



2006 Minerals Yearbook

GERMANY

THE MINERAL INDUSTRY OF GERMANY

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In 2006, Germany was a leading global exporter of industrial goods and services (including processed and fabricated mineral products). The country's mineral industry, however, depended almost entirely on imported mineral raw materials. Germany was the leading producer of lignite in the world, but domestic production provided only enough mineral fuel to account for 11% of total primary energy consumption in the country. Germany was dependent on imports of other mineral fuels for almost all the remainder of its primary energy consumption; renewable energy resources, such as wind power, accounted for only about 1% of total energy consumption. In addition to imports of mineral fuels, Germany's metal processing sector relied on imports of metal ores and concentrates because no metals were mined domestically. The country did possess considerable reserves of many industrial minerals, however.

Germany produced greater than 1% of total world production of aluminum, barite, bentonite, bromine compounds, cadmium (secondary), cement, diatomite, feldspar, gallium, gypsum, kaolin, crude iron, lime, magnesium compounds (as byproducts of potash mining), nitrogen (ammonia), potash, industrial quartz, salt, selenium (as a byproduct of copper refining), silica (industrial sand and gravel), crude steel, and sulfur. In addition, Germany's domestic mineral processing sector accounted for at least 5% of the world's total production capacity of alumina, fused aluminum oxide, graphite, magnesium metal (secondary), rhenium metal (byproduct), strontium compounds, and titanium dioxide pigments.

The international competitiveness of the country's nonfuel mineral processing and fabrication sectors relied primarily on such factors as a highly skilled labor force, rapid assimilation of new technology (especially metal and other mineral materials recycling technologies), and the development and maintenance of liberal trade relationships both within and outside of the European Union (EU), which officially expanded to 27 members at the end of 2006. Throughout the year, rising global demand for mineral fuels and associated price increases for imports of mineral fuels into Germany had a significant effect on the operating costs of the country's mineral industry. Additionally, rapid development of mineral processing operations in economically less-developed or lower-cost (for mineral extraction, processing, and transportation) regions of the world placed increased pressure on the mineral industry to minimize energy, labor, and material costs within the country. Germany was the leading producer of salt (NaCl), kaolin, and potash in the 27-member EU and was the second, third, and fourth ranked producer of these commodities, respectively, in the world. The country was also a leading producer of barite, bentonite, crude gypsum, and feldspar in the EU. Germany's metal processing sector was the leading producer of aluminum metal, refined copper, and crude steel in the EU and the EU's second ranked producer of refined lead and zinc metal (Bundesanstalt für Geowissenschaften und Rohstoffe, 2006, p. 138, 150, 155, 157, 159, 161, 165; Statistik der Kohlenwirtschaft e.V., 2007;

Statistisches Bundesamt, 2007, p. 12; U.S. Library of Congress, Federal Research Division, 2007, p. 10).

Minerals in the National Economy

In 2006, the output of the metal processing sector (up until the foundry stage of production) was valued at about \$85.7 billion¹ compared with \$69.6 billion in 2005, and these values accounted for 3.7% and 3.1% of the annual gross domestic products (GDPs), respectively. Most of this increase was accounted for by an increase in price of the metals produced. The German Federal Statistics Office (DSTATIS)'s real (based upon prices in 2000) producer's price index for all of the metals and alloys produced in the country increased by about 12.6%. The cost of metals contained in ores and concentrates also increased, and Germany spent about \$32.3 billion on imports of crude metallic mineral materials in 2006 compared with \$21.7 billion in 2005. Domestic mine production of nonfuel industrial minerals (excluding manufactured products, such as cement) was valued at approximately \$3.86 billion in 2006 compared with \$3.52 billion in 2005, although the real producer's price index increased by only slightly more than 1% (Bundesanstalt für Geowissenschaften und Rohstoffe, 2007, p. 21-22, 27-29; Statistisches Bundesamt, 2007, p. 10, 12, 15).

Although an official value of domestic coal mine production was not readily available, an estimate can be obtained by using the annual average price per metric ton (t) of coal equivalent (CE) contained in anthracite and bituminous (hard) coal, and of lignite consumed for domestic energy generation. Using this method, the value of mine production of lignite was approximately \$7.0 billion in 2006 compared with \$6.7 billion in 2005, although the volume of production decreased slightly. Domestic production of hard coal products (other than coking coal, which was valued at about \$131 per metric ton of CE in 2006 compared with \$78 per metric ton of CE for other hard coal products) was valued at about \$1.7 billion in 2006 compared with \$2.1 billion in 2005, and annual production levels continued to decrease. DSTATIS's producer's price index for all coal types (including the price of peat for mineral fuel usage) actually increased by about 4% in 2006 compared with that of 2005 (table 1; Statistik der Kohlenwirtschaft e.V., 2007; Statistisches Bundesamt, 2007, p. 9-10).

The recovery of metallic mineral raw materials exclusively from secondary sources (scrap metal) contributed about \$3.2 billion to the GDP in 2006 compared with \$2.2 billion in 2005, and that of industrial mineral raw materials (including from mineral-rich slags and residues) was valued at about \$1 billion in 2006 compared with \$0.9 billion in 2005. DSTATIS's real producer's price index for all secondary metals and industrial minerals increased by about 18% in 2006 compared with that

¹Where necessary, values have been converted from European Union euros (€) to U.S. dollars (US\$) at an annual average exchange rate of €0.8027=US\$1.00 for 2005 and €0.7964=US\$1.00 for 2006. All values are nominal, at current prices, unless otherwise stated.

of 2005. Primarily owing to this increase in scrap prices (which was even greater in nominal terms), Germany spent about \$22 billion on imports of scrap metal in 2006 compared with \$12 billion in 2005, and the country earned about \$10 billion from exports of scrap metal during 2006 compared with \$6.7 billion in 2005. Reliable data on the volume of scrap mineral materials produced was not available at the time of this writing (International Monetary Fund, 2007; Statistisches Bundesamt, 2007, p. 10, 17; 2008, p. 68, 72).

Approximately 1,260 metal-processing plants were operating in Germany in 2006, of which about 70 were focused exclusively on the recovery of metals from secondary sources. In 2005 (the latest year for which reliable statistics were available), 29,273 people were employed in underground mining (20,359 of which mined anthracite and bituminous coal) and 15,277 people were employed in open pit mining and quarrying (of which about 10,000 were employed in mining lignite). An additional 50,389 people were employed above ground to provide full-time administrative, clerical, and logistical support for domestic mining operations. The German Raw Materials and Mining Union defined the mineral raw materials industry to include mineral processing up until the foundry stage and the generation of electricity from mineral fuels (in addition to mining). Under this definition, the mineral industry employed more than 1.2 million people in 2005, which accounted for about 3.6% of the total number of full-time employees in the country (Vereinigung Rohstoffe und Bergbau e.V., 2006; Bundesministerium für Wirtschaft und Technologie, 2007, p. 76; Statistisches Bundesamt, 2007, p. 15).

Government Policies and Programs

Germany's main mining law is the Federal Mining Act (BGBI. IS. 1310), which was approved on August 13, 1980, and revised on December 9, 2006, through slight revision to provisions of Article 11 (BGBI. IS. 2833). The 2006 revision was not expected to have much effect on the structure of the mineral industry. Of greater structural impact was the continued phasing out of the subsidy for the mining of anthracite and bituminous coal (hard coal), which was scheduled to be completely eliminated by 2018. In 2006, the total amount of this subsidy was about \$3.3 billion. A Government review of this phaseout policy was scheduled for 2012, which coal mining interests in the country expected to represent the last date for approval of a possible extension of the 2018 deadline. Although these lobbying groups considered the probability of such an extension to be quite low, they believed that coal prices could increase substantially or that a global coal shortage could help create economic circumstances that would make it possible for industry to continue to mine hard coal from at least a few of the remaining mines in the country. It was also thought that private steel companies might help finance the mining of coking coal, even after the end of Government subsidies (Bundesministerium der Justiz, 2007, p. 1; Bundesministerium für Wirtschaft und Technologie, 2007, p. 34-36; Casteel, 2007, p. 4; Whitlock, 2007).

In 2006, the Federal Ministry of Economics and Technology (BMWt) claimed that the German mining law applies uniformly to all important mineral resources in the country

and is comprehensive in the sense that it covers all aspects of mining (such as health and safety and environmental aspects). Nonetheless, the BMWt expressed a desire to cooperate with the European Commission (EC) to continue to develop EU legislation (directives) to provide a more uniform regulation of the extractive industries throughout the EU. Through the end of 2006, the EU still had no comprehensive European mining legislation; the BMWt believed, however, that many EU directives (some of which were still in the proposal stage), were already having (or could have) a direct impact on domestic implementation of German mining law. Some examples include the following:

- Directive 94/22/EC concerning the conditions for granting and using authorizations for the prospecting, exploration, and production of hydrocarbons;
- Directive 92/91/EEC concerning the minimum requirements for improving the safety and health protection of workers in the mineral-extracting industries through drilling;
- Directive 92/104/EEC on the minimum requirements for improving the safety and health protection of workers in surface and underground mineral extracting industries; and
- A proposal for an EU directive on the management of waste from the extractive industries (Kullmann, 2007).

There is no single, easily identifiable mining investment law in Germany, although the process for investing in the German mineral industry is unique in some ways. Most importantly, the corporate sector in Germany relies almost exclusively on bank credit (loans) to fund investment instead of issuing securities to the public through market exchanges. This is especially true for small- and medium-scale enterprises (SMEs), which account for the majority of companies invested in the mineral industry of Germany. A foreign company usually has to register a GmbH (private limited-liability company) subsidiary in the country to obtain the same legal benefits as a domestic company. These benefits include Government investment grants, tax benefits, and low-interest loans or bank loans with a state guarantee. These benefits are greater for companies that export (Economist Intelligence Unit Limited, The, 2007; World Tax Inc., 2007).

A tax reform package that was launched in 2002 to eliminate a prohibitively high capital gains tax on the sale of shareholdings by companies in Germany was viewed in 2006 as helping to weaken the traditionally close relationship between companies and banks because it increased the willingness of companies to access the capital market directly. This was true mostly for only the larger companies, however, and SMEs continued to rely on bank credit for financing. Capital investment by SMEs was almost entirely financed by public-sector banks (locally owned savings banks and state banks) and cooperative banks. [The large number of public banks in Germany is considered unique among highly developed (economically) countries; these banks were originally created to facilitate rapid reconstruction (including playing a vital role in the redevelopment of the coal and steel production sectors of the mineral industry) after World War II.] The German Government had reached an agreement with the EC in 2001 to phase out Government guarantees for the commercial activities of public banks by July 2005, which, in 2006, caused consolidation among public banks. The German Government was concerned that this consolidation would reduce

access to credit for SMEs, but a study by Deutsche Bundesbank found that public bank consolidation had not significantly reduced SMEs' access to credit through 2006 (Casteel, 2007, p. 2; Economist Intelligence Unit Limited, The, 2007; Marsch and others, 2007, p. 2; World Tax Inc., 2007).

A new Environmental Impact Assessment Act (EIA Act) (BGBl. IS. 1757, 2797), which was approved on June 25, 2005, and revised through slight changes to Article 2 (BGBl. IS. 3316) of the act on December 21, 2006, was the environmental law that was most applicable to the mineral industry. This act incorporated provisions of an older ordinance concerning the assessment of environmental impacts for mining projects (BGBl. IS. 1420), which was approved on July 13, 1990, and revised through slight changes to Article 8 (BGBl. IS. 2819) on December 9, 2006; the act also incorporated other older ordinances, such as one for the protection of groundwater against pollution caused by certain dangerous substances (BGBl. IS. 542), which was approved on March 18, 1997, and was still applicable to the use and disposal of many of the chemicals used in mining and mineral processing in Germany. The EIA Act requires Environmental Impact Assessments for all domestic waste repositories created or used by the mineral industry. The Federal Mining Act actually stipulates how these repositories are to be constructed and operated (monitored) (Bandt and others, 2003; Bundesministerium der Justiz, 2007, p. 30; Bundesministerium für Wirtschaft und Technologie, 2007, p. 36).

During 2006, the mineral industry was most concerned with the EU's new Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) legislation, which was approved at the end of the year for implementation starting on June 1, 2007. This new chemical control directive applies to many mine products, including imported mineral raw materials and waste materials from mining and mineral processing operations in Germany. The REACH legislation requires mineral producers to prove that these chemically complex substances should not be classified as hazardous materials by testing and registering all chemical contents of these materials (rather than leaving this task to EU regulators). REACH could allow classification of many industrial minerals and metals (including metals contained in scrap) as hazardous chemicals until proven otherwise by the producers. Along with other mineral industry representatives, German steel producers lobbied for scrap to no longer be classified as waste according to the European Waste Directive or defined as a hazardous material according to REACH (Association of German Steel Recycling and Disposal Companies and German Steel Federation, 2006).

Production

Data on mineral production are provided in table 1. In 2006, production of primary aluminum decreased by about 20% compared with that of 2005, mostly because of the closure of the Hamburger Aluminium-Werk GmbH (HAW) smelter at the beginning of the year. Startup of the new Neckarwerk recycling plant in January 2006 was the primary cause of increased production of secondary refined aluminum by slightly less than 11%. The new plant recovered both aluminum and

magnesium metal from recycled materials to be delivered to the automotive and casting industries in southern Germany, and was thus the primary driver behind the 12% increase in production of magnesium metal in the country compared with that of 2005. In 2006, Germany used a total of about 27.4 million metric tons (Mt) of scrap metal as input into the country's metal (re)processing sector compared with 25.5 Mt in 2005; about 77.4% of this scrap metal consumption was used in the production of crude steel compared with about 77% in 2005. Thus, about 45% of crude steel production was based on scrap in 2006 compared with about 44% in 2005 (table 1; Bundesanstalt für Geowissenschaften und Rohstoffe, 2006, p. 52; 2007, p. 57; Aleris International, Inc., 2007, p. 11, 50; Norsk Hydro ASA, 2007, p. 44-45, 74, 113).

The production of iron ore in terms of both gross weight and iron content increased by about 16% in 2006 compared with 2005, but the average iron content of this material (which was used only for construction purposes and not in metallurgy) decreased to about 10.6% for 2006 and 2005 compared with about 14% for the 3 years prior to 2005. Although prices for natural gas and iron pellet feed as inputs into production of direct-reduced iron (DRI) in 2006 were comparable with prices in 2005, production increased by slightly less than 32% during this timeframe primarily owing to increased demand for DRI in place of more expensive and scarce iron and steel scrap as feed into electric arc furnaces to produce crude steel. Production of ferrochromium increased by slightly less than 18% primarily owing to new synergies after Kermas Ltd. (registered in the British Virgin Islands) acquired the German ferrochromium producer Elektrowerk Weisweiler GmbH (EWW) on June 1, 2005. This acquisition was part of a larger transaction that also involved Kermas acquiring Samancor Chrome Ltd. (located in South Africa) from former coowners Anglo American plc and BHP Billiton plc (of the United Kingdom). These acquisitions allowed EWW greater access to chromite ore from Samancor-operated mines in South Africa in addition to feed from three chromite mines already owned by EWW in Turkey. Production of other ferroalloys in Germany was estimated to have decreased by about the same proportion as the increase in ferrochromium production. In 2006, production of primary lead decreased by about 15% compared with that of 2005 at least partly owing to a 3-week shutdown at the Nordenham primary lead smelter in December to fix a technical problem with a smelting furnace (table 1; Southern African Legal Information Institute, 2005; Bundesanstalt für Geowissenschaften und Rohstoffe, 2006, p. 149; Metal Bulletin, 2006; International Chromium Development Association, 2007, p. 25; Metaleurop S.A., 2007; Midrex Technologies, Inc., 2007).

In 2005 and 2006, extraction of selenium from the treatment of copper-anodic slimes was estimated to have been noticeably higher in Germany as a result of a greater volume of imported copper concentrates processed in the country and greater demand for crude selenium (relative to supply) domestically and in the EU. Owing to increased supply from China and relatively low prices in 2002 and 2003, relatively less selenium was extracted from copper concentrates in Germany during those years. It was unclear why production of refined silver metal decreased by about 22% (122 t) in 2006 compared

with production in 2005, because recovery of silver from copper anode slimes increased by about 12% (105 t) (table 1; Norddeutsche Affinerie AG, 2006, p. 58, 112, 118; 2007, p. 51, 74-75, 137, 145-146, 149-150; RETORTE Ulrich Scharrer GmbH, undated).

In 2006, production of bromine compounds increased by about 57% compared with that of 2005, mostly owing to increased processing of imported bromine-bearing mineral raw materials. Reliable data concerning domestic production of natural bromine compounds as a byproduct recovered from the crude magnesium salts produced during potash mining, however, was not available. Increasingly strict environmental regulations helped encourage greater demand for chalk to purify industrial waste water, and production of natural chalk increased by about 23% during the year, although information was not available regarding which of the country's natural chalk quarries were primarily responsible for the increase. Production of ceramic and refractory clays (only fire clay and chamotte were reported) increased by about 10%, but no information concerning the opening of any new mines compared with those identified as producing in 2005 was available. Thus, this increase was likely to have resulted from increased production at existing clay mines and quarries. Reliable information was unavailable to explain the growth of about 175% in the production of unspecified clays, and a detailed listing of the types of clays included in this production category was also not available. Production of fluorspar was reported to have increased by about 50%, but this indicated a level of national production that exceeded the listed capacity of the only mine believed to produce fluorspar in the country by about 18,000 metric tons (t) (tables 1, 2; Bundesanstalt für Geowissenschaften und Rohstoffe, 2007, p. 24, 28, 186, 188, 222).

Production of anthracite and bituminous (hard) coal continued to decrease as the number of operating mines was reduced to eight in 2006 from nine in 2005. Owing to the policy of decreasing the Federal subsidy to hard coal mining in the country, this trend was expected to continue until all mines are closed around the time of the scheduled termination of the subsidy in 2018. The country's level of production of lignite in 2006 remained roughly equal to that of 2005, however, and was expected to remain a mainstay of the German mining industry and electrical power generation sector indefinitely. The ongoing removal of radioactive material from the former Wismut Mine site and surrounding contaminated areas continued to result in less annual recovery of uranium, although no hard date had yet been set for completion of this cleanup project (table 1; Gesamtverbandes des Deutschen Steinkohlenbergbaus, 2006, p. 59, 68; Casteel, 2007, p. 2-4).

Structure of the Mineral Industry

Table 2 is a list of major mineral industry facilities and their locations. In 2005, Alcoa Inc., Austria Metall AG, and Norsk Hydro ASA agreed to close their joint subsidiary HAW at the beginning of 2006, and it remained closed during the entire year. The partners then sold this primary aluminum smelter to Trimet Aluminium AG; the sale became effective on December 1. At the end of 2006, Aleris International Inc. changed the name

of its German secondary aluminum and magnesium metal-producing subsidiary to Aleris Recycling GmbH from VAW-IMCO Guss und Recycling GmbH. The company increased its combined metal production capacity by 50,000 metric tons per year (t/yr) in Germany through startup of its new Neckarwerk recycling plant at Deizisau. At the end of 2006, Alsa Technologies GmbH completed a new plant to process aluminum salt slag; the plant, which was located at Toeging, had a production capacity of about 30,000 t/yr of alumina (Al_2O_3) content (O'Driscoll, 2006; Steffen, 2006; Aleris International, Inc., 2007, p. 11, 50; Norsk Hydro ASA, 2007, p. 44-45, 74, 113).

Omya AG was the leading producer of ground calcium carbonate (GCC) in the world. The company processed domestically mined chalk and limestone to produce GCC. Because reliable figures were not available for actual GCC production (separate from those for production of limestone or natural chalk) in 2006, an estimated level of GCC production is not included in table 1 to avoid possible double counting. At the end of 2005, Graphit Kropfmühl AG closed its only graphite mine in Germany but continued to produce natural graphite in the country from imports of ore from the company's mines in other countries (tables 1, 2; Mining Journal, 2007).

Deutsche Steinkohle AG closed the Lohberg/Osterfeld colliery, including a coking plant, at the end of 2005. This left only eight anthracite and bituminous coal mines operating in the country and the resulting decline in production resulted in increased imports of coke and coking coal by the steel industry (Gesamtverbandes des Deutschen Steinkohlenbergbaus, 2006, p. 35, 59, 68, 73; Casteel, 2007, p. 3).

In May 2006, Mining & Chemical Products Ltd. (MCP) and Recapture Metals Inc. acquired Geo Gallium S.A. as a 50-50 joint venture, including Geo Gallium's Ingal-Stade primary gallium (crude) production facility. Production was estimated to have been about 12 t/yr from 2002 through 2006 because the price of gallium had been depressed from 2001 to 2005 and excess production capacity was not easily restarted in response to increasing prices in 2006. Full gallium production capacity as a byproduct of alumina refining at the Ingal-Stade plant was last listed in 2001 at about 35 t/yr after Geo Gallium expanded capacity to extract crude gallium in response to high prices in 1999 and 2000 (Compound Semiconductor.net, 2004; Abrams, 2006).

In the steel sector of the mineral industry, consolidation of ownership in Germany increased in June 2006 with the acquisition of Arcelor S.A. (based in Luxembourg) by Mittal Steel Co. NV of the Netherlands. Arcelor completely owned EKO Stahl GmbH, Stahlwerke Bremen GmbH, and Stahlwerk Thüringen GmbH in addition to a majority interest (51.25%) in AG der Dillinger Hüttenwerke. Mittal had already acquired Hamburger Stahlwerke GmbH in 1995 and two steel plants near Duisburg in 1997. At the end of 2006, Mittal renamed EKO Stahl and Stahlwerke Bremen as Arcelor Eisenhüttenstadt GmbH and Arcelor Bremen GmbH, respectively, and sold Stahlwerk Thüringen to Alfonso Gallardo S.A., although this sale was not scheduled to be finalized until March 5, 2007 (Businessworld, 2005; AG der Dillinger Hüttenwerke, 2007; Mittal Steel Co. NV, 2007, p. 2, 31, 52-54, 63, 70, F-35; Stahlwerk Thüringen GmbH, 2007).

Mineral Trade

In 2005 (the latest year for which reliable trade data were available), Germany spent 3.5% of its nominal GDP (or about \$96 billion) on imports of mineral commodities, including crude petroleum (\$43.3 billion), natural gas (\$21.2 billion), nonferrous metals (\$10.6 billion), ferroalloys (\$5.66 billion), precious metals and stones (\$4.6 billion), iron and steel (\$3.93 billion), coal (mostly anthracite and bituminous coal) (\$3.65 billion), industrial minerals (\$1.73 billion), and other mineral fuels, including uranium (\$1.44 billion) (Bundesanstalt für Geowissenschaften und Rohstoffe, 2006, p. 31-32; International Monetary Fund, 2007).

In 2005, the metal processing sector succeeded in reducing the amount of aluminum scrap and iron and steel scrap that was exported; however, the sector exported more copper scrap for processing outside of the country compared with levels exported in 2004. Germany exported about 7.5 million metric tons (Mt) of iron and steel scrap compared with about 9.2 Mt in 2004; 584,000 t of scrap aluminum compared with 614,000 t in 2004; and 439,000 t of refined copper scrap compared with about 408,000 t in 2004. The country also exported less scrap that contained cobalt, gallium, lead, magnesium, and tin, but exported more bismuth, nickel, tungsten, and zinc contained in scrap compared with export levels in 2004. Most scrap metal exports were shipped to other EU countries, but China was a significant importer of scrap aluminum and the leading importer of scrap copper and zinc from Germany (table 3; Bundesanstalt für Geowissenschaften und Rohstoffe, 2006, p. 15-20, 100-102).

The rest of Germany's trade in metals reflected its primary role in the global mineral industry as an importer of metallic ores and concentrates and an exporter and consumer of processed metal; even refined metals were mostly not exported but further used in German industrial production of automobiles, machinery, and other finished products. Thus, Germany was a leading global consumer of metals. The country also played a role as an important transshipper of some minerals in raw form, including beryllium, niobium (columbium), rubidium, tellurium, tungsten, and zirconium (tables 3, 4; Bundesanstalt für Geowissenschaften und Rohstoffe, 2006, p. 15-20, 25-27, 83-91, 100-102).

As a primary producer, Germany was an important supplier of cement, kaolin, feldspar, peat, salt, silica sand, and sulfur, almost entirely to other EU countries. The U.S. market was not a leading destination for industrial minerals from Germany. As Germany has continued gradually to reduce the Government's subsidy on mine production of hard coal, the country has become more dependent on imports. The steel manufacturing sector has become especially dependent on imports of hard coking coal as domestic supplies have continued to decrease. Before Poland officially joined the EU in 2004, Germany's most significant sources of hard coal and coke were all outside of the EU, including, in order of quantity imported, Australia, Canada, South Africa, Russia, Colombia, China, Ukraine, and Vietnam. Germany was basically self-sufficient in lignite but substantially import-dependent on all other mineral fuels. The only mineral fuel for which the United States was a significant importer from Germany was enriched uranium (tables 3, 4;

Bundesanstalt für Geowissenschaften und Rohstoffe, 2006, p. 81-82, 98-99, 111-115).

Commodity Review

Metals

Aluminum.—At the end of 2005, Norsk Hydro closed the HAW smelter in agreement with the two other joint owners. Hydro also closed its Elbewerk primary aluminum plant at Stade at the end of 2006. These closures were reportedly in response to the inability of the company to secure energy contracts for these plants at rates that would sustain profitable production for a sufficient period into the future. The company also expressed concern about increasing costs associated with purchasing alumina feed for these two smelters in 2005, although the price of alumina decreased in 2006. In part encouraged by this decrease in the price of alumina, Trimet Aluminium purchased HAW from the former owners in November 2006 and planned to restart production there at full capacity by the end of 2007. Norsk Hydro also reached an agreement to sell the plant site at Stade to two energy systems companies, which were interested in converting the facilities to include a combined heat and power station, a plant to produce bioethanol, and a plant to manufacture wind-turbine rotor blades (Knutzen and Steffen, 2006; Norsk Hydro ASA, 2007, p. 44-45, 74, 113).

Copper.—Norddeutsche Affinerie (NA) accounted for most of the production of refined copper and copper products in Germany, and the company was a significant producer (in Germany and in the EU) of various byproducts, including gold, platinum-group metals, selenium, silver, and sulfuric acid. On average, the company purchased 90% of the copper concentrates that it used in primary production according to the terms of long-term contracts and only 10% were purchased on the spot market. The annual input requirement of copper concentrate for NA was slightly greater than 1 Mt/yr, and the company had a long-term supply contract with the Escondida Mine in Chile (the world's leading copper mine in 2005) for approximately 10% to 15% of this input. Despite a 25-day strike at Escondida in August 2006, however, the company reported that it had sufficiently diverse sources for supply of concentrate that the strike had an insignificant impact on NA's imports of copper concentrates during the year. Since the concentrates from different mines in different regions of the world have a slightly different composition, however, a significant reduction in the percentage of NA's input of copper concentrate from a mine as large as Escondida was expected to have had a significant impact on the company's production of some byproducts (Kassakovich, 2006; Platts Bureaus, 2006; Norddeutsche Affinerie AG, 2007, p. 64, 137).

On July 23, 2006, a tunnel collapsed at the Chuquicamata Mine in Chile, which was expected to disrupt supply of copper concentrate to Germany. During 2006, Germany imported about 201,500 t of fine copper from Chile compared with 184,400 t in 2005, and production of primary refined copper in Germany actually increased. In terms of tonnage of fine copper content in 2006, Germany ranked a distant 10th as a destination for exports out of Chile and accounted for about 3.9% of Chile's total

exports (Harris, 2006; Comisión Chilena del Cobre, 2007, p. 37, 41; Norddeutsche Affinerie AG, 2007, p. 64, 137).

Gallium.—The capacity added by Geo Gallium at the Ingal-Stade plant in 2001 was reportedly never used as prices fell almost immediately thereafter and remained relatively low until 2005. MCP and Recapture expected to increase production to 24 t/yr in 2007 in response to increased demand for gallium. In the second half of 2006, crude gallium recovered at the plant in Stade began to be refined at Recapture's facilities in Utah and at MCP's facilities in the United Kingdom, rather than at Geo Gallium's plant in Salindres, France (Compound Semiconductor.net, 2004; Abrams, 2006).

Iron and Steel.—In 2006, ThyssenKrupp Steel AG was the 10th ranked producer in the world. The company continued to invest in an expansion of its crude steel production capacity in Sepetiba, Brazil, where costs were considerably lower than in Germany and the availability of mineral raw materials, especially iron ore, was substantially higher. Companhia Vale do Rio Doce of Brazil had a 10% ownership interest in the new Brazilian steel mill, and ThyssenKrupp expected the mill to have a production capacity of 4.4 Mt/yr of crude steel and to be completed by about March of 2009 (ThyssenKrupp Steel AG, 2007, p. 9, 30, 37, 56; Bundesministerium für Wirtschaft and Technologie, 2008).

Selenium.—At the end of 2004, Norddeutsche Affinerie AG finished developing a new design for photovoltaic cells to be constructed using larger proportions of the metallic mineral materials that the company produced itself (including copper, indium, and selenium). In 2006, the company was nearing completion of a plant to produce its own photovoltaic cells with this newer technology, which was expected to increase demand for selenium extracted from its own copper processing operations as well as the company's imports of crude selenium from copper smelters in other countries (Norddeutsche Affinerie AG, 2006, p. 22-23, 74, 118; 2007, p. 5, 145).

Industrial Minerals

Cement.—In 2006, HeidelbergCement AG was the leading producer of cement in Germany and the fourth ranked producer in the world. In January, HeidelbergCement (along with Holcim Deutschland AG and SCHWENK Zement KG) was added to a list of three other major cement companies (CEMEX Deutschland AG, Dyckerhoff AG, and Lafarge Zement GmbH) that were being cited for illegal cartel activity in Germany. The Government proceedings against cartel activity in the cement production sector had been started in 2002, and an initial court decision was not expected until 2008. In 2006, most of these companies were attempting to counter the high production costs in Germany by substituting more blast furnace slag (recycled from steel production) and fly ash (recovered from coal driven power stations) for clinker in domestic cement production. The only news concerning a change in ownership was that the parent company of Dyckerhoff, Buzzi Unicem SpA, announced on October 30 that it would be interested in buying up more share capital in this subsidiary. Buzzi Unicem's offer ran through January 29, 2007, at which time it had increased its total ownership share in Dyckerhoff to 88.37% compared with

78.58% in 2006 (ICR Research, 2006; Dyckerhoff AG, 2007, p. 8, 19-20, 33; HeidelbergCement AG, 2007, p. 35, 115).

Clay and Shale.—In 2006, the leading producer of clays continued to be the large foreign-owned WBB Fuchs GmbH & Co. KG (a specialist in kaolinitic clays); other significant German companies were smaller, family-owned SMEs, such as Goerg & Schneider GmbH & Co. and Stephan Schmidt KG. Germany was one of the leading producers of kaolin in Western Europe. All these producers were able to remain internationally competitive by producing relatively valuable customized blends, which was still cost effective because up to 25 different clays could be extracted from any one pit. The clay and shale operations of almost all the leading companies were located in the Westerwald region. WBB Fuchs specialized in high-alumina blue clays, light-firing refractory clay, and kaolins for refractories. The company produced about 200 different blends of clays, many for specific ceramic applications, such as isostatic pressing and pressure casting. Stephan Schmidt produced white- and light-firing clays, red-firing clays with high mechanical strength, special clays for engobes and glazes, binding clays, granulated clays, and spray-dried clay bodies. Georg & Schneider specialized in refractory clays, especially chamotte (or firebrick clay) and ball clays (or plastic clays). All these clay blends contained kaolins, but WBB Fuchs produced the highest grade kaolin with, on average, about 38% Al_2O_3 content (King, 2006).

Strontium.—On November 18, 2005, Solvay S.A. announced the formation of a new joint company with Chemical Products Corporation (CPC) called Solvay & CPC Barium Strontium GmbH & Co. KG. During 2006, the company's main production facility for barium and strontium carbonates in Germany was located in Bad Hoenningen, near Hannover, and was owned 75% by Solvay and 25% by CPC. Previous to the joint-venture agreement, this plant was 100% owned by Solvay and operated by the company's German subsidiary, Solvay Barium Strontium GmbH. Solvay reported that it reduced capacity to produce barium and strontium at this manufacturing facility, but it was unclear by how much the capacity was reduced below the production capacity of 95,000 t/yr of strontium carbonate listed for the plant at the beginning of the year. During the year, both CPC and Solvay separately operated celestite (strontium sulfate) mines in Mexico, Spain, and elsewhere that provided crude mineral feed for the production of strontium carbonate at the German plant (Solvay S.A., 2005; 2007, p. 32; Coope, 2006; Industrial Minerals, 2006; Taylor, 2006).

Mineral Fuels

Coal.—Hard coal mining is centered in the Ibbenbüren, the Ruhr, and the Saar coalfields in Germany and is uneconomical without subsidies because the current resources lie at great depths underground. As the hard coal subsidy is phased out, more mines will be closed resulting in greater imports of hard coal, coking coal, and coke. In 2006, the Lippe and the Walsum Mines were scheduled to be closed in 2009 and 2010, respectively (Bundesministerium für Wirtschaft und Technologie, 2007, p. 39).

Reserves and Resources

There were no metallic mineral reserves in Germany in 2006, and it was expected that there will be no mining of anthracite and bituminous coal once the hard coal subsidy is removed. However, mining has had a long tradition in Germany and the country still contains diverse resources of coal, metallic, and nonmetallic minerals. In 2006, Germany's main reserves, in decreasing order of value, were of lignite, kaolin, feldspar, oil shale, rock salt, potash, bentonite, coking coal, sulfur, barite, graphite, fluorspar, silica sand, natural stone aggregates, potash-magnesium salts and anhydrite, and dolomite-limestone-marl (Casteel, 2007, p. 2, 4, 10, 12).

Outlook

In 2006, costs for energy and mineral raw materials continued to increase in the country and were blamed for the closure of at least two primary aluminum smelters, although one of those is scheduled to be restarted by the end of 2007. The ongoing response of companies in the mineral industry was to restructure internally to reduce costs as much as possible and to invest in developing new capacity abroad rather than domestically. Additionally, vertical integration and concentration of ownership increased, especially in the steel sector. In the metal processing sector, it can be expected that more of the metals companies that have so far been mostly left out of the recent wave of mergers and acquisitions will be attempting to find additional partners in 2006 and 2007 in order to keep up with the economies of scale and scope that recently merged rivals were expected to take advantage of (Bundesverband der Deutschen Industrie e.V., 2006).

Even as the scarcity of domestic mineral fuels in Germany increases, the Government's hard coal subsidy continues to be phased out. Together with other high operating costs in Germany, the higher cost of imports of hard coal, coking coal, and coke can be expected to cause stress on maintaining domestic steel manufacturing capacity. In general, maintaining an economically important mineral industry in Germany is likely to involve further reductions in costs for companies, including those for labor, energy, and taxes, to encourage investment in continuing mineral production and at least maintain processing capacity domestically.

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TABLE 1
GERMANY: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity	2002	2003	2004	2005	2006
METALS					
Aluminum:					
Alumina, Al ₂ O ₃ equivalent ^c	717	830	835	830	850
Metal:					
Primary	652,845	660,793	667,839	647,934	515,539
Secondary	666,148	680,385	703,756	718,291 ^r	795,668
Total	1,318,993	1,341,178	1,371,595	1,366,225 ^r	1,311,207
Arsenic, white, Ar ₂ O ₃ content ^c	100	--	-- ²	-- ²	--
Cadmium, metal, refinery including secondary ^e	422 ²	640 ²	640	640	640
Copper, metal:					
Smelter:					
Primary	295,100	288,800	278,600	257,200	273,800
Secondary	283,100	306,600	262,600	251,400	266,300
Total	578,200	595,400	541,200	508,600	540,100
Refined:					
Primary	327,000	286,653	283,686	293,812 ^r	312,092
Secondary	368,791	310,925	368,956	344,446 ^r	350,246
Total	695,791	597,578	652,642	638,258 ^r	662,338
Gallium, crude ^c	12	12	12	12	12
Iron and steel:					
Ore, run of mine:³					
Gross weight	419	429	412	362	412
Fe content	59	60	58	38	44
Metal:					
Pig iron	29,427	29,461	30,018	28,854	30,362
Direct-reduced iron	540	590	593 ^r	440 ^r	580
Ferroalloys:					
Ferrochromium	20,018	18,318	24,857	22,672	26,710
Other ^{c,4}	30,000	32,000	26,000	25,000	20,500
Steel, crude	45,015	44,809	46,374	44,524	47,224
Semimanufactures	37,763	37,174	39,976	37,771	41,174
Lead, metal, refined:					
Primary	141,202	132,155	115,869	118,778	100,450
Secondary	238,700 ⁵	224,700 ⁵	243,304	222,932	221,050
Total	379,902	356,900	359,173	341,710	321,500
Magnesium, metal, including castings	24,506	25,987	26,591	27,282 ^r	30,556
Platinum-group metals, metal, refined	35,561	51,847	95,135	104,725	100,000 ^c
Selenium, metal ^c	600 ^r	661 ^{r,2}	1,000 ^r	2,000 ^r	2,500
Silicon, metal	25,257	27,870 ^r	28,773 ^r	29,349 ^r	30,000
Silver, metal, refined, including secondary ⁶	520	592	568	546	424
Tin, alloys	11,447	6,143	5,431	4,912	5,016
Zinc, metal:					
Primary	272,900	255,200	252,133	245,140	245,883
Secondary	105,700 ⁵	132,900 ⁵	129,887	89,751	96,683
Total	378,561	388,131	382,020	334,891	342,566
INDUSTRIAL MINERALS					
Abrasives:					
Natural, pumice	43,354	--	--	--	--
Artificial, corundum	56,728	59,097	72,565	73,620	75,817
Aluminum salt slag, Al ₂ O ₃ equivalent ^c	200	200	200	200	200
Barite, marketable (contained BaSO ₄)	100,993	109,506	93,624	88,591	85,524
Boron compounds, manufactured, including boric acid and oxide	168,250	176,837	168,841	203,475	222,169
Bromine compounds, manufactured, including oxide	413	388	248	274	431
Cement:					
Clinker, intended for market	23,954	25,233	26,281	24,378 ^r	24,952 ^p
Hydraulic	31,009	32,749	31,854	31,009 ^r	33,516 ^p

See footnotes at end of table.

TABLE 1--Continued
GERMANY: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity	2002	2003	2004	2005	2006
INDUSTRIAL MINERALS--Continued					
Chalk, natural, including ground	1,022	1,001	1,005	1,068	1,309
Clays, natural:					
Bentonite	495	479	405	352 ^r	364
Ceramic and refractory clays ^c	4,700	4,300	4,400	4,500	4,600
Of which, fire clay and chamotte	167	167	176	176	194
Kaolin, marketable	3,682 ^r	3,504 ^r	3,752	3,768	3,815
Other, unspecified	281	191	197	185	509
Diatomite ^c	54 ²	55 ²	54	54	54
Feldspar	243,368	233,028 ^r	182,842 ^r	168,640 ^r	167,332
Fluorspar, acid-grade	34,429	33,289	33,203	35,364	53,009
Graphite, mine output	3,312	2,840	3,155	2,638	--
Gypsum and anhydrite:					
Natural	1,761	1,748	1,579	1,644	1,771
Byproduct of flue-gas desulfurization ^c	7,100	7,660	7,660	7,640	7,600 ^p
Lime, quicklime, dead-burned dolomite	7,139	6,876	6,947	6,823 ^r	7,119
Magnesium compounds, byproduct of potash mining	1,411	1,288	1,197	1,290 ^r	1,203
Nitrogen, N content of ammonia	2,560	2,803	2,741	2,789 ^r	2,718
Peat, natural	122,696	135,356	119,961	120,000 ^e	120,000 ^e
Phosphoric acid, manufactured, P ₂ O ₅ content	34,486	32,569	37,810	37,374	34,373
Pigments, iron oxide ^c	4,000	4,000	4,000	4,000	4,000
Potash, K ₂ O content:					
Crude	4,278	4,413	4,439	4,434	4,385
Marketable	3,472	3,563	3,627	3,664	3,625
Salt, NaCl content, marketable:					
Evaporated salt, including marine salt	858	727	572	594	593
Industrial brines	8,307	9,078	10,432	9,904	9,590
Rock salt and other brines	6,572 ^r	6,620 ^r	7,833 ^r	8,834 ^r	9,663
Total	15,737 ^r	16,425 ^r	18,837 ^r	19,332 ^r	19,846
Siliceous earth, marketable	53,711	54,517	54,801	50,399 ^r	53,282
Soda ash (Na ₂ CO ₃), manufactured	1,512	1,493	1,438	1,533	1,515
Stone, sand and gravel:					
Stone, crude:					
Dimension, including partially worked	237	167	229	212	219
Of which, dolomite and limestone	76	106	76	75	75
Crushed, not including chalk	166,798	160,851	152,985 ^r	150,117 ^r	162,168
Dolomite and limestone, not for cement manufacture	31,300	30,000	23,700	20,600	22,400
Gravel, natural:					
Building gravel	73,131	70,173	65,566	62,498 ^r	68,706
Crude, including flint and pebbles	14,505	13,632	12,889	12,753 ^r	13,301
Other gravel, including quartzite	11,877	13,295	10,898	12,014 ^r	13,326
Sand, natural:					
Building sand	65,414	67,603	63,619 ^r	57,463 ^r	59,767
Silica sand, including glass sand and quartz sand	7,839	7,953	8,162	7,681 ^r	7,703
Other, including from granite and pegmatite	11,617	13,115	13,239	13,185 ^r	13,578
Total sand and gravel	184,383	185,771	174,373 ^r	165,594 ^r	176,381
Strontium carbonate, manufactured ^c	80	80	80	80	80
Sulfur:					
Marketable	1,093	1,014	939	1,055	1,114
Byproduct:					
Metallurgy ^c	754	701	591	600	600
Natural gas and petroleum	1,745	1,661	1,503	1,585	1,686
Total	2,499	2,362	2,094	2,190 ^e	2,290 ^e

See footnotes at end of table.

TABLE 1--Continued
GERMANY: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity	2002	2003	2004	2005	2006
MINERAL FUELS AND RELATED MATERIALS					
Asphalt and bitumen, natural	8,011	1,680	--	--	--
Coal:					
Anthracite and bituminous, marketable thousand metric tons	26,363 ^r	25,873 ^r	25,872 ^r	24,907 ^r	20,882
Lignite do.	181,746 ^r	179,087 ^r	181,926	177,908 ^r	176,324
Coke:					
Of anthracite and bituminous coal do.	7,226	7,827	8,479 ^r	8,397 ^r	8,372
Of lignite do.	154 ^c	165	187	173	181
Fuel briquets:					
Of anthracite and bituminous coal do.	124	114	102	92	96
Of lignite, including dust and dried do.	1,365	1,466	1,435	1,490 ^r	1,662
Gas:					
Manufactured: ^c					
Blast furnace thousand cubic meters	8,781 ²	8,936 ²	9,100	8,800	9,000
Coke oven do.	3,310 ²	2,870 ²	3,000	2,900	3,000
Total do.	12,091 ²	11,806 ²	12,100	11,700	12,000
Natural:					
Gross million cubic meters	21,422	22,092	20,264 ^r	19,762 ^r	19,667
Marketable do.	20,116	20,190	19,333	18,666 ^r	18,443
Petroleum: ⁷					
Crude thousand 42-gallon barrels	27,600	27,900	25,800	26,200	25,800
Refinery products:					
Liquefied petroleum gas do.	37,000	38,000	37,000	37,000	37,000
Distillate fuel oil do.	350,000	360,000	370,000	390,000	380,000
Residual fuel oil do.	65,000	69,000	77,000	74,000	76,000
Gasoline, including aviation do.	210,000	210,000	210,000	210,000	210,000
Kerosene and jet fuel do.	32,000	32,000	34,000	33,000	34,000
Naphtha do.	82,000	86,000	94,000	94,000	90,000
Refinery gas do.	48,700	51,600	51,300	50,600	49,100
Bitumen, bituminous mixtures, and other residues do.	32,000	30,000	29,000	32,000	31,000
Lubricants and miscellaneous oils do.	11,000	11,000	15,000	14,000	16,000
Petroleum coke do.	9,400	10,000	10,000	11,000	11,000
Mineral jelly, waxes, and paraffins do.	1,500	1,500	1,800	1,800	2,000
Other do.	12,000	8,400	11,000	9,400	9,800
Total do.	890,000	910,000	940,000	960,000	950,000
Uranium concentrate, U ₃ O ₈ content ^f	261	177	91	111	77

^cEstimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. ^pPreliminary. ^rRevised. -- Zero.

¹Table includes data available through October 2007.

²Reported figure.

³Iron ore is used domestically as an additive in cement and other construction materials but is of too low a grade to use in the steel industry.

⁴Estimated from reported domestic sales of ferroalloys [Statistische Bundesamt, 2007, Fachserie 4, Reihe 3.1—Produzierendes Gewerbe, Produktion im Produzierenden Gewerbe, Jahr 2006: Wiesbaden, Germany, Statistische Bundesamt, August, p. 176].

⁵Estimated by subtraction of primary from total, and rounded to four significant digits.

⁶Data may not include silver production as a byproduct of copper refining.

⁷All figures were converted to barrels from those reported in metric tons according to data from Mineralölwirtschaftsverband e.V., 2007, Jahresbericht—Mineralöl-Zahlen, 2006: Hamburg, Germany, Mineralölwirtschaftsverband e.V., May, p. 48, and reflect significant digits of conversion factors (three digits for crude petroleum and two digits for refinery products).

TABLE 2
GERMANY: STRUCTURE OF THE MINERAL INDUSTRY IN 2006¹

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners ²	Location of main facilities	Annual capacity
Alumina	Nabaltec GmbH	Plant at Schwandorf	110
Do.	Aluminium Oxid Stade GmbH (DADCO Alumina & Chemicals Ltd., 100%)	Plant at Stade	900
Do.	Martinswerk GmbH (Albemarle Corporation, 100%)	Plant at Bergheim (fused alumina)	350
Aluminum	Hydro Aluminium Deutschland GmbH (Norsk Hydro ASA, 100%)	Primary smelters: Elbewerk at Stade (closed end-2006) and Rheinwerk at Neuss; Primary rolling mill at Grevenbroich	300
Do.	Aluminium Norf GmbH (Novelis Inc., 50%, and Hydro Aluminium Deutschland GmbH, 50%)	Lippenwerk at Luenen (secondary) and primary rolling mill at Neuss	600
Do.	Metallhüttenwerke Bruch GmbH	Secondary foundry alloy plant at Dortmund; secondary cast alloy plants at Asperg and Bad Saeckingen	110
Do.	Aleris Recycling GmbH (Aleris International Inc., 100%)	Secondary smelters: Erftwerk at Grevenbroich, Innwerk at Toeging am Inn, and Neckarwerk at Deizisau	320
Do.	Trimet Aluminium AG	Smelter at Essen-Borbeck	175 ^c
Do.	Hamburger Aluminium-Werk GmbH (HAW) (Trimet Aluminium AG, 100%)	Primary smelter at Hamburg (closed during 2006)	130
Do.	Corus Aluminium Voerde GmbH (Corus Group plc., 100%)	Primary smelter at Voerde, North Rhine-Westphalia	100
Aluminum salt slag	Alsa Technologies GmbH (Agor AG, 100%)	Plants at Hannover, Luenen, and Toeging	250
Do.	K+S Entsorgung GmbH (K+S Aktiengesellschaft, 100%)	REKAL plant at Sigmundshall	100
Arsenic, metal	metric tons PPM Pure Metals GmbH (Metaleurop S.A., 100%)	Plant at Langelsheim	5
Barite	Sachtleben Bergbau GmbH	Clara Mine in the Black Forest and plant at Wolfach, and Dreislar Mine at Medebach-Dreislar	87
Do.	Deutsche Baryt-Industrie Dr. Rudolf Alberti GmbH & Co. KG (Sachtleben Bergbau GmbH, 75%, and other private, 25%)	Wolkenhügel mine in the Harz Mountains and plant at Bad Lauterberg	50
Bentonite	Süd-Chemie AG	Plants at Moosburg, Duisburg, and Heufeld	500
Do.	IKO Minerals GmbH (S&B Industrial Minerals S.A., 100%)	Stollberg plant at Oberhausen	200 ^c
Do.	Kärlicher Ton- und Schamotte-Werke Mannheim & Co. KG (KTS)	Quarry at Muelheim-Kaerlich	50
Calcium carbonate, natural, ground	Alpha Calcit Fullstoff GmbH & Co. KG	Plant at Cologne	250
Do.	Omya GmbH (Omya AG, 100%)	Plants at Burgberg, Emden, Lagerdorf, and Sohlde, and another plant near Hamburg	2,250
Cement	HeidelbergCement AG	Plant at Burglengenfeld; two plants at Ennigerloh; two plants at Geseke; plants at Koenigs Wusterhausen, Leimen, Paderborn, Mainz-Weisenau, and Schelklingen; the Lengfurt plant at Triefenstein; and plant at Wetzlar	9,500 ^c
Do.	Dyckerhoff AG (Buzzi Unicem SpA, 88.37%, and other private, 11.63%)	Plants at Deuna, Geseke, Goellheim, Lengerich, Neuss, Neuwied, and the Amöneburg plant at Wiesbaden	7,200
Do.	CEMEX Deutschland AG (CEMEX S.A. de C.V., 100%)	Two plants at Beckum; plants at Dortmund, Duisburg, Eisenhuettenstadt, and Ruedersdorf	6,000
Do.	SCHWENK Zement KG	Plants at Allmendingen, Bernburg, Heidenheim-Mergelstetten, and Karlstadt	5,000 ^c
Do.	Holcim (Deutschland) AG (Holcim Ltd., 88.9%, and other private, 11.1%)	HANSA plant at Bremen, plants at Laegerdorf and Rostock, and the Höver plant at Sehnde	3,600
Do.	Lafarge Zement GmbH (Lafarge S.A., 100%)	Plants at Kall-Soetenich, Karsdorf, and Walzbachtal	3,500
Do.	Holcim (Baden-Württemberg) AG (Holcim Ltd., 100%)	Plant at Dotternhausen	1,600
Do.	TEUTONIA Zementwerk AG (HeidelbergCement AG, 94.2%, and other private, 5.8%)	Plant at Hannover	900

See footnotes at end of table.

TABLE 2--Continued
GERMANY: STRUCTURE OF THE MINERAL INDUSTRY IN 2006¹

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners ²	Location of main facilities	Annual capacity
Cement--Continued	Märker Zement GmbH	Plants at Harburg and Lauffen	NA
Chalk	Vereinigte Kreidewerke Dammann KG	Quarries and plants at Laegerdorf, on Ruegen Island, and at Soehle	500
Clay, including ball and refractory clays	Stephan Schmidt KG	Tonbergbau Grube Anton open pit mine, Dornburg-Langendernbach, Müllenbach and Thewald Mines, Hoehr-Grenzhausen; Wiesa-Thonberg and Cunnnersdorf quarries, Kamenz-Wiesa, Westerwald	1,400 ^c
Do.	Marx Bergbau GmbH & Co. KG (Stephan Schmidt KG, 100%)	Lämmersbach and Meudt Mines, Ruppach-Goldhausen quarry, Dornburg-Langendernbach, Westerwald	300 ^c
Do.	Goerg & Schneider GmbH & Co.	Quarry and main plant at Boden, others at Mogendorf, Goddert, Siershahn, Wirges/Staudt, and Kettenbach/Taunus, Westerwald region; others in Saxony and Eifel regions	NA
Do.	Mittelhessische Tonbergbau GmbH (Goerg & Schneider GmbH & Co., 50%, and Stephan Schmidt KG, 50%)	Quarry and plant in the Giessen/Lahn region	100
Do.	Rohstoffgesellschaft GmbH Ponholz	Mine and chamotte plant at Maxhuetten-Haidoff, and Aufofweiher Mine, Bavaria	100
Do.	Adolf Gottfried Tonwerke GmbH	Quarries and plant near Grossheirath, Coburg, Bavaria	100
Coal, anthracite and bituminous	Deutsche Steinkohle AG (RAG Aktiengesellschaft, 100%)	Augusta Victoria/Blumenthal, Lippe, Ost, Prosperhaniel, Walsum, and West Mines, Ruhr region, North Rhine-Westphalia	16,000
Do.	do.	Saar Mine, Saar Basin, Saarland	6,000
Do.	do.	Ibbenbüren Mine, Steinfurt District, North Rhine-Westphalia	2,100
Coke from domestic coal	Deutsche Steinkohle AG (RAG Aktiengesellschaft, 100%)	Pitside coking plant at the Prosper-Haniel Mine	2,000 ^c
Coke from imported coal	ThyssenKrupp Steel AG	Schwelgern plant at Duisburg	2,100
Do.	Hüttenwerke Krupp Mannesmann GmbH (ThyssenKrupp Steel AG, 50%; Vallourec & Mannesmann Tubes SA, 20%; Mannesmannröhren-Werke GmbH, 30%)	Plant at Duisberg-Huckingen steel complex	1,100
Copper (cathodes)	Norddeutsche Affinerie AG (L. Possehl & Co. mbH, 10%; other institutional investors, 45%; other private investors, 45%)	Primary smelter and refinery and secondary plant at Hamburg	560 ^c
Do.	Hüttenwerke Kayser AG (Norddeutsche Affinerie AG, 100%)	Secondary plant and refinery at Luenen	185 ^c
Dolomite	Rheinkalk Hagen-Halden GmbH & Co KG (Lhoist NV, 100%)	Steinbruch-Donnerkuhle quarry and Hönnetal plant at Menden, and plant at Hagen-Halden	7,500
Feldspar	Amberger Kaolinwerke GmbH—Eduard Kick GmbH & Co. KG (Quarzwerte GmbH, 100%)	Mine at Hirschau, Bavaria	135
Do.	Gebrüder Dorfner GmbH & Co Kaolin-und Kristallquartzsand Werk KG	do.	NA
Ferrochrome	Elektrowerk Weisweiler GmbH (Kermas Limited, 100%)	Plant at Eschweiler-Weisweiler, near Aachen	30
Fluorspar	Sachtleben Bergbau GmbH	Clara Mine in the Black Forest and plant at Wolfach	35
Gallium	metric tons Geo Gallium S.A. (Mining & Chemical Products Ltd., 50%, and Recapture Metals Inc., 50%)	Ingall plant at Stade	35
Graphite, from imported ore	do. Kropfmühl AG	Plant at Kropfmuehl, Passau	20,000
Do.	do. do.	Plants at Bad Godesberg and Wedel, Holstein	8,000
Gypsum	VG-ORTH GmbH & Co. KG	Mine and plant at Stadtdendorf, and plants at Osterode, Spremberg, and Witzhausen	150
Do.	Gyproc GmbH Baustoff Production & Co. KG	Mines and plant in Lower Saxony	110
Iron, pig	ThyssenKrupp Steel AG	Two blast furnace plants at Hamborn and Schelgern	12,000

See footnotes at end of table.

TABLE 2--Continued
GERMANY: STRUCTURE OF THE MINERAL INDUSTRY IN 2006¹

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners ²	Location of main facilities	Annual capacity	
Kaolin	WBB Fuchs GmbH & Co. KG, subsidiary of WBB Minerals plc (S.C.R.- Sibelco NV, 100%)	25 quarries and 8 plants, including 2 at Ransbach and Kannenbäckerland plant in Hoehr-Grenzhausen, Westerwald region; also including quarries and plants of Kaolin-und Tonwerke Seilitz-Loethain, Saxony region	2,000	
Do.	Amberger Kaolinwerke GmbH-Eduard Kick GmbH & Co. KG (Quarzwerke GmbH, 100%)	Mines at Caminau, Hirschau, Kemmlitz, and Schnaittenbach	300	
Lead	Metaleurop Weser GmbH (Metaleurop S.A., 100%)	Primary smelter and refinery at Nordenham, and two combination plants at Langelsheim and Oker	145	
Do.	Berzelius Metall GmbH	Primary smelter at Stolberg and secondary smelters at Braubach am Rhein and Freiberg/Sachsen	200	
Do.	Sudamin MHD GmbH	Refinery at Duisburg	120	
Do.	Norddeutsche Affinerie AG	Refinery at Hamburg	50	
Lignite	RWE Power Aktiengesellschaft	Open pit mines in Rhenish mining area: Bergheim, Garzweiler, Inden, and Hambach	105,000	
Do.	Vattenfall Europe Mining AG	Jänschwalde-Cottbus-Nord, Nochten, and Welzow-Süd mines, Lausatian mining area	60,000	
Do.	Mitteldeutsche Braunkohlengesellschaft AG	Profen and Vereinigtes Schleenhain mines	25,000	
Limestone	Harz-Kalk GmbH	Quarry at Ruebeland	2,000 ^c	
Do.	Kalkwerk Bad Kösen GmbH	Quarry at Bad Koesen	2,000 ^c	
Do.	Fels-Werke GmbH	Quarry at Kaltes Tal	2,000 ^c	
Do.	Schäfer Kalk GmbH & Co KG	Plants at Hahnstaetten, Steeden, Stromberg, and Grevenbrueck	3,000	
Do.	Rheinkalk GmbH & Co KG (Lhoist NV, 100%)	Flandersbach quarry and plant at Wuelfrath	7,500	
Magnesium, metal, secondary	Norsk Hydro Magnesiumgesellschaft GmbH (Norsk Hydro ASA, 100%)	Plant at Botrop	26	
Do.	Aleris Recycling GmbH (Aleris International Inc., 100%)	Plant at Toeging am Inn	15	
Do.	do.	Plant at Deizisau	50	
Natural gas	million cubic meters	BEB Erdgas-Erdöl GmbH (ExxonMobil Central Europe Holding GmbH, 50%)	Plants at Clenze and Grossenkmeten	9,500
Do.	do.	Mobil Erdgas-Erdöl GmbH (ExxonMobil Central Europe Holding GmbH, 100%)	Plants at Scholen	4,000
Petroleum:				
Crude		The largest companies were:	6 areas with about 85 oilfields, including:	
Do.	thousand 42-gallon barrels	BEB Erdgas und Erdöl GmbH (ExxonMobil Central Europe Holding GmbH, 50%)	West of Ems River	30,000 ^c
Do.	do.	Wintershall AG (BASF AG, 100%)	Weser-Ems Rivers	21,000 ^c
Do.	do.	Deutsche Texaco AG	Elbe-Weser Rivers	20,000 ^c
Refined		The largest companies were:	About 20 refineries, including:	
Do.	do.	Deutsche Shell AG	Refineries at Godorf, Hamburg, and Grasbrook	256,000 ^c
Do.	do.	Esso Deutschland GmbH (ExxonMobil Central Europe Holding GmbH, 100%)	Refineries at Karlsruhe and Ingolstadt	245,000 ^c
Do.	do.	Ruhr Oel GmbH (Petróleos de Venezuela S.A., 50%, and BP Gelsenkirchen GmbH, 50%)	Refinery at Gelsenkirchen	215,500 ^c
Do.	do.	BAYERNOIL Raffineriegesellschaft mbH (OMV AG, 45%; Ruhr Oel GmbH, 25%; AGIP Deutschland GmbH, 20%; Deutsche BP AG, 10%)	Refinery at Neustadt-Donau	145,000 ^c
Potash, K ₂ O content	K+S Kali GmbH (K+S Aktiengesellschaft, 100%)	Mines at Bergmannsseggen-Hugo, Niedersachsen-Riedel, Salzdettfurth, Sigmundshall, Hattorf, Neuhof-Ellers, Sondershausen, and Wintershall	6,000	

See footnotes at end of table.

TABLE 2--Continued
GERMANY: STRUCTURE OF THE MINERAL INDUSTRY IN 2006¹

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners ²	Location of main facilities	Annual capacity
Salt (rock)	K+S Salz GmbH (K+S Aktiengesellschaft, 100%)	Mines at Bad Friedrichshall-Kochendorf, Braunschweig-Lüneburg, Heilbronn, Riedel, Stetten, and Wesel (Borth)	15,000
Siliceous earth, silica	Hoffmann Mineral and Co. KG	Mine and plant near Neuburg	50
Silicon, metal	metric tons RW Silicium GmbH (Graphit Kropfmühl AG, 100%)	Four electric arc furnaces in plant at Pocking	27,500
Steel, crude	ThyssenKrupp Steel AG	Bruckhausen and Beeckerwerth plants, near Duisburg	12,000
Do.	Salzgitter AG	Plants at Peine and Salzgitter	6,400 ^c
Do.	Hüttenwerke Krupp Mannesmann GmbH (ThyssenKrupp Steel AG, 50%; Vallourec & Mannesmann Tubes SA, 20%; Mannesmannröhren-Werke GmbH, 30%)	Plant at Duisberg-Huckingen	5,600
Do.	Arcelor Bremen GmbH (Mittal Steel Co. NV, 99.88%, and other private, 0.12%)	Plant at Bremen	4,000
Do.	Saarstahl AG (Struktur-Holding-Stahl GmbH & Co KG, 74.9%, and Dillinger Hüttenwerke AG, 25.1%)	Plants at Burbach, Neunkirchen, and Voelklingen	3,000
Do.	AG der Dillinger Hüttenwerke (Mittal Steel Co. NV, 51.25%; Saarstahl AG, 33.75%; Struktur-Holding-Stahl GmbH & Co KG, 15%)	Plant at Dillingen	2,800
Do.	Arcelor Eisenhüttenstadt GmbH (Mittal Steel Co. NV, 100%)	Plant at Eisenhüttenstadt	2,800
Do.	Mittal Steel Co. NV	Plants at Duisburg and Hamburg	2,600 ^c
Do.	Badische Stahlwerke GmbH	Plant at Kehl	2,300 ^c
Do.	Brandenburger Elektrostahlwerk GmbH (RIVA FIRE S.p.A, 100%)	Plant at Brandenburg	1,700 ^c
Do.	ThyssenKrupp Nirosta (ThyssenKrupp Steel AG, 100%)	Plants at Bochum and Krefeld	1,600 ^c
Do.	Georgsmarienhütte GmbH	Plants at Bous, Georgsmarienhütte, and Groeditz	1,300 ^c
Do.	Stahlwerk Thüringen GmbH (Alfonso Gallardo S.A., 100%)	Plant at Unterwellenborn	1,100 ^c
Do.	Deutsche Edelstahlwerke GmbH	Plants at Siegen and Witten	1,100 ^c
Do.	Lech-Stahlwerke GmbH (Max Aicher GmbH & Co. KG, 100%)	Plant at Herbertshofen	1,100 ^c
Do.	Hennigsdorfer Elektrostahlwerk GmbH (RIVA FIRE S.p.A, 100%)	Plant at Hennigsdorf	1,000 ^c
Do.	Elbe-Stahlwerke Feralpi GmbH (Feralpi Siderurgica S.p.A., 100%)	Plant at Riesa	900 ^c
Strontium carbonate	Solvay & CPC Barium Strontium GmbH & Co. KG (Solvay S.A., 75%, and Chemical Products Corporation, 25%)	Plant at Bad Hoeninggen, near Hannover	95
Zeolites	Hans G. Hauri Mineralstoffwerk GmbH	Mine and plant at Boetzingen, near Freiburg	NA
Zinc, metal	Xstrata plc	Smelter at Nordenham	155 ^c
Do.	Ruhr-Zink GmbH	Refinery at Datteln	140
Do.	Sudamin MHD GmbH	Smelter at Duisburg	100

^cEstimated; estimated data are rounded to no more than three significant digits. NA Not available.

¹Table includes data available through October 2007.

²Many more industrial minerals companies are listed in the Industrial Minerals Directory, 2003, but an updated directory had not been published by October 2007.

TABLE 3
GERMANY: EXPORTS OF SELECTED MINERAL COMMODITIES IN 2005¹

(Metric tons unless otherwise specified)

Commodity	Total	Destinations ^e	
		United States	Other (principal ²)
METALS			
Aluminum:			
Bauxite, ore and concentrate	28,087	--	Sweden 5,510; France 4,630; Netherlands 3,400.
Oxides	204,075	11,200	Italy 31,600; United Kingdom 26,700; Poland 22,000.
Hydroxides thousand metric tons	528	68	Netherlands 145; United Kingdom 70; Italy 35.
Ash and residue containing aluminum	21,126	--	France 5,280; Spain 4,520; Netherlands 3,800.
Metal, including alloys:			
Primary, not alloyed	60,757	--	Austria 23,300; Czech Republic 12,600; Italy 8,200.
Primary, alloys, all forms	167,497	--	Austria 48,200; Belgium 32,300; Poland 13,100.
Secondary	163,345	--	France 33,800; Netherlands 27,000; Italy 21,200.
Scrap	583,987	--	Italy 136,000; Austria 99,900; Netherlands 94,000.
Antimony:			
Ore and concentrate	3	--	Austria, 100%.
Metal, including alloys, all forms	12	--	Sweden 3; Japan 2; Taiwan 2.
Arsenic, metal, including alloys, all forms	20	5	Belgium 8; China 2; Japan 2.
Bismuth, metal, including alloys, all forms	349	--	France 153; Belgium 105; Slovenia 35.
Chromium, ore and concentrate	14,188	--	Czech Republic 3,830; Slovakia 2,500; Austria 1,920.
Cobalt:			
Ore and concentrate	171	--	Belgium 87; China 77.
Oxides and hydroxides	185	--	China 85; France 37; Italy 15.
Metal, including alloys, all forms	444	--	United Kingdom 133; France 107; Japan 37.
Scrap	384	99	United Kingdom 109; Finland 99; France 59.
Copper:			
Ore and concentrate	46,139	--	Sweden 44,500.
Matte and speiss, including cement copper	535	--	Canada 525.
Ash and residue containing copper	15,928	--	Belgium 9,700; Canada 3,150; Austria 1,190.
Metal, including alloys:			
Unrefined	232	--	Austria 110; Netherlands 80; Slovenia 22.
Refined, not alloyed	149,083	22,400	France 64,700; Italy 28,800; United Kingdom 9,540.
Alloys, all forms	20,232	--	Italy 3,950; Switzerland 2,140; France 2,120.
Scrap	439,134	--	China 187,000; Netherlands 80,800; Belgium 34,700.
Gallium, indium, and thallium, metal including scrap	15	--	France 13.
Germanium, oxides	259	--	United Kingdom 161; Italy 21; France 14.
Gold:			
Metal, including alloys, all forms kilograms	82	20	Austria 48; Japan 5.
Waste and sweepings	31	--	Italy 17; Switzerland 11.
Iron and steel:			
Ore and concentrate	7,023	--	Slovakia 2,420; Switzerland 2,090; France 1,070.
Pyrite, roasted	7,257	--	Switzerland 5,840; Ireland 1,400.
Ash and residue containing iron thousand metric tons	940	--	France 352; Luxembourg 193; United Kingdom 174.
Metal:			
Pig iron, cast iron, related materials	82,776	--	France 19,000; Czech Republic 15,300; Italy 9,020.
Scrap thousand metric tons	7,544	--	France 1,690; Netherlands 1,580; Luxembourg 1,270.
Sponge iron, powder	175,291	--	France 123,000; Unspecified 51,000.
Ferroalloys:			
Ferrochromium	26,472	5,510	Austria 3,710; Italy 3,280; Sweden 3,120.
Ferromanganese	12,660	--	Austria 2,990; Switzerland 2,960; France 1,350.
Ferromolybdenum	3,867	--	Italy 1,110; Czech Republic 1,090; France 418.
Ferronickel	31	--	Switzerland 19; Belgium 6; Czech Republic 2.
Ferrosilicochromium	4	--	India, 100%.
Ferrosilicomagnesium	14,254	--	Italy 5,630; France 2,000; Netherlands 1,150.
Ferrosilicomanganese	2,928	--	Belgium 890; France 691; Switzerland 685.
Ferrosilicon	53,979	--	France 17,400; Belgium 7,720; Austria 6,800.
Ferrotungsten	176	--	Italy 52; Austria 35; Belgium 28.
Ferrotitanium	5,263	--	Italy 1,170; France 763; Sweden 742.

See footnotes at end of table.

TABLE 3--Continued
GERMANY: EXPORTS OF SELECTED MINERAL COMMODITIES IN 2005¹

(Metric tons unless otherwise specified)

Commodity	Total	Destinations ^e	
		United States	Other (principal ²)
METALS--Continued			
Iron and steel, metal, ferroalloys--Continued:			
Ferrovandium	528	--	Italy 292; United Kingdom 55; Spain 45.
Ferriobium	1,448	107	Italy 408; Belgium 278; France 161.
Other ferroalloys	11,585	--	Italy 2,440; France 2,220; Slovenia 857.
Steel, crude	1,999	--	United Kingdom 270; Australia 262; Bahrain 240.
Lead:			
Ore and concentrate	102	--	China, 100%.
Lead containing antimony	15,090	--	Czech Republic 6,810; Austria 4,060; France 1,480.
Metal, including alloys:			
Alloys, all forms	25,382	--	France 7,970; Belgium 7,610; Czech Republic 4,370.
Refined	81,647	--	France 39,400; Czech Republic 18,000; Austria 10,700.
Unrefined	2	--	Portugal, 100%.
Scrap	19,493	--	Belgium 12,400; Netherlands 4,660.
Lithium carbonate	2,991	--	France 763; Belgium 505; United Kingdom 269.
Magnesium, metal, including alloys:			
Scrap	12,913	--	Austria 4,380; Czech Republic 4,330; Netherlands 749.
Unwrought	8,372	--	Romania 1,570; Hungary 1,410; Austria 1,310.
Manganese, ore and concentrate	3,218	--	Belgium 2,730.
Mercury	36	11	Sweden 5; Liechtenstein 4; Singapore 3.
Molybdenum, ore and concentrate	2,770	247	China 762; Belgium 717; Netherlands 407.
Nickel:			
Matte, speiss, related materials	5,604	--	Canada, 100%.
Oxides and hydroxides	102	16	Japan 67.
Ash and residue containing nickel	427	--	Netherlands 210; Sweden 179; Austria 38.
Metal, including alloys:			
Alloys, all forms	9,376	--	Austria 7,180; Sweden 863; France 750.
Unalloyed	8,988	--	Netherlands 3,800; Austria 1,570; France 935.
Scrap	9,342	972	Netherlands 2,960; Italy 1,160; United Kingdom 869.
Platinum-group metals:			
Waste and sweepings	1,649	825	Belgium 620; United Kingdom 99.
Metal, including alloys, all forms:			
Platinum	kilograms 38,394	5,680	Belgium 11,100; Switzerland 6,100; China 5,950.
Palladium	do. 16,639	4,410	Switzerland 2,160; Brazil 1,910; Japan 1,350.
Rhodium	do. 4,681	726	Belgium 1,570; Japan 768; Brazil 365.
Iridium, osmium and ruthenium	do. 9,034	6,170	Hong Kong 958; Belgium 578.
Rare-earth metals, including alloys:			
Metal	1	--	Malaysia < 1; South Korea < 1.
Compounds, all forms	123	--	France 22; Malaysia 13; Russia 13.
Selenium, elemental	205	36	Belgium 23; Mexico 21; Hong Kong 19.
Silver:			
Metal	1,583	--	Unspecified 1,020; Turkey 120; Belgium 104.
Powder	kilograms 58,454	3,040	France 20,300; Greece 17,200; Japan 5,030.
Tin:			
Ore and concentrate	163	--	Belgium, 100%.
Ash and residue containing tin	764	--	Belgium 672; Netherlands 77.
Metal, including alloys	1,672	--	Netherlands 575; Austria 279; Poland 174.
Scrap	701	--	France 501; Belgium 92; Netherlands 53.
Titanium, ore and concentrate	607	--	Italy 263; France 177; Mexico 83.
Tungsten:			
Ore and concentrate	43	--	Netherlands, 100%.
Metal, including alloys:			
Metal	915	--	Unspecified, 100%.
Scrap	2,894	860	Austria 518; United Kingdom 382; Sweden 333.
Wolframite	2,753	--	Unspecified, 100%.

See footnotes at end of table.

TABLE 3--Continued
GERMANY: EXPORTS OF SELECTED MINERAL COMMODITIES IN 2005¹

(Metric tons unless otherwise specified)

Commodity	Total	Destinations ^e	
		United States	Other (principal ²)
METALS--Continued			
Vanadium, oxides and hydroxides	1,216	--	Unspecified, 100%.
Zinc:			
Ore and concentrate	7,257	--	Belgium 3,710; Serbia 2,410; Netherlands 1,020.
Matte and related materials	8,875	--	Belgium 2,640; Netherlands 1,900; Luxembourg 1,160.
Blue powder	5,211	552	Switzerland 1,110; Austria 427; China 427.
Ash and residue containing zinc	36,331	--	Belgium 18,100; Netherlands 14,300; France 3,090.
Metal, including alloys:			
Alloys, all forms	30,115	--	Austria 11,900; Italy 3,400; Czech Republic 2,530.
Unalloyed	81,664	--	France 25,800; United Kingdom 21,300; Austria 10,300.
Scrap	55,913	--	Belgium 16,400; China 14,800; India 6,320.
Zirconium:			
Ore and concentrate	5,044	--	Belgium 3,570; Austria 298.
Metal, including alloys	38	16	Japan 6; Canada 4; France 3.
INDUSTRIAL MINERALS			
Abrasives, natural:			
Corundum, emery, garnet, etc.	4,546	--	Sweden 1,677; Switzerland 886; Netherlands 659.
Pumice	102,274	--	Netherlands 47,100; Luxembourg 41,300; Switzerland 716.
Asbestos, crude	< 1	100%	--
Barite and witherite	32,375	--	Unspecified, 100%.
Borates, natural, crude, including calcined	30	--	Czech Republic 13; Switzerland 9; South Africa 7.
Cement	thousand metric tons 6,238	--	Netherlands 2,240; Belgium 823; France 412.
Chalk, natural	137,812	--	Netherlands 49,900; Sweden 18,300; Denmark 17,800.
Clays, crude:			
Bentonite	71,977	--	Austria 13,500; Switzerland 13,200; France 12,600.
Kaolin	301,870	--	Italy 80,300; Austria 79,400; Switzerland 42,000.
Other, unspecified	thousand metric tons 2,434	--	Italy 881; Netherlands 825; Belgium 299.
Diamond, natural:			
Gem, not set or strung	carats 164,393	20,500	Thailand 27,600; Hong Kong 22,500; Israel 13,200.
Industrial stones	do. 5,186	--	Switzerland 2,020; Austria 1,660; Belgium 534.
Dust and powder	kilograms 2,984	--	Austria 582; Ireland 430; Thailand 325.
Diatomite and other infusorial earth	7,611	--	Austria 2,760; Poland 655; Netherlands 533.
Feldspar	113,329	--	France 60,700; Italy 16,000; Czech Republic 8,730.
Fluorspar:			
Acid-grade	11,323	--	Sweden 2,510; Hungary 1,530; Poland 1,440.
Metallurgical-grade	12,738	--	Denmark 2,290; Spain 2,280; Czech Republic 2,230.
Graphite, natural	14,241	--	Czech Republic 3,770; France 1,990; Austria 1,170.
Gypsum and anhydrite, natural	thousand metric tons 1,252	--	Belgium 310; Norway 212; Netherlands 185.
Kyanite and related materials:			
Andalusite, kyanite, sillimanite	2,214	--	Hungary 759; Italy 467; Poland 166.
Mullite	9,977	2,960	United Kingdom 2,270; Italy 1,800; Hungary 1,250.
Lime, hydrated	thousand metric tons 955	--	Netherlands 631; Belgium 95; France 81.
Magnesium compounds:			
Magnesite, crude, including burned	81,082	--	France 29,400; Austria 20,500; Slovakia 7,300.
Epsomite	760,490	--	France 171,000; Malaysia 165,000; Indonesia 119,000.
Mica, crude, including splittings and waste	3,656	--	Brazil 1,200; Italy 669; Austria 548.
Peat, natural	thousand metric tons 2,007	--	Netherlands 885; France 237; Italy 177.
Phosphates:			
Crude	5,045	--	Belgium, 100%.
Milled	3	--	Austria 3; Poland < 1.
Precious and semiprecious gemstones, natural (other than diamond):			
Pyrite, unroasted	240	--	France 165; Turkey 40; Czech Republic 22.
Salt and brine	thousand metric tons 3,373	--	Belgium 904; Netherlands 580; Czech Republic 381.

See footnotes at end of table.

TABLE 3--Continued
GERMANY: EXPORTS OF SELECTED MINERAL COMMODITIES IN 2005¹

(Metric tons unless otherwise specified)

Commodity	Total	Destinations ^e	
		United States	Other (principal ²)
INDUSTRIAL MINERALS--Continued			
Stone, sand and gravel:			
Basalt, lava rocks, etc.	263,860	--	Netherlands 242,000; Switzerland 18,700.
Dimension stone:			
Dolomite and limestone	thousand metric tons	730	-- Luxembourg 529; Netherlands 69; Belgium 45.
Granite		66,453	-- Switzerland 60,300.
Marble, travertine, etc.		178,347	-- Switzerland 71,500; Netherlands 39,600; Belgium 26,800.
Foundation sand and gravel		158,268	-- Austria 66,900; Switzerland 62,800; France 18,700.
Limestone for cement		165,383	-- Luxembourg 135,000; Belgium 11,600; France 8,430.
Quartz and quartzite		39,220	-- Netherlands 9,810; Austria 5,260; Czech Republic 4,590.
Quartz sand	thousand metric tons	8,670	-- Netherlands 6,030; Belgium 1,460.
Sandstone		7,958	-- Netherlands 5,670; Austria 708; United Arab Emirates 549.
Schist and shale		18,422	-- Belgium 9,160; Netherlands 4,050; Denmark 3,060.
Unworked stone, natural	thousand metric tons	9,194	-- Netherlands 5,880; Belgium 1,280; Switzerland 818.
Other natural stone, unspecified	do.	5,343	-- Netherlands 3,920; Switzerland 358; France 347.
Sulfur, crude, including native and byproduct	do.	899	-- Morocco 210; Senegal 106; Poland 76.
Talc, steatite, soapstone, pyrophyllite		3,906	-- Romania 726; France 590; Denmark 434.
Vermiculite, perlite, chlorite		3,145	-- Belgium 686; Poland 497; Austria 494.
MINERAL FUELS AND RELATED MATERIALS			
Asphalt and bitumen, natural		134,091	-- Austria 23,600; Luxembourg 16,800; France 15,400.
Coal:			
Anthracite		11,103	-- Israel 5,020; Belgium 1,390; Austria 1,270.
Lignite	thousand metric tons	34	-- Austria 31.
Other bituminous, including briquets		284,861	-- France 111,000; Belgium 79,500; Poland 75,500.
Coke:			
Of anthracite and bituminous coal		75,085	-- United Kingdom 28,700; Netherlands 14,300; Austria 9,090.
Of lignite		8,227	-- Austria 5,550; Canada 1,490; Japan 658.
Gas, natural, gaseous	thousand metric tons	13,771	-- Unspecified, 100%.
Petroleum, crude	do.	1,258	-- United Kingdom 1,220.
Uranium, natural:			
Crude, U content	kilograms	65,930	-- France 64,000.
Enriched, fissile isotopes	do.	9,223	5,710 Belgium 1,620; France 489; Finland 479.

^eEstimated; estimated tonnages are rounded to no more than three significant digits; may not add to totals shown. -- Less than 5%.

¹Source: Bundesanstalt für Geowissenschaften und Rohstoffe, 2006, Table 1.2—Rohstoffsituation, 2005: Hannover, Germany, October.

²Destination country was estimated to have accounted for at least 5% of Germany's total exports of the mineral commodity.

TABLE 4
GERMANY: IMPORTS OF SELECTED MINERAL COMMODITIES IN 2005¹

(Metric tons unless otherwise specified)

Commodity	Total	Sources ^c	
		United States	Other (principal ²)
METALS			
Aluminum:			
Bauxite, ore and concentrate	thousand metric tons	2,435	-- Guinea 1,920; Australia 134.
Oxides	do.	1,000	-- Jamaica 465; Ireland 178; France 86.
Hydroxides		231,124	-- Ireland 117,000; Iran 25,000; Hungary 19,000.
Ash and residue containing aluminum		156,965	-- Netherlands 46,800; France 44,100; Denmark 18,400.
Metal, including alloys:			
Primary, not alloyed	thousand metric tons	649	-- Russia 151; Iceland 112; Brazil 97.
Primary, alloys, all forms	do.	690	-- Netherlands 175; Norway 149; United Kingdom 109.
Secondary		431,665	-- United Kingdom 129,000; Austria 46,200; Netherlands 40,100.
Scrap		438,066	-- Netherlands 94,200; France 49,500; Switzerland 46,900.
Antimony:			
Metal, including alloys, all forms		146	-- China 106; Vietnam 20; Russia 17.
Scrap		1	-- China, 100%.
Arsenic, metal, including alloys, all forms		2	-- China 2; Japan < 1.
Bismuth, metal, including alloys, all forms		1,489	-- United Kingdom 969; Mexico 404; Belgium 85.
Chromium, ore and concentrate		141,483	-- South Africa 93,200; Turkey 34,700.
Cobalt:			
Oxides and hydroxides		542	-- Finland 272; Belgium 78; Italy 74.
Metal, including alloys, all forms		2,256	239 Canada 329; Russia 314; Belgium 305.
Scrap		230	21 Netherlands 45; South Africa 33; Switzerland 28.
Copper:			
Ore and concentrate	thousand metric tons	1,149	-- Chile 412; Peru 213; Argentina 201.
Matte and speiss, including cement copper		27,618	-- Brazil 16,100; Chile 5,050; Romania 3,370.
Ash and residue containing copper		47,524	3,660 Italy 11,500; Ukraine 6,940; Netherlands 5,800.
Metal, including alloys:			
Unrefined		36,671	-- Armenia 9,500; Chile 5,980; Peru 4,660.
Refined, not alloyed	thousand metric tons	625	-- Russia 227; Chile 143; Poland 101.
Alloys, all forms		26,657	-- United Kingdom 6,000; Belgium 4,210; Poland 3,970.
Scrap		432,147	-- France 67,000; Netherlands 44,900; United Kingdom 38,500.
Gallium, indium, and thallium, metal, including scrap		25	4 United Kingdom 6; China 5; France 3.
Germanium, oxides		2,349	312 France 829; China 533; United Kingdom 331.
Gold:			
Metal, including alloys, all forms	kilograms	29	9 France 11; Switzerland 4; United Kingdom 3.
Waste and sweepings		1,926	-- United Kingdom 435; Austria 424; Australia 339.
Iron and steel:			
Ore and concentrate	thousand metric tons	39,061	-- Brazil 21,800; Sweden 5,390; Canada 5,230.
Pyrite, roasted		20,496	-- Norway 19800.
Ash and residue containing iron		185,409	-- Austria 156,000; Luxembourg 23,500.
Metal:			
Pig iron, cast iron, related materials		320,422	-- Russia 167,000; South Africa 58,000; Canada 29,500.
Scrap	thousand metric tons	5,273	-- Netherlands 1,200; Poland 796; Czech Republic 733.
Sponge iron, powder		156,048	-- Canada 58,800; Sweden 29,200; Trinidad & Tobago 21,400.
Ferroalloys:			
Ferchromium		454,703	-- South Africa 295,000; Netherlands 55,900; Kazakhstan 35,500.
Ferromanganese		170,967	-- South Africa 56,800; France 36,900; Spain 30,800.
Ferromolybdenum		15,594	-- Belgium 7,310; Armenia 2,150; United Kingdom 1,330.
Ferronickel		157,091	-- United Kingdom 62,800; Greece 36,900; Venezuela 31,700.
Ferrosilicochromium		1,429	-- Russia 822; South Africa 422; China 186.
Ferrosilicomagnesium		6,831	-- Norway 4,600; Slovenia 1,560; Argentina 417.
Ferrosilicomanganese		172,967	-- Norway 47,900; Ukraine 32,500; China 22,800.
Ferrosilicon		238,120	-- Norway 58,300; France 36,200; Poland 32,900.
Ferrotungsten		600	-- China 463; Netherlands 49.
Ferrotitanium		10,302	-- Russia 3,470; United Kingdom 2,660; Netherlands 1,960.

See footnotes at end of table.

TABLE 4--Continued
GERMANY: IMPORTS OF SELECTED MINERAL COMMODITIES IN 2005¹

(Metric tons unless otherwise specified)

Commodity	Total	Sources ^c	
		United States	Other (principal ²)
METALS--Continued			
Iron and steel, metal, ferroalloys--Continued:			
Ferrovandium	4,843	--	Austria 2,700; Russia 1,210.
Ferriobium	4,361	--	Brazil 3,580; Canada 593.
Other ferroalloys	68,205	--	France 25,200; United Kingdom 9,000; Italy 8,120.
Steel, crude	13,918	--	Czech Republic 6,330; Poland, 1,780; United Kingdom 1,530.
Lead:			
Ore and concentrate	171,533	--	Australia 42,400; Sweden 36,900; Ireland 29,700.
Lead containing antimony	14,696	--	Sweden 5,140; Belgium 4,010; Ukraine 1,540.
Metal, including alloys:			
Alloys, all forms	13,332	--	United Kingdom 4,810; France 2,280; Netherlands 2,200.
Refined	70,209	--	United Kingdom 19,700; Belgium 17,600; Poland 12,600.
Unrefined	10,296	--	Poland 4,970; Switzerland 2,030; United Kingdom 1,080.
Scrap	74,054	--	Belgium 25,000; United Kingdom 24,900; Netherlands 4,740.
Lithium:			
Carbonate	8,097	785	Chile 7,030.
Oxides and hydroxides	4,209	943	Switzerland 2,850; Russia 244.
Magnesium, metal, including alloys:			
Scrap	19,996	--	China 11,500; Austria 3,940; Switzerland 1,980.
Unwrought	42,806	--	China 21,500; Czech Republic 5,350; Norway 5,090.
Manganese, ore and concentrate	7,645	--	Netherlands 3,660; France 1,450; Brazil 1,090.
Mercury	36	4	Spain 21; Finland 6.
Molybdenum, ore and concentrate	11,537	2,620	Belgium 1,950; China 1,880; Chile 1,750.
Nickel:			
Matte, speiss, related materials	6,902	--	Netherlands 6,860.
Oxides and hydroxides	502	--	Czech Republic 157; Canada 118; Belgium 80.
Ash and residue containing nickel	8,206	911	Netherlands 2,830; France 935; Singapore 615.
Metal, including alloys:			
Alloys, all forms	2,182	133	United Kingdom 1,130; Austria 454; Belgium 116.
Unalloyed	87,939	--	Russia 35,600; United Kingdom 27,100; Norway 10,600.
Scrap	11,672	969	Austria 2,520; United Kingdom 1,140; France 1,020.
Niobium (columbium):			
Ore and concentrate, including tantalum	79,274	--	Unspecified, 100%.
Scrap containing both niobium and tantalum	401	--	Malaysia 171; Belgium 137; Rwanda 47.
Platinum-group metals:			
Waste and sweepings	6,575	796	South Africa 1,100; Austria 414; United Kingdom 355.
Metal, including alloys, all forms:			
Platinum kilograms	46,420	5,760	South Africa 15,400; Belgium 12,300; United Kingdom 7,610.
Palladium do.	45,278	3,120	Belgium 18,400; United Kingdom 8,330; South Africa 5,570.
Rhodium do.	5,829	869	Belgium 3,050; United Kingdom 717; South Africa 490.
Iridium, osmium, and ruthenium do.	4,217	384	South Africa 1,560; United Kingdom 810; Russia 443.
Rare-earth metals, including alloys:			
Metal	402	--	China 234; Austria 116; Belgium 25.
Compounds, all forms	1,082	--	China 540; France 278; Austria 156.
Selenium, elemental	225	--	Canada 45; Uzbekistan 43; Russia 40.
Silicon, metal	156,690	--	Norway 63,100; Brazil 48,600; France 16,300.
Tin:			
Ore and concentrate	2	--	Switzerland, 100%.
Ash and residue containing tin	1,011	--	Netherlands 761; Belgium 173.
Metal, including alloys	20,992	--	Peru 4,810; Indonesia 4,050; Thailand 3,630.
Scrap	506	--	Netherlands 175; France 119; Slovakia 39.
Titanium, ore and concentrate	558,278	--	Norway 232,000; Canada 154,000; South Africa 142,000.
Tungsten:			
Ore and concentrate	493	--	Brazil 128; Thailand 124; Canada 77.

See footnotes at end of table.

TABLE 4--Continued
GERMANY: IMPORTS OF SELECTED MINERAL COMMODITIES IN 2005¹

(Metric tons unless otherwise specified)

Commodity	Total	Sources ^c	
		United States	Other (principal ²)
METALS--Continued			
Tungsten--Continued:			
Metal, including alloys:			
Metal	2,066	196	Austria 791; Canada 593; China 140.
Scrap	3,329	613	United Kingdom 449; Austria 396; Russia 306.
Wolframite	857	448	China 200; Ireland 166.
Vanadium, oxides and hydroxides	741	--	China 250; Unspecified 247; Australia 157.
Zinc:			
Ore and concentrate	401,829	54,600	Ireland 110,000; Peru 66,300; Sweden 61,900.
Matte and related materials	17,703	--	Netherlands 4,510; Belgium 2,730; France 2,090.
Blue powder	6,126	349	Belgium 3,640; Norway 1,420; United Kingdom 337.
Ash and residue containing zinc	22,066	1,810	Netherlands 4,770; Switzerland 4,390; France 2,890.
Metal, including alloys:			
Alloys, all forms	76,981	--	Belgium 49,700; France 9,550; Finland 6,770.
Unalloyed	245,794	--	Spain 81,100; Finland 61,400; Netherlands 47,700.
Scrap	22,480	--	France 8,450; Netherlands 6,160; Denmark 2,230.
Zirconium, metal, including alloys	145	--	Netherlands 100; France 31.
INDUSTRIAL MINERALS			
Abrasives, natural:			
Corundum, emery, garnet, etc.	11,062	--	India 7,410; Netherlands 1,080; United Kingdom 985.
Pumice	166,223	--	Italy 139,000; Iceland 25,800.
Asbestos, crude	98	--	Canada 73; South Africa 18; Zimbabwe 7.
Barite and witherite	231,471	--	China 156,000; France 31,500; Bulgaria 27,100.
Borates, natural, crude, including calcined	9,102	--	Turkey 3,450; Belgium 2,920; Netherlands 2,410.
Cement	thousand metric tons 1,605	--	France 371; Belgium 355; Czech Republic 300.
Chalk, natural	251,539	--	Netherlands 130,000; France 54,600; Belgium 42,000.
Clays, crude:			
Bentonite	253,226	--	Netherlands 109,000; Italy 40,500; Czech Republic 38,500.
Kaolin	thousand metric tons 803	194	Netherlands 215; Czech Republic 138; United Kingdom 133.
Other, unspecified	157,146	25,100	Czech Republic 47,900; Luxembourg 21,400; United Kingdom 17,000.
Diamond, natural:			
Gem, not set or strung	carats 432,555	--	Belgium 154,000; India 153,000; Israel 44,600.
Industrial stones	thousand carats 1,076	--	United Kingdom 513; Ireland 273; Belgium 173.
Dust and powder	kilograms 9,567	1,510	Ireland 4,250; China 1,000; Ukraine 555.
Diatomite and other infusorial earth	87,236	11,300	Spain 36,000; Denmark 16,800; Netherlands 10,500.
Feldspar	101,931	--	France 38,100; Turkey 18,600; Norway 17,600.
Fluorspar:			
Acid-grade	245,089	--	South Africa 96,100; Namibia 57,100; China 42,600.
Metallurgical-grade	19,806	--	China 16,300; South Africa 3,070.
Graphite, natural	55,843	--	China 19,600; Netherlands 16,400; Unspecified 11,600.
Gypsum and anhydrite, natural	140,238	--	France 53,600; Austria 51,700; Netherlands 16,000.
Kyanite and related materials:			
Andalusite, kyanite, sillimanite	52,574	--	South Africa 24,300; France 15,000; Belgium 5,470.
Mullite	5,473	662	Hungary 2,440; United Kingdom 1,640; Canada 465.
Lime, hydrated	thousand metric tons 298	--	France 121; Czech Republic 86; Belgium 51.
Magnesium compounds:			
Magnesite, crude, including burned	521,442	--	China 279,000; Netherlands 78,700; Slovakia 26,600.
Epsomite	299	--	Netherlands 144; Belgium 101; France 54.
Mica, crude, including splittings and waste	32,009	--	India 11,700; France 9,440; Netherlands 3,390.
Peat, natural	285,308	--	Netherlands 90,700; Latvia 68,500; Estonia 49,400.
Phosphates:			
Crude	86,903	--	Israel 69,400; Russia 15,000.
Milled	17,432	--	Belgium 16,000.

See footnotes at end of table.

TABLE 4--Continued
GERMANY: IMPORTS OF SELECTED MINERAL COMMODITIES IN 2005¹

(Metric tons unless otherwise specified)

Commodity	Total	Sources ^c	
		United States	Other (principal ²)
INDUSTRIAL MINERALS--Continued			
Precious and semiprecious stones, natural (other than diamond):			
Gem, not set or strung	1,406	--	Brazil 800; Madagascar 152; China 87.
Industrial stones	grams 3,500	900	China 2,600.
Pyrite, unroasted	62,686	--	Finland 59,700.
Salt and brine	thousand metric tons 2,559	--	Netherlands 1,990; United Kingdom 131.
Stone, sand and gravel:			
Basalt, lava rocks, etc.	68,572	--	Norway 33,100; Italy 15,200; Netherlands 7,060.
Dimension stone:			
Dolomite and limestone	614,711	--	Belgium 273,000; Estonia 267,000.
Granite	136,889	--	Poland 28,300; Norway 13,700; Portugal 12,600.
Marble, travertine, etc.	thousand metric tons 3,101	--	Norway 1,740; Austria 896; Italy 248.
Foundation sand and gravel	22,562	--	Switzerland, 100%.
Limestone for cement	thousand metric tons 1,876	--	Belgium 625; Poland 525; Austria 490.
Quartz and quartzite	78,977	--	Austria 34,000; Brazil 16,800; Sweden 9,000.
Quartz sand	thousand metric tons 1,590	--	France 871; Netherlands 294; Austria 162.
Sandstone	21,670	--	India 6,720; Poland 6,460; Italy 1,710.
Schist and shale	29,224	--	France 24,800.
Natural stones, unworked	thousand metric tons 1,183	--	France 1,010; Netherlands 75.
Other natural stone, unspecified	do. 6,259	--	Norway 3,290; United Kingdom 1,510; Sweden 444.
Sulfur, crude, including native and byproduct	46,127	--	Belgium 10,200; Netherlands 9,730; Norway 7,060.
Talc, steatite, soapstone, pyrophyllite	376,618	--	Netherlands 121,000; France 91,900; Austria 76,800.
Vermiculite, perlite, chlorite	97,031	--	Greece 67,100; Hungary 16,800; South Africa 11,000.
MINERAL FUELS AND RELATED MATERIALS			
Asphalt and bitumen, natural	34,095	6,270	Denmark 5,730; Switzerland 5,180; Trinidad & Tobago 5,050.
Coal:			
Bituminous:			
Anthracite	thousand metric tons 992	50	Russia 424; Belgium 143; Ukraine 69.
Coke	do. 4,926	--	Poland 1,170; Australia 1,150; China 1,030.
Semicoke, coking coal	do. 5,284	1,140	Australia 1,960; Canada 1,510; Russia 481.
Other, including briquets	do. 24,178	--	South Africa 6,120; Poland 5,970; Russia 5,630.
Lignite	do. 112	--	Czech Republic 106.
Coke of lignite	60	--	Australia, 100%.
Gas, natural, gaseous	do. 76,144	--	Unspecified, 100%.
Petroleum, crude	do. 113,068	--	Russia 37,100; United Kingdom 19,300; Norway 16,800.
Uranium, natural:			
Crude, U content	1,942	--	Canada 889; United Kingdom 633; France 252.
Enriched, fissile isotopes	kilograms 14,989	--	France 6,030; Russia 4,510; Netherlands 2,590.

⁶Estimated; estimated tonnages are rounded to no more than three significant digits; may not add to totals shown. -- Less than 5%.

¹Source: Bundesanstalt für Geowissenschaften und Rohstoffe, 2006, Table 1.1—Rohstoffsituation, 2005: Hannover, Germany, October.

²Source country was estimated to have accounted for at least 5% of Germany's total imports of the mineral commodity.