most active area with several exploration licenses in effect.

Omagh Minerals Limited, a wholly owned subsidiary of European Gold Resources Inc. (formerly Montenor Resources Inc.) of Canada, received formal Governmental consent for its open pit gold mine at Cavanacaw, County Tyrone, Northern Ireland. The 189-square-kilometer concession reportedly contains a large number of gold deposits and occurrences apart from established gold resources. A cluster of lode and openended shear structures in or adjacent to the Kearney Structure contains an estimated mineral inventory of more than 2 million metric tons of ore grading 6.9 grams per metric ton of gold equating to about 14,000 kilograms. The company estimated that it could have an initial production of more than 500 kilograms per year (kg/yr) of gold and more than 600 kg/yr of silver. Exploration was continuing to define further reserves. This project would be the first gold mine in Northern Ireland (Omagh Minerals Limited, March 19, 1998, [untitled], news release, accessed September 20, 1999, at URL http://gold.ica. net/irishpro.htm).

Crediton Minerals Plc., a subsidiary of MinMet Plc. of Ireland, planned a 2-year exploration program for gold and silver in an area known as the Crediton Trough, located to the north and west of Exeter in Devon. BGS found significant detrital gold in the course of stream drainage sampling, and subsequent geochemical evaluation identified anomalous levels of gold in volcanic rocks of Permian age. Crediton drilled nine cored holes, one of which was reported to have intersected gold mineralization at shallow depth within a volcanic horizon in Permian sandstones (Mining Magazine, 1998).

Production of iron ore was limited to a small amount of hematite ore mined by Egremont Mining Co. at the Florence Mine in Cumbria. The output goes for pigments and foundry annealing uses, rather than metal production. Primary steel production was based on imported iron ore, mainly from Australia and Brazil.

British Steel was the largest steel producer in Europe and the third largest in the world after Nippon Steel of Japan and Posco Steel of North Korea, with group sales of about \$13 billion. The basic oxygen steelmaking process produced about 13 million metric tons per year (Mt/yr) of liquid steel. Although traditional ingot casting was still used in the manufacture of certain grades of steel, most of the output was produced by means of continuous casting.

Section and plate production was principally undertaken at the integrated steelworks of Teesside and Scunthorpe, with the manufacture of pipes and tubes at Corby and Hartlepool and rails at Workington. Flat-rolled strip steel was made at Port Talbot and Llanwern. Further processing was undertaken at Lianelli and Ebbw Vale for tin plate and at Shotten for galvanizing and painting.

British Steel set up the Packaging Recycling Unit (PRU) to help raise recovery and recycling levels for steel packaging in response to new Government legislation. The PRU will work with the reclamation industry and local authorities to promote new recovery systems for steel nationwide. PRU was expanding the recovery and recycling of steel in Northern Ireland. A new recovery route for steel cans was set up with ferrous scrap company Hammond Metal Recycling Ltd. (HMR). Through HMR, steel cans were transported to British Steel's plants where they were recycled (British Steel, May 18, 1998, news release, accessed September 20, 1999, at URL http://www.britishsteel. co.uk/Vault/PresslibResults.asp).

The last United Kingdom tin mine, Crew Group of Canada's South Crofty Mine in the county of Cornwall, was bought by a private investor. Crew Group will retain ownership of the land surrounding the mine. South Crofty was allowed to flood when it was closed in March 1998 and will require 3 to 4 weeks of pumping before mining can start. The cost of returning the mine to its preclosure state was estimated to be about \$3 million (Mining Journal, 1998a).

The United Kingdom's two largest cement producers were Blue Circle Industries Plc. (BCI), with 50% of the domestic market, and Castle Cement Ltd., with more than 25%. The third producer was the Rugby Group. BCI had 10 plants, including one in Northern Ireland. Castle had four plants, including a grinding plant. Rugby had six plants. The housing market had been a positive factor during the past 2 years; however, it appeared to be slowing down in response to higher house prices and interest rates, as well as the turbulence in the financial markets (International Cement Review, 1998).

BCI announced details of its proposed development in Kent. About \$280 million was to be spent to construct a cement plant in Holborough to serve the markets of the southeastern United Kingdom. Production capacity would be 1.4 Mt/yr. The site was intended to replace existing facilities in Northfleet where output will cease in 2001. BCI also announced that it was closing its small high-cost plants at Masons and Plymstock in 1999 (Industrial Minerals, 1998a).

BCI also announced that it was planning to invest about \$55 million into its Dunbar facility in Scotland. Funds will be used to increase production capacity nearly 20% from existing levels of 850,000 t/yr to 1 Mt/yr and to broaden the product range (Industrial Minerals, 1998a).

Scancem will make one of its largest ever investments in new production capacity by investing about \$84 million in its subsidiary Castle Cement. Through the enlargement of two dry kilns, Castle can close four energy-intensive wet kilns. This would lead to a more rational operation and allow a much wider range of fuels to be used. The extension of the two kilns will be implemented between 1999 and 2001 (Scancem, June 16, 1998, Scancem invests SEK 700 M in Britain's Castle Cement, news release, accessed June 22, 1998, at URL http://www.scancem. com/news/1998/9806216.htm).

The United Kingdom was the leading world producer and exporter of ball clay, as well as the world's largest exporter and second-largest producer, after the United States, of kaolin (china clay). Watts, Blake, Bearne & Co. Plc. (WBB) was the country's largest producer of ball clay.

WBB Devon Clays Ltd. was responsible for the ball clay operations of WBB. The division operated eight open pit and three underground mines that had a total combined capacity of 500,000 t/yr of crude ball clay.

English China Clays Plc. (ECC) was the largest producer of kaolin and one of the major producers worldwide. Operations were mainly in the southwestern area of the United Kingdom.

ECC Ball Clays Ltd. was responsible for the domestic ball clay operations of ECC. The division operated five quarries and three underground mines that had a combined output of 450,000 t/yr of crude ball clay.

ECC International Ltd. operated ball clay and kaolin mines and quarries in the Wareham Basin, Dorsetshire; the Bovey Basin, south Devonshire; and the Petrockstowe Basin, north Devonshire. The majority of the production was from the Bovey Basin.

Fluorspar mining was concentrated in Derbyshire from the Southern Pennine deposit. The major producer was Laporte Industries Plc., which operated two underground mines and one open pit mine. The ore was processed at Laporte's Cavendish Mill near Sheffield.

Durham Industrial Minerals Ltd. was to close five fluorspar mines at Rookhope in Weardale. These closures would follow the shutdown of three other major fluorspar producers outside China since 1995—Gencor in South Africa, Ozark-Mahoning in the United States, and Bayer in Germany. Falling prices of fluorspar, Chinese competition, and the strength of the pound were thought to have contributed to the closings (Industrial Minerals, 1998b).

British Gypsum Ltd., a subsidiary of BPB Industries Plc., was the major producer of gypsum in the United Kingdom. The company had mines in Cumbria, Leicestershire, Nottinghamshire, Staffordshire, and Sussex that produced about 3 Mt/yr of gypsum. With few exceptions, this material went to supply the domestic market.

Cleveland Potash Ltd. (CPL), the only potash producer in the United Kingdom, operated the Boulby Mine in Yorkshire. CPL also mined rock salt as a coproduct from an underlying seam in the Boulby Mine. The seam of potash extends out under the North Sea. To reach it, the miners must descend 1,100 meters (m) in a shaft (reputed to be the deepest shaft in western Europe) to pass through the potash seam and into the salt below. About 45% of the potash produced at Boulby was destined for domestic markets with a further 34% exported to France. The remainder was sold throughout Europe (Pearson, 1998).

Most slate mining in the United Kingdom was in northern Wales; additional mining operations were in Cornwall and the Lake District. Alfred McAlpine Slate Ltd. was the owner and operator of the Cwt y Bugail, Ffestiniog, and Penrhyn quarries in North Wales. The Penrhyn quarry at Bethesda, measuring 2,415 by 805 m, was considered to be the world's largest slate quarry and has been in operation for more than 400 years. The company also produced natural slate from its American quarry at Hilltop Slate Inc., New York. Historically, natural slate has been used in roofing applications, but in more recent times, markets have been extended to include interior flooring and windowsills together with ornamental landscapes. McAlpine Slate produced more than one-half of the United Kingdom's entire production of natural slate. The company exported about two-thirds of its production, mostly to Europe (McAlpine Slate Ltd., 1998, Company information, accessed October 28, 1998, at URL http://www.amslate.com/company.html).

McAlpine received planning permission to exploit additional reserves at its Penrhyn quarry. The quarry, which covers an area of about 325 hectares (h), will be extended by an additional 45 h. This enlargement will extend the life of the quarry and increase extraction by a further 80 million metric tons of slate at the southern end of the quarry (Industrial Minerals, 1998c).

Scottish Power Ltd. of the United Kingdom agreed to buy PacifiCorp of the United States for a reported \$6.9 billion to create one of the world's top 10 electricity utilities. It will be the first time a U.K. company has bought a large U.S. electricity supplier, thus reversing the recent transatlantic trend (Taylor, 1998).

Following the closure of several coal mines in the United Kingdom in 1997, no further closures took place in 1998. Most of the coal mining industry was owned by RJB Mining Plc., the largest coal mining company in the United Kingdom and the largest independent coal producer in the European Union. The largest operation was the underground Selby Complex consisting of Riccall/Whitmoor, Stillingfleet Combine, and Wistow. Midland Mining Ltd., the second largest underground mine producer in terms of output, owned the Silverdale Mine, the deepest coal mine in western Europe, and the Annesly-Bentinck Mine, which was scheduled to close in 1999. There were also 24 small drift mines in operation in 1998 (British Geological Survey, 1998)

Open pit mines in production in 1998 totaled 83. RJB Mining owned 16 producing open pit mines; Celtic Energy Ltd. owned 5 open pit mines; and Scottish Coal Company Ltd. had 11 open pit mines in Scotland. The remaining open pit mines were operated by more than 25 other operators (British Geological Survey, 1998).

The offshore U.K. sector of the North Sea Oilfield, in its 34th year of activity, continued to be significant in international oil and gas activities. As a result, the country has become headquarters for international oil companies and a major energy supplier to other countries.

When expressed in terms of their energy content, indigenous production of primary fuels was 1.7% higher in 1998 than in 1997. The 15 new oilfields that started production during 1998 helped raise production to a higher level. The number of offshore oil and gasfields in production at one time reached 200 for the first time. Total production of primary fuels has risen by 155% since 1970 mainly because of the growth in production of petroleum and natural gas (Department of Trade and Industry, 1998, p. 7).

In mid-1998, there was good news for offshore operators in that the Government was considering restoring a tax break. The proposal would give capital gains tax rollover relief to companies that sell interests in U.K. oil licenses and invest the proceeds in another North Sea asset. This would allow a company to defer the tax charge on any capital gain on the transaction. This would be the first time that the benefit has been allowed since 1987 (Petroleum Economist, 1998).

Completion of the eighteenth round of licensing was announced in June 1998. The acreage, comprising 602 blocks, offered represented mature areas of the U.K. Continental Shelf where all the producing fields are located, with the exception of Foinaven and Schiehallion. Of the blocks offered, 82 received bids. In December 1998, 78 of these bids were awarded to 44 companies in a total of 48 licenses. Most applicants focused on acreage close to existing infrastructure where new discoveries could be brought on- stream rapidly, thus prolonging current asset life (World Oil, 1998).

The United Kingdom had an onshore producing oilfield, the Wytch Farm Field in Dorset, containing estimated reserves of 450 million barrels. The field extends offshore under Poole Bay.

In the United Kingdom and Europe, transportation changed significantly with the completion and operation of the Channel Tunnel. The tunnel, referred to as the "Chunnel," was constructed underneath the English Channel and connects Folkestone, England, and Coquelles, near Calais, France. Everything transported through the tunnel will move by rail. The trip takes about 30 minutes. The Channel Tunnel, linking the two countries, was a vital component of the European singlemarket concept.

A step to revive the economic infrastructure of South Wales was taken in March with the reopening of Port Talbot's old dock, more than a quarter of a century after it had closed. Commercial shipping through the Port Talbot dock in the center of the town ceased in 1970 after the opening of a deepwater harbor specifically designed to handle large coal- and iron-ore-carrying vessels serving British Steel's South Wales plants at Llanwern and Margam. The reopened dock will handle the movement of 400,000 t/yr of slag from Port Talbot to a cement works in Purfleet for Cambrian Stone Ltd., a joint venture between Tarmac Quarry Products Ltd. and British Steel. Associated British Ports Holdings Plc. invested \$2 million to refurbish the dock and its lock gates (Focus, March 13, 1998, news release, accessed March 13, 1998, at URL http://biz.yahoo.com/finance/980313/focus port.html).

The United Kingdom has been a significant player in the world mining and mineral-processing industries. This has been more the result of an extensive range of companies in the country, with various interests in the international mineral industry rather than the domestic mineral industry. This scenario is expected to continue.

Exploration is expected to continue onshore and offshore. Onshore exploration activities will be directed mainly toward precious metals. Offshore exploration interest will continue to be focused on North Sea areas, particularly the areas west of the Shetland Islands, the Central North Sea, and the Southern Gas Basin. The Department of Trade and Industry is expected to continue to be involved in the development of mineral resources. Efforts to raise the level of environmental management and to maximize the best use of natural resources, including use of recycled materials and alternate sources of energy, will continue.

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Major Sources of Information

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TABLE 1 UNITED KINGDOM: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity METALS	1994	1995	1996	1997	1998 e/
Aluminum:					
Alumina from imported bauxite e/	105,000	108,000	99,000	100,000	100,000
Metal:	105,000	100,000	<i>))</i> ,000	100,000	100,000
Primary	231,223	237,899	239,963	247,675	258,000
Secondary	248,900	282,000	257,200	257,800	236,000
Cadmium, metal including secondary	469	549	541	455	440
Copper, metal, refined:					
Primary	11,078	12,007	12,869	9.000 e/	7,000
Secondary	35,586	42,993	43,746	51,000 e/	47,000
Total	46,664	55,000	56.615	60,000 e/	54,000
Iron and steel:	+0,00+	55,000	50,015	00,000 0/	54,000
Iron ore:					
Gross weight	1,271	1,051	1,180	1,210	1,200
Fe content (55% Fe)	293	242	271	278	275
Metal:	275	212	271	270	215
Pig iron thousand tons	11,943	12,236	12,830	13,057	12,569 2
Steel, crude do.	17,286	17,604	18,220	18,528	17,007 2/
Steel, hot rolled do.	14,000	19,119	18,869	16,149 r/	15,214 2
Lead:	14,000	19,119	10,007	10,147 1/	13,214 2/
Mine output, Pb content e/	2 000	1 600	1 800	1 200	1 800
Mine output, Pb content e/ Metal:	2,000	1,600	1,800	1,800	1,800
Smelter: Bullion from imported concentrate	36,619	41,642	41,991	38,500 e/	36,000
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Secondary (refined) e/ 3/	100,000	100,000	100,000	100,000	100,000
Total e/ Refined:	136,619	141,642	141,991	138,500	136,000
	101.007	140 705	169 109	015 040	220 500
Primary 4/	191,036	149,706	168,108	215,243	220,500
Secondary 3/	161,430	170,998	177,466	175,783	163,500
Total	352,466	320,704	345,574	391,026	384,000
Magnesium metal, secondary including alloys e/	1,000	1,500	1,000	1,000	1,000
Nickel metal, refined e/ 5/	28,400	35,156	38,561	36,586	41,994 2/
Tin:					
Mine output, Sn content	1,922	1,972	2,103	2,396	400
Metal, secondary (refined) e/	100	100	100	r/	
Zinc, metal, smelter	101,300	105,998	96,867	107,704	100,000
INDUSTRIAL MINERALS					
Barite 6/	54,000	85,000 e/	102,000	74,000 e/	68,000
Bromine	33,800	26,200	30,600	30,000 e/	28,000
Cement, hydraulic thousand tons	12,307	11,805	12,214	12,900 e/	13,000
Clays:					
Fire clay do.	679	708	536	338 r/	500
Fuller's earth 7/ do.	134	132	143	135 r/	95
Kaolin (China clay) 8/ do.	2,654	2,586	2,281	2,360 r/	2,400
Ball clay and pottery clay 8/ do.	825	893	866	916 r/	960
Other, including shale do.	12,464	14,000 e/	13,000	12,000 e/	10,000
Diatomite e/	180				
Feldspar (china stone)	7,000	7,900 e/	8,000	8,000 e/	8,000
Fluorspar, all grades 9/	50,000	55,000 e/	65,000	67,000 e/	65,000
_Gypsum and anhydrite e/ thousand tons	2,000	2,000	2,000	2,000	2,000
Lime, quicklime and hydrated e/ do.	2,500	2,500	2,500	2,500	2,500
Nitrogen, N content of ammonia do.	1,006	799	850 r/	642	871 2
Potash, K2O equivalent	580,000	582,000	618,000	564,500 r/	608,400 2/
Salt:					
Rock e/ thousand tons	1,700	1,800	1,800	1,800	700
From brine e/ do.	1,300	1,300	1,300	1,300	1,300
In brine, sold or used as such do.	4,004	3,548	3,512	3,561 r/	3,500
Sand and gravel:					
Common sand and gravel do.	91,450	101,732	96,377	99,800 e/	96,000
Industrial sand do.	4,038	4,200 e/	4,816	4,800 e/	4,000
Sodium compounds, n.e.s, carbonate e/ do.	1,000	1,000	1,000	1,000	1,000
Stone:					
Crushed:					
Calcite e/ thousand tons	3				
Chalk do.	10,236	9,949	9,239	9,550 r/	9,500
		17,952	16,555 r/	18,282 r/	17,000
Dolomite do.	17.616				49,000
Dolomite do. Igneous rock do.	17,616 56,494	57,061	50,705	48,000 ľ/	
Igneous rock do.	56,494	57,061 94,441	50,705 86,342	48,656 r/ 87.752 r/	88.000
Igneous rock do. Limestone do.	56,494 106,626	94,441	86,342	87,752 r/	88,000 18,700
Igneous rock do. Limestone do. Sandstone do.	56,494 106,626 18,974	94,441 19,494	86,342 17,251	87,752 r/ 18,499 r/	18,700
Igneous rock do. Limestone do. Sandstone do. Slate including fill do.	56,494 106,626 18,974 308	94,441 19,494 195	86,342 17,251 408 r/	87,752 r/ 18,499 r/ 347 r/	18,700 450
Igneous rock do. Limestone do. Sandstone do. Slate including fill do. Total e/ do.	56,494 106,626 18,974	94,441 19,494	86,342 17,251	87,752 r/ 18,499 r/	18,700
Igneous rock do. Limestone do. Sandstone do. Slate including fill do. Total e/ do. Dimension: e/ do.	56,494 106,626 18,974 <u>308</u> 19,282	94,441 19,494 <u>195</u> 19,689	86,342 17,251 <u>408</u> r/ 17,659	87,752 r/ 18,499 r/ <u>347 r/</u> 18,846	18,700 450 182,650
Igneous rock do. Limestone do. Sandstone do. Slate including fill do. Total e/ do. Dimension: e/ undo. Igneous do.	56,494 106,626 18,974 <u>308</u> 19,282 100	94,441 19,494 195 19,689 100	86,342 17,251 408 r/ 17,659 100	87,752 r/ 18,499 r/ <u>347 r/</u> 18,846 100	18,700 450 182,650 115
Igneous rock do. Limestone do. Sandstone do. Slate including fill do. Total e/ do. Dimension: e/ Igneous Igneous do. Limestone do.	56,494 106,626 18,974 <u>308</u> 19,282 100 200	94,441 19,494 195 19,689 100 200	86,342 17,251 408 r/ 17,659 100 222	87,752 r/ 18,499 r/ 347 r/ 18,846 100 225	18,700 450 182,650 115 225
Igneous rock do. Limestone do. Sandstone do. Slate including fill do. Total e/ do. Dimension: e/ undo. Igneous do.	56,494 106,626 18,974 <u>308</u> 19,282 100	94,441 19,494 195 19,689 100	86,342 17,251 408 r/ 17,659 100	87,752 r/ 18,499 r/ <u>347 r/</u> 18,846 100	18,700 450 182,650 115

See footnotes at end of table.

TABLE 1--Continued UNITED KINGDOM: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity	1994	1995	1996	1997	1998 e/
INDUSTRIAL MINERALSContinued					
Sulfur, byproduct: e/					
Of metallurgy	70,500	62,300	44,700	39,200 r/	40,000
Of petroleum refining	162,000	140,000	132,000	137,000 r/	140,000
Total	232,500	202,300	176,700	176,200 r/	180,000
Talc, soapstone, pyrophyllite	5,275	4,298	5,322	5,500 e/	5,000
Titania e/ 10/	85,000	85,000	233	200 e/	200
MINERAL FUELS AND RELATED MATERIALS					
Coal:					
Anthracite thousand tons	1,000	1,000	1,000	1,000 e/	1,000
Bituminous including slurries, fines, etc. do.	47,971	52,630	50,515	46,981	40,272
Lignite do.	2	2	2	1 r/	1
Total do.	48,973	53,632	51,517	47,983	41,273 2/
Coke:					
Metallurgical	6,164	6,187	6,220	6,178	6,180
Breeze, all types	38	41	40	44 e/	35
Fuel briquets, all grades e/	1,034	841	796	814	700
Gas, natural:					
Marketable 11/ million cubic meters	69,700	75,461	89,900	91,800 e/	92,000
Marketed 12/ do.	57,200	62,300 e/	65,000	66,000 e/	68,000
Natural gas liquids 13/ thousand 42-gallon barrels	53,200	56,700 r/	54,705 r/	55,391 r/	58,877 2/
Peat cubic meters	1,982	2,280	1,885	1,619	1,500
Petroleum:					
Crude 14/ thousand 42-gallon barrels	892,740	914,250	914,475	902,408 r/	931,665 2/
Refinery products:					
Liquefied petroleum gases do.	20,138	22,597	22,875	24,232	22,000
Naphtha including white spirit do.	23,900	24,259	25,160	24,259 r/	19,848 2/
Gasoline do.	234,277	231,660	238,390	249,210	240,210 2/
Jet fuel do.	61,600	62,696	66,440	66,763	63,536 2/
Kerosene do.	22,994	22,661	27,203	25,854	26,900 2/
Distillate fuel oil do.	202,442	202,681	215,616	214,684	207,828 2/
Residual fuel oil do.	75,777	73,053	76,450	87,633	74,000
Lubricants do.	9,072	8,827	7,777	8,617	7,938 2/
Bitumen do.	15,568	14,902	13,265	13,683	13,271 2/
Petroleum coke do.	3,735	4,174	5,619	5,600	5,500
Petroleum wax do.	503	362	323	325	350
Unspecified e/ do.	4,361	30,177	30,590	30,275	30,000
Refinery fuel and losses do.	42,000	42,000	40,000	35,000	40,000
Total e/ do.	716,367	740,049	769,708	786,135 r/	791,381
e/Estimated r/Revised		,	,	, ,	- ,

e/ Estimated. r/ Revised.

1/Table includes data available through July 1999.

2/ Reported figure.

3/ Includes a small quantity of primary lead from domestic concentrate.

4/ Produced entirely from imported bullion and includes the lead content of alloys.

5/ Refined nickel and nickel content of ferronickel.

6/ Includes witherite.

7/ Salable product.

8/ Sales, dry weight.

9/ Proportions of grades not available; probably about two-thirds acid grade.

10/ Sales. 11/ Methane, excluding gas flared or reinjected.

12/ Marketable methane, excluding that used for drilling, production, and pumping operations.

13/ Includes ethane, propane, butane, and condensates.

14/ Excludes gases and condensates.

TABLE 2

UNITED KINGDOM: VALUE OF SELECTED MINERAL COMMODITIES e/

(Million dollars 1/)

Mineral	1993	1994	1995	1996	1997
Ball clay	56	64	69	68	69
Chalk	61	71	72	74	83
China clay (kaolin)	370	367	384	382	440
Fluorspar	14	11	10	13	13
Fuller's earth	24	19	19	23	19
Gypsum and anhydrite	29	29	32	35	25
Limestone and dolomite	826	960	995	964	984
Potash	114	134	135	155	135
Salt	82	100	303	309	364
Silica sand	58	64	93	95	91

e/ Estimate.

1/ Value has been converted from pound sterling (£) to U.S. dollars (\$) at the rate of £1.00 =US\$1.57, the average rate during 1998.

Source: British Geological Survey, United Kingdom Minerals Yearbook 1998.

TABLE 3 UNITED KINGDOM: STRUCTURE OF THE MINERAL INDUSTRY IN 1998

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aggregate	ARC Ltd. (Hanson Plc., 100%) Foster Yoeman Ltd.	50 quarries in various locations	50,000
Aggregate	ARC Etd. (Hanson Fic., 100%) Foster Toeman Etd.	Glensanda quarry at Oban	15,000
Aluminum, primary	British Alcan Aluminium Ltd.	Fort William, Kinlochleven, and Lynemouth	15,000
Do.	Anglesy Aluminium Ltd. (Rio Tinto Corp. 51%; Kaiser	For Winnani, Kinioenieven, and Eynemouti	175
	Aluminum and Chemical Corp., 49%)	Holyhead, Wales	113
Aluminum, secondary	Trent Alloys Ltd. (Cookson Group, 100%)	North Cave, Humberside	30
Do.	Deeside Aluminium Ltd.	Clwyd, Wales	45
Ball clay	Watts, Blake, Bearne & Co. Plc.	Various operations in northern and southern Devon	500
Celestite	Bristol Minerals Co. Ltd.	Yate, Avon	30
Cement	Aberthaw and Bristol Channel Portland Cement Co. Ltd.	East Aberthaw and Rhoose, Glamorgan	1,000
Do.	Blue Circle Industries Plc.	Plants at Aberthaw, Cauldon, Dunbar, Hope,	7,300
		Masons, Northfleet, Plymstock, and Weardale	
Do.	Castle Cement Ltd. (Scancem, 100%)	Plants at Ketton, Ribblesdale, Pades,	3,400
		and Pitstone	
Do.	Rugby Group	Plants at Barrington, Chinnor, Rochester, Rugby,	2,700
		Rochester, and South Ferriby	
China clay (kaolin)	ECC Group Plc.	Mines and plants in Devonshire and Dorsetshire	3,000
Coal	RJB Mining Plc.	19 mines in various locations	40 1/
Copper	IMI Refiners Ltd.	Refinery at Walsall, West Midlands	80
Ferroalloys	British Steel Plc.	Teesside, Cleveland	80
Do.	Murex Ltd.	Rainham, Essex	25
Do.	London and Scandinavian Metallurgical Co. Ltd.	Rotherham, South Yorkshire	30
Fluorspar	Durham Industrial Minerals Ltd.	Mines in Weardale	50
Do.	Laporte Industries Plc.	Mill at Stoney Middleton, Mines in Derbyshire	70
Gypsum	British Gypsum Ltd.	Mines in Cumbria, Nottinghamshire, and Sussex	3,500
Lead, refined	Britania Refined Metals Ltd.	Northfleet, Kent	165
Lead, secondary	H.J. Enthoven and Son Ltd. (Billiton (U.K.) Ltd., 100%)	Darley Dale, Derbyshire	60
Lead, smelter	MIM Holdings (U.K) Ltd.	Avonmouth, Avon	55
Natural gas	Amoco Ltd. British Petroleum Ltd. Esso (U.K.) Ltd.,	North Sea gasfields	1,250 2/
-	Phillips Petroleum Co. Plc., Shell (U.K.) Ltd.		
Nickel, refined	INCO Europe Ltd. (INCO Ltd., Canada)	Clydach, Wales	30
Petroleum, crude	Amoco Ltd., British Petroleum Ltd., Chevron Ltd.,	North Sea oilfields	2.1 3/
	Esso (U.K.) Ltd., Occidental Petroleum Co. Ltd.,		
	Shell (U.K.) Ltd., Texaco, Unocal, Inc.		
Petroleum, refined	British Petroleum Ltd., Conoco Ltd., Mobil Oil Co. Ltd.,	11 refineries in various locations	2.3 3/
	and others		
Platinum-group metals	Johnson Matthey Plc.	Enfield (London) and Royston, Cambridgeshire	20
Potash	Cleveland Potash Ltd.	Boulby Mine, Yorkshire	500
Salt, rock	Imperial Chemical Industries Plc.	Mines at Winsford, Cheshire	3,000
Do.	Irish Salt Mining and Exploration Co.	Carrick Fergus, Northern Ireland	300
Sand and gravel	TMC Pioneer Aggregates Ltd.	Chelmsford, Essex	1,000,000
Silica, sand	Hepworth Minerals and Chemicals Ltd.	Operations in Cambridgeshire, Cheshire,	6,000
<u></u>		Humberside, and Norfolk	
Slate, natural	Alfred McAlpine Slate Ltd.	Penrhyn quarry, Bethesda, North Wales	25
Steel	British Steel Plc.	4 intergrated steelworks in Gwent, Lanark, South	18,000
Talc	Alay Sandison and San I td	Humberside, and Cleveland	15
Do.	Alex Sandison and Son Ltd. Shetland Talc Ltd. (Anglo European Minerals Ltd., 50%;	Unst, Shetland Islands Cunningsburg, Shetland Islands	<u>15</u> 35
D0.	Dalriada Mineral Ventures Ltd. 50%)	Cummigsoulg, Sheuanu Islanus	33
Tin, ore	Crew Group of Canada	South Crofty Mine, Cornwall (Closed March 1998)	1.800
Titanium, sponge	Deeside Titanium Ltd.	Plant at Deeside, Clyde	5
Zinc, smelter	MIM Holdings (U.K.) Ltd.	Avonmouth, Avon	120
	mini notanigo (0.ix.) Eta.		120

 Zinc, smeler
 Millin

 1/ Million metric tons.
 2/ Billion cubic feet per year.

 3/ Million 42-gallon barrels per day.