

# THE MINERAL INDUSTRY OF NORWAY

By Chin S. Kuo

Norway has abundant energy resources with rich offshore hydrocarbon deposits. The growth of its oil and gas sector significantly contributed to the country's economy. Together with mining and quarrying, the sectors accounted for 12.3% of the gross domestic product (GDP). In 2003, the GDP grew by only 0.6% compared with 1% in 2002. Per capita GDP based on purchasing power parity, however, was the second highest in Europe with \$47,316 (International Monetary Fund, 2003§<sup>1</sup>).

As a major international oil producer, Norway had an output capacity of 3 million barrels per day (Mbbbl/d). Gas and liquefied natural gas production was also substantial. All the gas and most of the oil produced were exported. Oil and gas exports accounted for 56% of total exports. Hydropower provided nearly all the country's electricity (U.S. Department of State, 2004§).

The reorganization of the Petroleum Directorate under the Ministry of Petroleum and Energy has been proposed by the Government. Its safety and environment section will become the Petroleum Inspectorate and will report to the Ministry of Labor and Government Administration effective January 1, 2004. The resource section of the Petroleum Directorate will continue its work as a directorate reporting to the Ministry of Petroleum and Energy (Rigzone.com, 2003b§).

The Petroleum Directorate reported that Norway's identified resources of oil and gas off its western coast decreased by 7% compared with those of 2002. The country's oil reserves were about 5 billion cubic meters, and its gas reserves, 6.5 billion cubic meters. Norway was the world's third leading oil exporter after Saudi Arabia and Russia. It exported one-half of its oil output and one-fourth of its recoverable gas produced in the North Sea (Alexander's Gas & Oil Connections, 2003d§).

## Commodity Review

### Metals

Hydro Aluminium ANS had a 540,000-metric-ton-per-year (t/yr) aluminum smelting capacity in Norway. In 2003, it planned to phase out 190,000 t/yr of its capacity that used outdated Soederberg technology. About 600 workers out of a total of 3,050 would be affected. By yearend 2006, 50,000 t/yr of capacity at the Ardal smelter and 20,000 t/yr of capacity at the Hoyanger smelter would be shut down. At the Karmoy smelter, 120,000 t/yr of capacity was to be closed down by the end of 2009 (Mining Journal, 2003a).

Construction of 14 new furnace groups was complete, but only 10 were in operation at Elkem Aluminium ANS's Mosjoen aluminum smelter owing to higher hydropower costs. The final four furnace groups should begin production in April of 2003. The plant's primary aluminum capacity had increased to

165,000 t/yr from 122,000 t/yr since the completion of construction work. Elkem A/S owned 50% of Elkem Aluminium, and Alcoa Inc. of the United States, the other 50% (Metal Bulletin, 2003).

Store Norske Spitsbergen Kulkompani A/S, which was a State-owned sole coal mining company, identified a gold prospect on Svalbard Island and planned to begin drilling in 2004. Preliminary tests showed an 11-kilometer (km)-long gold-bearing zone that had varying amounts of gold. The area is located 20 km north of Ny Aalesund on Svalbard (Reuters, 2003§).

Blackstone Ventures Inc. of Canada was involved in nickel exploration in Norway. The company would be able to earn a 60% interest in each of the Vakkerlien and Espedalen projects by spending \$1.75 million during 4 years. Vakkerlien's delineated resource was estimated to be 400,000 metric tons at 1% nickel and 0.4% copper. Espedalen contained a differentiated mafic intrusion with disseminated and massive sulfide mineralization with copper and nickel (Mining Journal, 2003b).

Companhia Vale do Rio Doce (CVRD) of Brazil signed a contract to acquire 100% of the capital of Elkem Rana A/S (a wholly owned subsidiary of Elkem) for \$17.6 million. Elkem Rana's plant at Mo i Rana produced ferrochrome until June 2002. The plant, which had two furnaces and a sinter unit, would be converted to produce manganese alloys in July 2003 with an investment of \$10 million. The plant's production capacity was 110,000 t/yr of ferroalloys, which included ferrosilicon manganese and ferromanganese high-carbon alloys. The deal facilitated CVRD's plan to expand its ferroalloys business in continental Europe and strengthened its position in the world ferroalloys market (Companhia Vale do Rio Doce, 2003).

In the absence of a significant improvement in market conditions of silicon metal, however, Elkem restarted two of its silicon metal furnaces in the first quarter to offset reduced output from its U.S. operation. While fully operating its Rana Metal ferrosilicon plant, FESIL ASA continued to restrict silicon metal production. Both furnaces at FESIL's Lilleby Metal plant were out of operation, and three of the four furnaces at its Hola Metal plant were shut down in 2003 (Metal Bulletin Research, 2003).

Outokumpu Oyj of Finland will replace the old roasting production process by direct leaching at its Odda zinc plant in Norway. The \$95 million project was expected to be completed in fall 2004. The direct leaching process of wider quality-range zinc concentrates would improve the efficiency of production. The modernization would increase the concentrate feed capacity by 10%. The Odda plant produced 150,000 t/yr of zinc metal (Outokumpu Oyj, 2003).

### Industrial Minerals

Norcem A/S awarded KHD Humboldt Wedag AG of Germany the contract to provide engineering and equipment for the

<sup>1</sup>References that include a section mark (§) are found in the Internet References Cited section.

modification of cement kiln line No. VI in its Brevik plant. This will enable the use of a wider range of alternative fuels combined with increased energy efficiency and reduced carbon dioxide emissions. The modification was to be finished by mid-2004 (Cement News, 2003).

Skaland Grafitverk AS, which was a flake graphite operation on the island of Senja in northern Norway, stopped production in January while the operation worked off its stockpiles. Skaland was a joint venture among James Durrans Ltd. (45%) of the United Kingdom, Georg H. Luh GmbH (45%) of Germany, and Berg Industri Selskap AS (10%). Skaland produced 8,500 t/yr of processed graphite with a carbon content of from 85% to 98%. A new deposit of graphite-bearing ore was identified and could extend the mine life by another 50 years. The deposit contained a high percentage of large flake graphite and a carbon content of 28% (Industrial Minerals, 2003).

### **Mineral Fuels**

The Ministry of Petroleum and Energy offered major oil companies new exploration licenses in the North Sea. Norsk Hydro Produksjon A/S, Exxon Mobil Corp. of the United States, and DONG A/S of Denmark were offered two operatorships each, while Statoil ASA, Agip, DNO ASA, Pertra AS, and RWE Dea AG were granted one operatorship each in the 2003 North Sea licensing round. In this round, 14 companies nominated 43 blocks as interesting by 2 or more companies (Alexander's Gas & Oil Connections, 2003b§).

Statoil sold interests that it held in two production licenses to Paladin Resources Norge AS. Its holdings of 30% and 25% in production licenses 143 and 239, respectively, were at the southern end of the Norwegian continental shelf on the boundary with the United Kingdom's North Sea sector. Statoil's strategy was to concentrate its efforts on other defined core areas (Dow Jones Business News, 2003§). Meanwhile, Statoil was to purchase two production licenses for the North Sea from ExxonMobil that were 50% of production license 29B, which is located north of the Sleipner West Field, and 15% of production license 241, which is located south of Sleipner West.

DONG acquired Amerada Hess Corp.'s 20% interest in the Norwegian production licenses 122 and 122B, which also included Statoil (50%), Agip (20%), and ExxonMobil (10%). The Marulk gas discovery was made in the licenses, but there were no plans to develop it. The acquisition of the interest was to secure access to the resources in the longer term (Rigzone.com, 2003a§).

Ruhrgas AG (a subsidiary of E.ON of Germany) acquired a 15% interest in Njord Field in the North Sea from ConocoPhillips Company. Njord Field contained reserves that could total as much as 10 billion cubic meters of gas and 51 million barrels (Mbbbl) of oil. Oil production began in 1997, and gas extraction would begin in 2 to 3 years. Other shareholders in the field were Norsk Hydro, Gaz de France, and ExxonMobil each with 20% and Paladin, Petoro AS, and OER Oil AS with smaller stakes (Rigzone.com, 2003c§).

ConocoPhillips and its partners' plan for their Ekofisk Field was that an additional 190 Mbbbl of oil equivalent would be recovered, and production would increase by 70,000 barrels

per day (bbl/d) at peak and start in the third quarter of 2005. Investment of \$1.16 billion would include a new production platform and 25 new wells (Petroleum Economist, 2003b).

Fortum Corp. of Finland closed the sale of its Fortum Petroleum AS and its Norwegian exploration and production business to ENI International BV. The transaction completed the divestment of Fortum's noncore exploration and production holdings (Hugin Online, 2003§).

Statoil's oil and gas production would be 1.06 Mbbbl/d of oil equivalent in 2003 compared with 1.07 Mbbbl/d in 2002. The decrease would result from a lag between the slowing down in production at its mature fields and the increase in output at its new fields. Its 2004 goal would be 1 Mbbbl/d from the Norwegian continental shelf and 120,000 bbl/d from its international operations (Alexander's Gas & Oil Connections, 2003e§). Statoil's production from the Alpha North Gasfield would start in October 2004. The estimated reserves were 1.21 billion cubic meters of gas and 32 Mbbbl of condensate. The company was the operator with a 49.5% interest.

Statoil began oil production from its Vigdis Field extension in the North Sea. The extension could recover 50 Mbbbl of oil from the field. Startup production by one well was expected to be 12,000 bbl/d, and peak output from three wells, 57,000 bbl/d. Six wells would eventually be drilled, developed, and produced. Statoil became the field operator in 2003 (Oil & Gas Journal, 2003b).

Production of Norsk Hydro's Tune gas/condensate field was 3 billion cubic meters per year from four wells. Reserves were estimated to be 22.9 billion cubic meters of gas and 36.5 Mbbbl of condensate. Cost of the development was \$435 million. Tune interests were Norsk Hydro (40%), Petoro (40%), and Total SA (20%) (Petroleum Economist, 2003a). Norsk Hydro's \$200 million development and operation plan of the Oseberg South was expected in October 2004 with a peak production of 21,000 bbl/d. Recoverable oil reserves were estimated to be 24 Mbbbl.

Norsk Hydro started oil production from its Grane Field at a water depth of 120 meters (m) 185 km west of Haugesund in September. Output would reach the planned level of 210,000 bbl/d in the first half of 2005. It was estimated that 700 Mbbbl of oil could be recovered from Grane. Oil from Grane was transported through a 212-km pipeline to Norsk Hydro's terminal at Stura in Oygarden. The company was the operator with a 38% interest (Alexander's Gas & Oil Connections, 2003a§).

Norway may soon become a leading producer of natural gas as well as a leading oil exporter. In 10 years, the production of natural gas in volume could be greater than that of crude oil. Gas production was currently (2003) 25% of Statoil's total production on the Norwegian shelf. A new gas pipeline from Norway to the United Kingdom would be necessary to handle the additional gas sales to the United Kingdom (Alexander's Gas & Oil Connections, 2003c§).

Norsk Hydro's development of the Ormen Lange Field in the Norwegian Sea was expected to be completed by October 2007. The field is located 140 km west of Kristiansund, Norway, under 1,000 m of water. Ormen Lange could increase Norwegian gas exports by 25%, thus making Norway the world's second

leading gas exporter after Russia. Reserves were estimated to be 375 billion cubic meters of gas and 22 million cubic meters of condensate. Gas production was expected to peak at 20 billion cubic meters per year for a life of 30 to 40 years (Oil & Gas Journal, 2003a).

## Outlook

Norway was expected to increase its oil and gas production despite a decrease in its identified resources of oil and gas in 2003. The production increase was expected to come from the Ekofisk, Fjord, and Grane Fields, and the Vigdis Field extension during the next 2 to 3 years. The country, which was already a leading exporter of oil, was expected to become a leading producer of gas. Exploration for oil and gas was expected to be active after the 2003 North Sea licensing round.

## References Cited

- Cement News, 2003, Norcem AS, Dalen, Norway: Cement News, v. 34, no. 2, February, p. 1.
- Companhia Vale do Rio Doce, 2003, CVRD acquires Norwegian ferroalloy company: Rio de Janeiro, Brazil, Companhia Vale do Rio Doce press release, February 3, p. 1.
- Industrial Minerals, 2003, Skaland clears graphite stocks: Industrial Minerals, no. 426, March, p. 14.
- Metal Bulletin, 2003, Elkem interrupts smelter project amid high power prices: Metal Bulletin, no. 8750, February 20, p. 5.
- Metal Bulletin Research, 2003, Elkem restarts furnaces while FESIL keeps facilities on hold: Metal Bulletin Research, no. 129, May, p. 6.
- Mining Journal, 2003a, Norsk to scale down Norwegian capacity: Mining Journal, v. 340, no. 8724, February 21, p. 128.
- Mining Journal, 2003b, Norwegian nickel intent: Mining Journal, v. 341, no. 8745, July 18, p. 46.
- Oil & Gas Journal, 2003a, Quick takes: Oil & Gas Journal, v. 101, no. 13, March 31, p. 8.
- Oil & Gas Journal, 2003b, Quick takes: Oil & Gas Journal, v. 101, no. 41, October 27, p. 9.
- Outokumpu Oyj, 2003, Outokumpu to modernize the Odda zinc plant: Outokumpu Oyj press release, January 15, p. 1.
- Petroleum Economist, 2003a, News in brief: Petroleum Economist, v. 70, no. 1, January, p. 41.
- Petroleum Economist, 2003b, News in brief: Petroleum Economist, v. 70, no. 7, July, p. 41.

## Internet References Cited

- Alexander's Gas & Oil Connections, 2003a (October 17), Norsk Hydro starts oil production from Grane field, accessed November 4, 2003, at URL <http://www.gasandoil.com/goc/company/cne34237.htm>.

- Alexander's Gas & Oil Connections, 2003b (April 17), Norway grants North Sea exploration licenses to nine firms, accessed May 2, 2003, at URL <http://www.gasandoil.com/goc/company/cne31659.htm>.
- Alexander's Gas & Oil Connections, 2003c (March 6), Norway to soon become leading producer of natural gas, accessed March 7, 2003, at URL <http://www.gasandoil.com/goc/news/nte31037.htm>.
- Alexander's Gas & Oil Connections, 2003d (July 10), Norwegian petroleum reserves fall by 7%, accessed July 11, 2003, at URL <http://www.gasandoil.com/goc/news/nte32849.htm>.
- Alexander's Gas & Oil Connections, 2003e (March 6), Statoil forecasts on 2003 daily output, accessed March 7, 2003, at URL <http://www.gasandoil.com/goc/company/cne31095.htm>.
- Dow Jones Business News, 2003 (January 24), Statoil sells interests in two licenses to Paladin, accessed January 28, 2003, at URL [http://biz.yahoo.com/djus/030124/0732000211\\_1.html](http://biz.yahoo.com/djus/030124/0732000211_1.html).
- Hugin Online, 2003 (March 3), Fortum concluded the sale of its Norwegian E&P assets to ENI, accessed March 3, 2003, at URL <http://huginonline.com/Finland/FUM>.
- International Monetary Fund, 2003 (September), Norway, World Economic Outlook Database, accessed August 17, 2004, via URL <http://www.imf.org/external/pubs/ft/weo/2003/02/data/dbcselem.cfm?G=0>.
- Reuters, 2003 (October 9), Arctic coal miner to drill for Svalbard gold, accessed October 10, 2003, at URL [http://biz.yahoo.com/rm/031009/minerals\\_gold\\_svalbar](http://biz.yahoo.com/rm/031009/minerals_gold_svalbar).
- Rigzone.com, 2003a (June 3), DONG acquires Hess' stake in two Norwegian licenses, accessed June 12, 2003, at URL [http://www.rigzone.com/news/article.asp?a\\_id=6869](http://www.rigzone.com/news/article.asp?a_id=6869).
- Rigzone.com, 2003b (June 10), Norwegian Petroleum Directorate to be split, accessed June 12, 2003, at URL [http://www.rigzone.com/news/article.asp?a\\_id=6946](http://www.rigzone.com/news/article.asp?a_id=6946).
- Rigzone.com, 2003c (June 3), Ruhrgas acquires interest in Norwegian gasfield, accessed June 12, 2003, at URL [http://www.rigzone.com/news/article.asp?a\\_id=6867](http://www.rigzone.com/news/article.asp?a_id=6867).
- U.S. Department of State, 2004 (July), Norway, Country Background Note, accessed August 31, 2004, at URL <http://www.state.gov/r/pa/ei/bgn/3421.htm>.

## Major Sources of Information

Norwegian Geological Survey  
P.O. Box 3006 Lade  
7002 Trondheim, Norway  
Ministry of Petroleum and Energy  
P.O. Box 8148 Dep  
0033 Oslo, Norway

TABLE 1  
NORWAY: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

| Commodity                                     | 1999                | 2000                 | 2001                 | 2002                 | 2003               |                    |
|---|---------------------|----------------------|----------------------|----------------------|--------------------|--------------------|
| METALS  |                     |                      |                      |                      |                    |                    |
| Aluminum:                                     |                     |                      |                      |                      |                    |                    |
| Primary                                       | 1,020,215           | 1,025,676            | 1,067,000            | 1,095,500            | 1,192,400          |                    |
| Secondary                                     | 178,313             | 254,600 <sup>r</sup> | 223,900 <sup>r</sup> | 271,000 <sup>r</sup> | 256,800            |                    |
| Cadmium, smelter                              | 211                 | 298                  | 372 <sup>r</sup>     | 209                  | 331                |                    |
| Cobalt:                                       |                     |                      |                      |                      |                    |                    |
| Mine output, Co content <sup>e</sup>          | 100                 | 100                  | 100                  | 100                  | 100                |                    |
| Metal, refined                                | 4,009               | 3,433                | 3,314 <sup>r</sup>   | 3,994                | 4,556              |                    |
| Copper, metal, refined, primary and secondary | 33,262              | 27,000 <sup>e</sup>  | 26,700               | 30,500               | 35,900             |                    |
| Iron and steel:                               |                     |                      |                      |                      |                    |                    |
| Iron ore and concentrate, Fe content          | thousand tons       | 355                  | 369                  | 340 <sup>e</sup>     | 350 <sup>e</sup>   | 350 <sup>e</sup>   |
| Metal:  |                     |                      |                      |                      |                    |                    |
| Pig iron <sup>e</sup>                         | do.                 | 60                   | 60                   | 60                   | 80 <sup>r</sup>    | 90                 |
| Ferroalloys: <sup>e</sup>                     |                     |                      |                      |                      |                    |                    |
| Ferrosilicon                                  | do.                 | 160                  | 154 <sup>2</sup>     | 83 <sup>2</sup>      | 61 <sup>2</sup>    | 60                 |
| Ferromanganese                                | do.                 | 235                  | 235                  | 240                  | 240                | 245                |
| Ferrosilicomanganese                          | do.                 | 230                  | 230                  | 230                  | 230                | 230                |
| Ferrosilicon, 75% basis                       | do.                 | 460                  | 460                  | 450                  | 390 <sup>r</sup>   | 350                |
| Silicon metal                                 | do.                 | 100                  | 100                  | 100                  | 105                | 100                |
| Other   | do.                 | 15                   | 15                   | 15                   | 15                 | 15                 |
| Total   | do.                 | 1,200                | 1,190                | 1,120                | 1,040 <sup>r</sup> | 1,000              |
| Steel, crude                                  | do.                 | 611                  | 620                  | 635                  | 694                | 698                |
| Semimanufactures, rolled                      | do.                 | 458                  | 573                  | 623                  | 630 <sup>e</sup>   | 635 <sup>e</sup>   |
| Magnesium, primary                            | 40,800              | 41,400               | 36,000 <sup>e</sup>  | 10,000 <sup>e</sup>  | --                 |                    |
| Nickel:                                       |                     |                      |                      |                      |                    |                    |
| Mine output:                                  |                     |                      |                      |                      |                    |                    |
| Concentrate <sup>e</sup>                      | 21,000              | 18,000               | 18,000               | 12,000               | --                 |                    |
| Ni content                                    | 2,965               | 2,538                | 2,529                | 1,700                | --                 |                    |
| Metal, primary                                | 74,137              | 58,679               | 68,220               | 68,500               | 77,200             |                    |
| Platinum-group metals <sup>e,3</sup>          | kilograms           | 1,000                | 1,000                | 1,000                | 1,000              | 1,000              |
| Titanium: <sup>e</sup>                        |                     |                      |                      |                      |                    |                    |
| Ilmenite concentrate                          | thousand tons       | 580 <sup>2</sup>     | 750                  | 750                  | 750                | 800                |
| TiO <sub>2</sub> content                      | do.                 | 257 <sup>2</sup>     | 340                  | 340                  | 340                | 345                |
| Zinc, metal, primary                          | 132,600             | 125,800              | 129,300              | 137,300              | 135,500            |                    |
| INDUSTRIAL MINERALS                           |                     |                      |                      |                      |                    |                    |
| Cement, hydraulic                             | thousand tons       | 1,827                | 1,851                | 1,870 <sup>e</sup>   | 1,850 <sup>e</sup> | 1,860 <sup>e</sup> |
| Feldspar <sup>e</sup>                         | 72,777 <sup>2</sup> | 75,000               | 73,000               | 75,000               | 74,000             |                    |
| Graphite <sup>e</sup>                         | 2,500               | 2,500                | 2,500                | 2,400                | 2,400              |                    |
| Lime, hydrated, quicklime <sup>e</sup>        | thousand tons       | 100                  | 100                  | 100                  | 100                | 100                |
| Mica, flake <sup>e</sup>                      | 2,500               | 2,500                | 2,500                | 2,600                | 2,600              |                    |
| Nepheline, syenite <sup>e</sup>               | thousand tons       | 305 <sup>2</sup>     | 300                  | 310                  | 310                | 300                |
| Nitrogen, N content of ammonia                | do.                 | 122                  | 334                  | 323                  | 330                | 354                |
| Olivine sand <sup>e</sup>                     | do.                 | 3,162 <sup>2</sup>   | 3,200                | 3,300                | 3,200              | 3,100              |
| Stone, crushed: <sup>e</sup>                  |                     |                      |                      |                      |                    |                    |
| Dolomite                                      | 893 <sup>2</sup>    | 900                  | 900                  | 900                  | 850                |                    |
| Limestone                                     | 6,915 <sup>2</sup>  | 7,000                | 7,500                | 7,400                | 7,200              |                    |
| Quartz and quartzite                          | 1,314 <sup>2</sup>  | 1,300                | 1,500                | 1,400                | 1,500              |                    |
| Sulfur, byproduct:                            |                     |                      |                      |                      |                    |                    |
| Metallurgical                                 | 97                  | 92                   | 105                  | 102                  | 100                |                    |
| Petroleum <sup>e</sup>                        | 12                  | 18                   | 18                   | 18                   | 18                 |                    |
| Total <sup>e</sup>                            | 109                 | 110                  | 123                  | 120                  | 118                |                    |
| Talc, soapstone, steatite <sup>e</sup>        | 26                  | 27                   | 27                   | 28                   | 28                 |                    |

See footnotes at end of table.

TABLE 1--Continued  
 NORWAY: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

| Commodity                               | 1999                       | 2000             | 2001      | 2002      | 2003      |           |
|---|----------------------------|------------------|-----------|-----------|-----------|-----------|
| MINERAL FUELS AND RELATED MATERIALS     |                            |                  |           |           |           |           |
| Coal, all grades <sup>c</sup>           | thousand tons              | 328 <sup>2</sup> | 330       | 320       | 310       | 300       |
| Gas, natural, marketed <sup>c,4</sup>   | million cubic meters       | 43,000           | 42,000    | 41,000    | 40,000    | 40,000    |
| Peat, for agricultural use <sup>c</sup> | do.                        | 30               | 30        | 30        | 30        | 30        |
| Petroleum <sup>c</sup>                  |                            |                  |           |           |           |           |
| Crude <sup>5</sup>                      | thousand 42-gallon barrels | 1,100,000        | 1,000,000 | 1,000,000 | 1,050,000 | 1,100,000 |
| Natural gas liquids                     | do.                        | 42,000           | 41,000    | 41,000    | 41,000    | 42,000    |
| Refinery products:                      |                            |                  |           |           |           |           |
| Naphtha                                 | do.                        | 26,000           | 26,000    | 27,000    | 27,000    | 27,000    |
| Gasoline                                | do.                        | 25,000           | 26,000    | 26,000    | 26,000    | 27,000    |
| Kerosene                                | do.                        | 9,000            | 9,000     | 9,000     | 9,000     | 9,000     |
| Distillate fuel oil                     | do.                        | 45,000           | 46,000    | 46,000    | 46,000    | 47,000    |
| Residual fuel oil                       | do.                        | 12,000           | 12,000    | 12,000    | 12,000    | 12,000    |
| Other products                          | do.                        | 4,000            | 4,000     | 4,500     | 5,000     | 5,000     |
| Refinery fuel and losses                | do.                        | 4,000            | 4,000     | 4,000     | 5,000     | 5,000     |
| Total                                   | do.                        | 125,000          | 127,000   | 129,000   | 130,000   | 132,000   |

<sup>c</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. <sup>1</sup>Revised. -- Zero.

<sup>1</sup>Table includes data available through August 26, 2004.

<sup>2</sup>Reported figure.

<sup>3</sup>Data represent exports.

<sup>4</sup>Reported as total methane sales.

<sup>5</sup>Excluding natural gas liquids.

TABLE 2  
NORWAY: STRUCTURE OF THE MINERAL INDUSTRY IN 2003

(Thousand metric tons unless otherwise specified)

| Commodity         | Major operating companies and major equity owners                            | Location of main facilities                          | Annual capacity                                    |        |
|-------------------|--|--|--|--------|
| Aluminum          | Hydro Aluminium ANS (Norsk Hydro A/S, 70%)                                   | Smelters at Ardal, Hoyanger, Karmoy, and Sunndalsora | 600  |        |
| Do.               | do.  | Plant at Holmestrand                                 | 90   |        |
| Do.               | Elkem Aluminium ANS (Elkem A/S, 50%, and Alcoa Inc., 50%)                    | Smelters at Farsund and Mosjoen                      | 250  |        |
| Do.               | Sor-Norge Aluminium A/S (Alusuisse Group, 50%, and Hydro Aluminium ANS, 49%) | Smelter at Odda                                      | 50   |        |
| Cadmium           | Norzink A/S (Outokumpu Oyj, 100%)  | Smelter at Eitrheimsneset                            | 0.3  |        |
| Cement            | Norcem A/S   | Plants at Brevik and Kjopsvik                        | 2,150  |        |
| Coal              | Store Norske Spitsbergen Kulkompani A/S                                      | Mines at Longyearbyen and Svea                       | 450  |        |
| Cobalt            | Nikkelverk A/S (Falconbridge Nickel Mines Ltd., 100%)                        | Smelter at Kristiansand                              | 3  |        |
| Copper:           |  |  |  |        |
| Ore, Cu content   | Nikkel og Olivin A/S (Outokumpu Oyj, 100%)                                   | Mine at Narvik                                       | 1  |        |
| Metal             | Nikkelverk A/S (Falconbridge Nickel Ltd., 100%)                              | Smelter at Kristiansand                              | 40   |        |
| Dolomite          | Franzefoss Bruk A/S  | Mine at Ballagen                                     | 350  |        |
| Do.               | Norwegian Holding A/S  | Mines at Hammerfall, Logavlen, and Kvitblikk         | 500  |        |
| Feldspar          | Franzefoss Bruk A/S  | Mine at Lillesand                                    | 100  |        |
| Ferroalloys       | Elkem Salten (Elkem A/S, 100%)   | Ferrosilicon plant at Straumen                       | 90   |        |
| Do.               | Elkem Bjolvefossen (Elkem A/S, 100%)   | Ferrosilicon plant at Alvik                          | 60   |        |
| Do.               | Elkem Thamshavn (Elkem A/S, 100%)  | Ferrosilicon plant at Orkanger                       | 60   |        |
| Do.               | Finnfjord Smelteverk A/S, Rana Metal (FESIL ASA, 100%)                       | Ferrosilicon plant at Mo i Rana                      | 110  |        |
| Do.               | A/S Hafslung Metal (FESIL ASA, 100%)   | Ferrosilicon plant at Sarpsborg                      | 75   |        |
| Do.               | Ila og Lilleby Smelteverk (FESIL ASA, 100%)                                  | Ferrosilicon plant at Finnsnes                       | 60   |        |
| Do.               | Oye Smelteverk (Tinfos Jernverk A/S, 100%)                                   | Silicomanganese plant at Kvinesdal                   | 235  |        |
| Iron:             |  |  |  |        |
| Metal             | Ulstein Jernstoperi A/S  | Hordvikneset   | 10   |        |
| Ore               | Rana Gruber A/S (Norsk Jernverk Holding A/S, 100%)                           | Mine at Mo i Rana                                    | 2,000  |        |
| Do.               | Artic Bulk Minerals A/S  | Mine and plant at Kirkenes                           | 1,500  |        |
| Lime              | Hylla Kalkverk (Nikolai Bruch A/S, 100%)                                     | Verdal/Trondheim Mine and plant                      | 80   |        |
| Do.               | A/S Norsk Jernverk   | Plant at Mo i Rana                                   | 48   |        |
| Do.               | Ardal og Sunndal Verk A/S  | More og Romsdal Mine at Surnadal                     | 20   |        |
| Do.               | Brevik Kalkverk A/S  | Alesund Mine at Larsnes                              | 20   |        |
| Do.               | Mjoendalen Kalkfabrik  | Plant at Asen/Drammen                                | 7  |        |
| Limestone         | Norcem A/S   | Dalen, Bjortvedt, and Kjopsvik Mines                 | 1,600  |        |
| Do.               | Vardelskalk A/S (Franzefoss Burk A/S, 100%)                                  | Sandvika Mine  | 800  |        |
| Do.               | Brevik Kalkverk A/S  | Visnes and Glaerum Mines                             | 500  |        |
| Magnesium         | Norsk Hydro A/S (Government, 51%)  | Plants at Porsgrunn and Sauda                        | 50   |        |
| Manganese, alloys | Eramet SA  | do.  | 500  |        |
| Natural gas       | million cubic meters   | Den Norske Stats Oljeselskap A/S                     | Gama, Gullfaks, Sleipner Ost, and Statfjord Fields | 12,270 |
| Do.               | do.  | Phillips Petroleum Company Norway                    | Ekofisk Field                                      | 9,900  |
| Do.               | do.  | Elf Petroleum Norge A/S                              | Frigg, Heimdal, and Ost-Frigg Fields               | 5,750  |
| Do.               | do.  | Norsk Hydro Produksjon A/S                           | Troll-Oseberg Field                                | 2,600  |
| Do.               | do.  | BP Petroleum Development of Norway                   | Gyda and Ula Fields                                | 1,040  |
| Do.               | do.  | Esso Norge A/S                                       | Odin Field   | 1,000  |
| Do.               | do.  | Amoco Norway A/S                                     | Hod and Valhall Fields                             | 910    |
| Nepheline syenite | North Cape Mineral A/S (Unimin Corp., 84%)                                   | Mine at Stjernoy                                     | 350  |        |
| Nickel:           |  |  |  |        |
| Ore, Ni content   | Nikkel og Olivin A/S (Outokumpu Oyj, 100%)                                   | Mine at Narvik                                       | 3  |        |
| Do.               | Titania A/S (Kronos Norge A/S, 100%)   | Mine at Tellnes                                      | 0.5  |        |
| Metal             | Nikkelverk A/S (Falconbridge Nickel Mines Ltd., 100%)                        | Smelter at Kristiansand                              | 85   |        |
| Olivine           | A/S Olivin   | Aheim Mine and plant                                 | 2,500  |        |
| Do.               | do.  | Stranda Mine and plant                               | 300  |        |
| Do.               | Franzefoss Bruk A/S  | Lefdal Mine at Bryggja                               | 500  |        |

TABLE 2--Continued  
 NORWAY: STRUCTURE OF THE MINERAL INDUSTRY IN 2003

(Thousand metric tons unless otherwise specified)

| Commodity             |                           | Major operating companies and major equity owners      | Location of main facilities                                   | Annual capacity |
|-----------------------|---------------------------|--|---|-----------------|
| Petroleum             | 42-gallon barrels per day | Den Norske Stats Oljeselskap A/S                       | Gullfaks, Statfjord, Tommeliten, and Veslefrikk Fields        | 1,069,300       |
| Do.                   | do.                       | Norsk Hydro Produksjon A/S                             | Brage, Mime, and Oseberg Fields                               | 566,200         |
| Do.                   | do.                       | Phillips Petroleum Company Norway                      | Ekofisk Field   | 237,500         |
| Do.                   | do.                       | Saga Petroleum A/S                                     | Snorre Field  | 170,000         |
| Do.                   | do.                       | BP Petroleum Development of Norway                     | Gyda and Ula Fields   | 155,000         |
| Do.                   | do.                       | A/S Norske Shell                                       | Draugen Field   | 90,000          |
| Do.                   | do.                       | ExxonMobil Refining & Supply Co.                       | Slagen Refinery   | 110,000         |
| Do.                   | do.                       | Statoil Mongstad                                       | Mongstad Refinery   | 200,000         |
| Pyrite                |                           | Folldal Verk A/S (Norsulfid A/S, 100%)                 | Mine at Hjerkin   | 10              |
| Quartzite             |                           | Elkem Tana (Elkem A/S, 100%)                           | Mine at Tana  | 540             |
| Do.                   |                           | Elkem Marnes (Elkem A/S, 100%)                         | Mine at Sandhornoy  | 200             |
| Do.                   |                           | Vatnet Kvarts A/S                                      | Mine at Nordland  | 150             |
| Do.                   |                           | Snekkevik Kvartsbrudd                                  | Mine at Kragero   | 110             |
| Silicon metal         |                           | Lilleby Metall A/S (FESIL ASA, 100%)                   | Plant at Trondheim  | 9               |
| Steel                 |                           | Fundia AB (Norsk Jenverk, 50%; Rautaruukki Group, 50%) | Plants at Christiania, Mandal Stal, Mo i Rana, and Spigerverk | 600             |
| Talc                  |                           | A/S Norwegian Talc (Pluess-Staufer AG, 51%)            | Mine/plant at Altermark/Knarrevik and Framfjord               | 90              |
| Do.                   |                           | Kvam Minerals A/S                                      | Mine/plant at Kvam  | 6               |
| Titanium, concentrate |                           | Titania A/S (Kronos Norge A/S, 100%)                   | Mine at Tellnes   | 800             |
| Zinc, metal           |                           | Norzik A/S (Outokumpu Oyj, 100%)                       | Smelter at Odda   | 150             |