

TUNGSTEN

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No U.S. tungsten mine production was reported in 2006. U.S. supply of tungsten raw materials comprised imports, tungsten-bearing scrap, releases from industry stocks, and sales of excess materials from the National Defense Stockpile (NDS). China continued to be the world's leading producer of tungsten concentrates and the leading supplier of U.S. imports of tungsten materials. U.S. apparent consumption was higher than that for 2005. Salient U.S. tungsten statistics and world tungsten concentrate production for 2006 and the previous 4 years are listed in table 1.

Most data in this report have been rounded to three significant digits. Totals and percentages were calculated from unrounded numbers. Unless otherwise specified, all statistics in this report are in metric tons of contained tungsten. Tungsten prices and many tungsten statistics from other sources are quoted in units of tungsten trioxide (WO_3). The short ton unit, which is used in the United States, is 1% of a short ton (20 pounds), and WO_3 is 79.3% tungsten by weight. A short ton unit of WO_3 , therefore, equals 20 pounds of WO_3 and contains 7.19 kilograms (kg) (15.86 pounds) of tungsten. The metric ton unit, which is used in most other countries, is 1% of a metric ton (10 kg). A metric ton unit of WO_3 , therefore, equals 10 kg of WO_3 and contains 7.93 kg (17.48 pounds) of tungsten.

Tungsten is a whitish-gray metal with many unique properties and a wide variety of commercial, industrial, and military applications. The leading use is as tungsten carbide in cemented carbides, which are wear-resistant materials used by the construction, metalworking, mining, and oil and gas drilling industries. Tungsten alloy and pure tungsten metal contacts, electrodes, and wires are used in electrical, electronic, heating, lighting, and welding applications. Tungsten is also used to make heavy-metal alloys for armaments, heat sinks, radiation shielding, and weights and counterweights; superalloys for turbine blades; tool steels; and wear-resistant alloy parts and coatings. Tungsten alloys and composites are used as a substitute for lead in bullets and shot. Tungsten chemicals are used to make catalysts, corrosion-resistant coatings, dyes and pigments, fire-resistant compounds, lubricants, phosphors, and semiconductors.

Legislation and Government Programs

The Defense National Stockpile Center (DNSC), U.S. Department of Defense, sold tungsten materials from the NDS under two formats—negotiated sales and a strategic supply alliance. Awards of ores and concentrates from negotiated sales were made in February and June. During fiscal year 2006 (October 1, 2005, through September 30, 2006), 3,760 metric tons (t) of contained tungsten was sold, including all of the remaining ferrotungsten. At the end of the fiscal year, 252 t of tungsten contained in ores and concentrates had been sold, but

not shipped, from the stockpile. During the calendar year, 3,710 t of tungsten was sold. The quantities of tungsten materials remaining in the stockpile at the end of the calendar year, including those committed for sale and pending shipment, are listed in tables 1 and 2 (U.S. Department of Defense, 2007, p. 10-11, 58).

The Annual Materials Plan for fiscal year 2006, which represented the maximum quantities of tungsten materials that could be sold, is listed in table 2. These quantities remained the same for fiscal year 2007 (October 1, 2006, through September 30, 2007) (Defense National Stockpile Center, 2006).

The U.S. Fish and Wildlife Service (FWS) granted final approval to four new tungsten shot products for hunting waterfowl and coots—iron-tungsten-nickel alloy, tungsten-bronze, tungsten-iron-copper-nickel, and tungsten-tin-iron—and changed the way it classified approved shot types. Under the new classification, the number of FWS-approved shot types containing tungsten was nine (U.S. Fish and Wildlife Service, 2006).

The Toxic Substances Control Act (TSCA) Interagency Testing Committee recommended that 17 tungsten compounds be removed from TSCA's Preliminary Assessment Information Reporting (PAIR) Program. Fifteen of the compounds were thought to have low potential for occupational exposure and problems were anticipated with reporting production levels and worker exposures for two specific tungsten oxides. At yearend, five tungsten compounds remained in the PAIR program, which requires producers and importers of listed materials to report production, importation, and exposure data to the Environmental Protection Agency (U.S. Environmental Protection Agency, 2006, 2007).

Production

Domestic production statistics for tungsten are based on data collected by the U.S. Geological Survey (USGS) by means of two separate voluntary surveys. Statistics that result from these surveys are listed in tables 1 and 3. The annual "Tungsten Ore and Concentrate Survey" covered the production, purchases, disposition, and stocks of tungsten ores and concentrates. No tungsten mine output was reported for the United States in 2006. The monthly "Tungsten Concentrate and Tungsten Products Survey" canvassed companies that produced tungsten carbide powder, tungsten chemicals, and/or tungsten metal powder from ammonium paratungstate, tungsten-bearing scrap, and tungsten concentrate. Major U.S. processors of tungsten materials operating in 2006 included Allegheny Technologies Inc.'s Metalworking Products business, Huntsville, AL; Buffalo Tungsten Inc., Depew, NY; General Electric Co., Euclid, OH; Kennametal Inc., Latrobe, PA, and Fallon, NV; and Osram Sylvania, Inc., Towanda, PA.

Allegheny Technologies worked on a project to triple the ammonium paratungstate production capacity of its Huntsville facility. The expanded capacity, which could use either concentrates or scrap as feed, was expected to be operational by yearend (Ryan's Notes, 2006).

The New York Power Authority approved a low-cost hydropower allocation for New York Tungsten LLC in connection with its selection of Depew, NY, for the construction of a new tungsten powder manufacturing facility. New York Tungsten was a joint venture between Buffalo Tungsten and Silver Eagle Technology Inc. (New York Power Authority, 2006).

Tundra Composites LLC of White Bear Lake, MN, formed a joint venture with Canadian tungsten mining company North American Tungsten Corp. Ltd. for the production of ammonium paratungstate and other tungsten intermediates, tungsten powders, and composites. The joint venture was to use Tundra's processing technology to treat ores supplied primarily, if not exclusively, by North American Tungsten. During the year, the venture built and began to operate a pilot plant at Tundra's facility in White Bear Lake. The plant's production was expected to be approximately 300 metric tons per year (t/yr) of tungsten powder and intermediates initially, but was forecast to increase to approximately 600 t/yr in 2007. The partners planned to make a decision in 2007 on building a full-scale commercial plant in Hoyt Lake, MN, with the capacity to produce 3,200 t/yr of tungsten (North American Tungsten Corp. Ltd., 2006b).

In 2006, U.S. processors consumed more tungsten concentrates and ammonium paratungstate and less tungsten scrap than they did in 2005. Domestic production of ammonium paratungstate was higher than that of 2005. Net production of tungsten metal powder and tungsten carbide powder increased slightly in 2006 compared with that of 2005 (table 3).

Consumption

U.S. apparent consumption of all tungsten materials, as calculated from net imports, primary and secondary production, and changes in Government and industry stock levels, was 13,200 t in 2006, which was 14% higher than the 2005 apparent consumption of 11,600 t. The increase in demand was met by increases in total imports, consumption of scrap from domestic sources, and NDS shipments.

Statistics on consumption of tungsten in end-use applications by U.S. metal consumers were developed from the voluntary "Consolidated Consumers Survey." For this survey, more than 60 tungsten consumers were canvassed on a monthly or annual basis. Reported consumption and stock data in tables 1 and 4 include estimates to account for nonrespondents.

Total U.S. reported consumption of tungsten materials to make end-use products in 2006 was 10% higher than that of 2005. Nearly all end-use industries used more tungsten in 2006 than in 2005. Compared with consumption in 2005, U.S. end-users consumed more ferrotungsten, tungsten carbide powder, and tungsten metal powder in 2006, but less tungsten chemicals and tungsten scrap.

Weekly reports of the number of operating drilling rigs give an indication of the demand for tungsten carbide in the form of cemented carbide components used by industry to explore for or

to produce oil and natural gas. The number of rigs that operated in the United States continued to trend upward during 2006. The average number of operating rigs in the United States was 1,649, 19% higher than the average 1,383 operating rigs in 2005 (Baker Hughes Inc., undated).

In 2006, total consumption of tungsten scrap by U.S. processors and consumers was 4,460 t of contained tungsten, which was 4% less than the 4,650 t (revised) consumed in 2005.

Prices

Tungsten prices remained high in 2006. This was attributed to the success of the Chinese Government in controlling that country's production and exports, in combination with a close balance between supply and demand (Tunna, 2006; Roskill Information Services Ltd., 2007, p. 3).

Ammonium paratungstate is the most widely traded primary tungsten material, and as a result, its price has become a reference price for such upstream materials as tungsten ore concentrates and such downstream materials as tungsten metal powder and tungsten carbide powder. Annual average ammonium paratungstate prices increased more than 150% from 2004 to 2005, and then another 14% to 24% in 2006 (table 1). The U.S. ammonium paratungstate price reported by Platts Metals Week fluctuated within the range of \$225 to \$285 per short ton unit (\$248 to \$314 per metric ton unit). U.S. ammonium paratungstate prices reported by Metal Bulletin fluctuated within the range of \$250 to \$290 per short ton unit (\$276 to \$320 per metric ton unit).

Annual average tungsten ore concentrate prices were more than 30% higher than those of 2005 (tables 1 and 5). The U.S. spot tungsten ore concentrate prices reported by Platts Metals Week fluctuated within the range of \$150 to \$210 per short ton unit (\$165 to \$231 per metric ton unit). Platts' ferrotungsten prices ranged between \$27 and \$36 per kilogram of contained tungsten.

Foreign Trade

The total tungsten content of U.S. exports was 6,440 t, 8% higher than the 5,940 t exported in 2005. Exports of all materials, except ammonium paratungstate, ferrotungsten, tungsten carbide powders, and materials in the category for wrought tungsten bars and rods, profiles, plates, sheets, strip and foil increased compared with those of 2005 (tables 6-10).

The total tungsten content of U.S. imports was 12,000 t, 8% higher than the 11,200 t imported in 2005. China, which continued to be the leading supplier of imported tungsten to the United States, provided 46% of all tungsten imports in 2006. In 2006, the total tungsten content of imports from China increased by 17% to 5,540 t from 4,730 t in 2005. The distribution of materials imported from China was as follows: ammonium paratungstate, 48%; tungsten carbide powder, 14%; tungsten oxide, 13%; tungsten metal powder, 7%; ferrotungsten and wrought tungsten, 5% each; unwrought tungsten, 4%; tungsten waste and scrap, 2%; and other tungstates, minor amount. Other significant suppliers of tungsten materials were as follows: Germany, with 11% of the total tungsten imports to the United

States; Bolivia and Canada, 7% each; and Israel and Portugal, 6% each.

The tungsten contained in U.S. imports of ores and concentrates was 10% higher than that of 2005 (table 11). In 2006, the leading suppliers of U.S. imports of tungsten ores and concentrates were Bolivia (37%), Portugal (31%), Rwanda (10%), Canada (9%), and Thailand (5%).

U.S. imports of ammonium paratungstate increased by 51% compared with those of 2005 (table 12). China continued to be the dominant supplier, providing 92% of U.S. ammonium paratungstate imports. Imports of other tungsten materials are presented in tables 13-14.

In 2006, U.S. net import reliance as a percentage of apparent consumption was 68%. Net import reliance as a percentage of apparent consumption is used to measure the adequacy of current domestic production to meet U.S. demand. Net import reliance was defined as imports minus exports plus adjustments for Government and industry stock changes. Releases from stocks, including shipments from the NDS, were counted as part of import reliance, regardless of whether they were imported or produced in the United States. Because there was no recorded U.S. mine production in 2006, about 68% of U.S. tungsten supply was from imports and stock releases, and 32% was from scrap materials generated in the United States.

World Review

Estimated world tungsten mine production increased in 2006, primarily owing to an increase in production from the Cantung Mine in Canada (table 15). In addition to mine production and tungsten recovered from scrap, tungsten materials from NDS contributed to supply in 2006.

Armenia.—Pure Iron JSC produced 42 t of ferrotungsten at its Yerevan plant, a significant increase from the 8 t produced in 2005 (Interfax Ltd., 2007a).

Australia.—Tasmania Mines Ltd. produced limited quantities of scheelite concentrates as a byproduct of mining magnetite from its Kara open pit mine south of Burnie in Tasmania.

Straits Resources Ltd. worked towards restarting underground mining at the Hillgrove gold-antimony mine near Armidale, New South Wales, where approximately 240 t/yr of tungsten was planned to be produced as a byproduct when production began in mid-2007 (Straits Resources Ltd., 2007, p. 4).

Queensland Ores Ltd. earned an 85% interest in the Wolfram Camp project 90 kilometers (km) west of Cairns, Queensland, from joint-venture partner Tropical Metals Pty. Ltd. The project comprised an open pit mine and mill operation that would produce approximately 333 t/yr of tungsten in wolframite concentrate and 100 t/yr molybdenum in molybdenite concentrate. Queensland Ores hoped to obtain the necessary mining leases in mid-2007, so that production could begin by late 2007. Previous mining at Wolfram Camp began in the 1890s and ceased in the 1980s (Queensland Ores Ltd., 2007).

King Island Scheelite Ltd. (KIS) completed a feasibility study on redeveloping the former King Island Scheelite Mine at Grassy, King Island, northwest of Tasmania. During the first 10 years of production, KIS would operate an open pit mine and mill complex to produce scheelite concentrates containing 800

to 4,000 t/yr of tungsten and averaging 2,400 t/yr of tungsten. The existing open pit would be extended towards the sea and would require construction of a seawall and reclamation area to prevent the entrance of seawater. By yearend, all major government approvals for the project had been granted or issued in draft form. In early 2007, Xiamen Tungsten Corp. decided against forming a joint venture with KIS to develop the project, and KIS was evaluating alternative financing arrangements (King Island Scheelite Ltd., 2006; 2007, p. 3-4).

Thor Mining PLC completed a feasibility study and decided to proceed with constructing an open pit mine and mill at its Molyhil tungsten-molybdenum deposit 220 km northeast of Alice Springs in the Northern Territory. Development of the project was subject to State Government and Native Title approvals and finalization of financing and offtake agreements. If construction were to begin in mid-2007, first production of concentrates could be in early 2008. Thor planned to produce approximately 800 t/yr of tungsten in scheelite concentrate and 450 t/yr of molybdenum in molybdenite concentrate. The company planned additional exploration drilling in 2007 to extend the project beyond an initial 4-year mine life (Thor Mining PLC, 2007; undated).

Austria.—Wolfram Bergbau und Hütten GmbH Nfg KG produced tungsten concentrates from the Mittersill scheelite mine in the Province of Salzburg. These concentrates and feedstocks from other countries were converted to primary tungsten products at Wolfram Bergbau's Bergla tungsten processing plant in Steiermark Province.

Cemented carbide tool manufacturer CERATIZIT S.A. built a recycling plant at its CERATIZIT Austria GmbH operation in Reutte and began processing hard cemented carbide scrap in October. The company developed a new process for treating soft cemented carbide scrap, which it planned to begin using in 2007. CERATIZIT also planned to build a second recycling plant at its CERATUNGSTEN S.à.r.l. operation in Luxembourg (CERATIZIT Austria GmbH, 2006).

Canada.—North American Tungsten Corp. Ltd. (NTC) produced 1,983 t of tungsten in concentrate from its Cantung Mine in the Northwest Territories. Production in 2005 was approximately 384 t because the mine was on care-and-maintenance status until it reopened in September. During 2006, NTC worked to improve production at the mine by introducing new equipment, changing the mining emphasis from cut-and-fill methods to bulk longhole methods, increasing underground mine development, improving mill operations, and ensuring sufficient power generation capabilities. The company also worked toward developing its Mactung deposit by conducting environmental studies and commissioning an update of the economics of a 1982 feasibility study. Mactung, which is on the Yukon and Northwest Territories border, has been called the largest undeveloped high-grade tungsten skarn deposit in the world (North American Tungsten Corp. Ltd., 2006a, 2007).

China.—In 2006, China Non-ferrous Metals Industrial Association reported that there were 48 ammonium paratungstate producers with a combined capacity of 146,500 t/yr, 69 tungsten metal powder producers with a combined capacity of 54,600 t/yr, 197 cemented carbide producers with a combined capacity of 30,700 t/yr, and more than 33 producers

of tungsten filament with a combined capacity of 29.56 billion meters per year. Production was reported as follows: 79,864 t of tungsten concentrate, 45,600 t of ammonium paratungstate, 20,200 t of tungsten metal and tungsten carbide powders, 13,200 t of cemented carbide, 11,500 t of ferrotungsten, 3,131 t of tungsten bars, and 19 billion meters of tungsten filament. In 2006, China imported 12,274 t of tungsten ores and concentrates, 800 t of tungsten contained in scrap, and 8,201 t of tungsten contained in products, excluding cemented carbides. Domestic consumption increased to 23,500 t of contained tungsten, with the main market sectors as follows: cemented carbides, 48.4%; special alloys, 34.7%; fabricated products, 12.5%; and chemicals, 4.4%. China exported 31,857 t of tungsten contained in products, excluding cemented carbides (Huang, 2007; Zhang, 2007).

In spite of its position as the world's leading producer of mined tungsten, China has imported increasing amounts of tungsten concentrates in recent years. In 2006, China imported an estimated 6,330 t of tungsten in concentrates, which was more than double the estimated 3,140 t imported in 2005 (Beijing Antaika Information Development Co., Ltd., 2006c; 2007).

In recent years, China's Government has had a program to make full use of its tungsten resources and to try to stabilize world tungsten prices. This program included regulating the production of tungsten concentrates through mine closures and production quotas and regulating tungsten exports by restricting the volumes and types of tungsten materials and products that could be sent out of the country. For 2006, the tungsten concentrate production quota was 59,060 t (65% WO₃), and was distributed by province or autonomous region as follows: Jiangxi (56%), Hunan (22%), Yunnan (6%), Guangdong (5%), Henan (3%), Fujian, Guangxi, and Inner Mongolia (2% each), Anhui and Zhejiang (1% each), and Qinghai (0.1%). The 2006 export quota for tungsten materials was set at 15,800 t of contained tungsten. There were 13 state-owned companies that qualified as tungsten exporters and 17 companies were qualified to supply tungsten for export. Effective November 1, a tax of 10% was applied to ferrotungsten exports and a tax of 15% was applied to tungsten scrap exports. At yearend, the Government announced that it would be imposing a 5% tax on exports of ammonium paratungstate, tungsten carbide, tungsten trioxide, and unwrought tungsten metal and powder, effective January 1, 2007. In addition, the Government banned toll trading of the following tungsten materials: ammonium paratungstate; superfine tungsten powder with a granularity of 0.1 to 0.5 micrometers; tungsten bars and rods, profiles, plates, sheets, strip and foil; tungsten carbides; tungsten trioxides; other tungsten and alloy with granularity less than 500 micrometers; unwrought tungsten, including bars and rods obtained simply by sintering; and waste and scrap (Beijing Antaika Information Development Co., Ltd., 2006a; 2006b; Metal Bulletin, 2006; Metal-Pages Ltd., 2006a, 2006b; Roskill Information Services Ltd., 2007, p. 41-42).

Czech Republic.—Metek Metal Technology SA (a Swiss subsidiary of Metal-Tech Ltd.) built a pilot plant in the Czech Republic for the recycling of spent catalysts and other waste from the oil refining industry. The plant was to have the capacity to produce 100 t/yr of tungsten and molybdenum products, and

would be a joint venture between Metal-Tech Cz, a.s. (80%) and United Works for Chemical and Metallurgical Production (20%) (AFX News Ltd., 2006).

Germany.—The Bayer Group planned to sell H.C. Starck GmbH & Co. KG to a consortium comprised of financial investors Advent International and The Carlisle Group. H.C. Starck had tungsten processing operations in Goslar, Germany, and Sarnia, Ontario, Canada, and produced tungsten products in the United States and elsewhere (Platts Metals Week, 2006).

Israel.—Metal-Tech Ltd. recycled various types of metal-based wastes to produce tungsten carbide powder, tungsten metal powder, and tungsten oxide at its tungsten processing plant in Ramat Hovav.

Korea, Republic of.—The Republic of Korea reportedly planned to build up a stockpile of 14 metals, including tungsten. The amount of each metal was to be equivalent to that imported during a 2-month period (Shinhye, 2006).

Kyrgyzstan.—Sarydzhas Mineral Mining Co. planned to open old mine workings in the Trudovoye tin-tungsten deposit and to construct an ore processing plant (Interfax Ltd., 2007c).

Peru.—Dynacor Mines Inc. began producing tungsten concentrates from the Pasto Bueno mine and mill complex in the Ancash region. The company signed an offtake agreement with Osram for up to 1,200 t/yr of tungsten in concentrate during the mine's projected 3 years of production. Under the agreement, Dynacor could sell any concentrates not purchased by Osram. In 2006, five containers of tungsten concentrate were shipped from the mine, and three more were shipped in January 2007 (Dynacor Mines Inc., 2006, 2007).

Portugal.—Beralt Tin & Wolfram S.A. continued to make improvements at its Panasqueira tungsten mine and concentrating plant in central Portugal. The company introduced additional low-profile underground mining equipment, which resulted in an increase in the amount of ore mined compared with that of 2005. The production of tungsten in concentrate declined, however, owing to the mining and processing of lower grade ore, which resulted in part from the lack of past mine development work to access new mine areas. By yearend, Beralt had completed a ramp to access new areas of tungsten resources. The grade of ore sent to the concentrating plant was expected to improve with the mining of new areas using low-profile equipment, which would require the extraction of less waste rock. Refurbishment of the plant included the installation of a new slimes concentrator, which resulted in higher tungsten recoveries. Tungsten concentrates from Panasqueira were sold to Osram under a multiyear contract (Primary Metals Inc., 2007).

Russia.—In recent years, tungsten concentrates have been produced from Primorsky GOK's Vostok-2 Mine and Lermontovskaya Mining Co.'s operation in Primorskiy Krai, from Tyrnyauzsky GOK's operation in the Republic of Kabardino-Balkariya, and from Novoorlovsky GOK in the Aga Buryat Autonomous Okrug. Tyrnyauzsky reportedly ceased production in 2005. In 2006, production from Primorsky, which was Russia's largest tungsten producer, declined 4% from that of 2005. Novoorlovsky GOK was in operation, and Lermontovskaya was in receivership (Antanta Capital Investment Bank, 2006; Metal-Pages, 2006c; Interfax Ltd., 2006, 2007b).

Russia is also a producer of ferrotungsten for domestic use and export. In the past few years, the country increased its capacity to process tungsten-bearing scrap (Schiller, 2004, p. 11).

Spain.—Heemskirk Consolidated Ltd. acquired the Los Santos tungsten project in the Castilia y Leon region and began developing the project. A feasibility study completed during the year proposed mining 300,000 t/yr of scheelite ore from a series of open pits for a minimum of 14 years. The project was approved for development, and by yearend, detailed design and engineering on the concentrator and finalization of construction permits were nearly complete and offtake negotiations and project financing were well advanced. Heemskirk planned to begin construction in early 2007, so that commissioning could take place in early 2008 (Heemskirk Consolidated Ltd., 2007a; b, p. 7-8).

Uzbekistan.—A number of projects were planned to enhance the future supply of tungsten raw materials to the Uzbek Heat-Resistant and Refractory Metals Plant. These included the construction of an ore mining and concentrating complex at the Yakhton deposit in Samarqand Province and the development of the Sautbai deposit in Navoiy Province. Additionally, Ingichki Metals (a joint venture of Navoi Mining and Metallurgy Combine and Russia's Integra Group) worked on a project to produce scheelite concentrates from tailings at the Ingichki tungsten deposit, which would be supplied to Uzbek (Interfax Ltd., 2007d).

Vietnam.—Nui Phao Mining Joint Venture Co. Ltd. selected Ausenco Ltd. to undertake the detailed engineering, procurement, and construction management for the Nui Phao project, which was 80 km north-northwest of Hanoi in Thai Nguyen Province. The project comprised an open pit mine and milling operation to produce tungsten, copper, and fluorite concentrates and bismuth cement. The tungsten concentrates were expected to contain an average of approximately 3,800 t/yr of tungsten (4,788 t/yr of WO₃) during the expected mine life of more than 16 years. Osram had an agreement to purchase up to 100% of the annual average production of tungsten concentrates for a minimum of 5 years, with extensions up to 15 years. Any tungsten concentrates not purchased by Osram could be sold to the market by the joint venture. During the year, the joint venture worked on project funding and implementing a resettlement plan for people living in the vicinity of the mine. Nui Phao Mining expected to begin production in early 2009. Tiberon Minerals Ltd. of Toronto, Ontario, Canada, held a 70% interest in the joint venture; the remaining interest was held equally by two Vietnamese companies (Thai Nguyen Mineral Co. and Export-Import Investment Co. Thai Nguyen). Late in the year, Dragon Capital Management Ltd. (a subsidiary of Chinese investment banking institution Dragon Capital Group) began a bid to acquire Tiberon (Tiberon Minerals Ltd., 2007, p. 6-7, 11-14, 21, 24).

Outlook

Demand for tungsten tends to follow general economic conditions. Future consumption of tungsten in cemented carbides, which is the leading end-use sector, will depend on the performance of the following industries: automotive and aircraft production; construction; electronics manufacturing, where cemented carbide microdrills are used on circuit boards; general

manufacturing; large equipment manufacturing; mining; and oil and gas drilling. Demand for tungsten is also influenced by changes in government spending for defense applications.

World tungsten supply will continue to be dominated by Chinese production and exports. Chinese export licenses for 2007 were limited to a total of 15,400 t of all tungsten products, a decrease from the quota of 15,800 t in 2006. To qualify for a license, companies were required to have minimum production capacities and minimum recycling rates. In addition to discouraging tungsten exports, the Chinese Government planned to expand tungsten imports (Beijing Antaika Information Development Co., Ltd., 2006b; Ryan's Notes, 2007; Zhang, 2007).

As a result of anticipated future growth in demand for tungsten, production from non-Chinese mines was expected to increase. In 2007, Curtis Tungsten, Inc. restarted operations at the Andrew Mine in California, Peru's Pasto Bueno Mine began commercial production, and the Integra Group reportedly began recovering tungsten from tailings in Uzbekistan. Additional new production from mines outside China was scheduled to begin in 2008 or 2009. Some of this new production was to take place in Australia, Spain, the United States, and Vietnam. Numerous additional tungsten mine projects were in the exploration and prefeasibility stages of development.

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TABLE 1
SALIENT TUNGSTEN STATISTICS¹

(Metric tons of tungsten content and dollars per metric ton unit)

	2002	2003	2004	2005	2006
United States:					
Concentrates:					
Consumption	W	W	W	W	W
Exports	94	20	43	52	130
Imports for consumption	4,090	4,690	2,310	2,080	2,290
Stocks, December 31:					
Consumer	W	W	W	W	W
U.S. Government ²	30,100	29,400	28,400	26,100	22,900
Price:					
U.S. spot quotation ³	55	50	49	146	200
European ⁴	38	45	55	123	166
Ammonium paratungstate:					
Production	W	W	W	W	W
Consumption ⁵	8,860	9,450	8,790	9,530	11,300
Stocks, December 31, producer and consumer	68	W	W	W	W
Price:					
U.S. free market ⁶	72	69	92	237	293
U.S. market ³	73	72	91	240	273
European free market ⁶	54	62	84	223	261
Primary products:					
Net production ⁷	12,400	9,420	7,400	7,810	8,050
Consumption ⁸	9,490	9,600	11,200	11,100 ^r	12,200
Stocks, December 31:					
Producer ⁹	666	793	787	800	827
Consumer ⁸	394	423	406	508 ^r	469
U.S. Government ²	947	765	685	282	266
World, production of concentrate	66,200 ^r	68,300 ^r	102,000 ^r	88,200 ^r	90,800 ^e

^eEstimated. ^rRevised. W Withheld to avoid disclosing company proprietary data.

¹Data are rounded to no more than three significant digits.

²Defense National Stockpile Center. Includes material committed for sale pending shipment.

³Annual average calculated from weekly prices reported by Platts Metals Week.

⁴Annual average calculated from semiweekly prices reported by Metal Bulletin.

⁵Reported by tungsten processors.

⁶Annual average calculated from annual average high and low prices reported by Metal Bulletin.

⁷Includes only tungsten metal powder and tungsten carbide powder.

⁸Includes ammonium paratungstate and other tungsten chemicals, ferrotungsten, tungsten metal powder, tungsten carbide powder, and tungsten scrap.

⁹Data exclude cast and crystalline tungsten carbide powder and chemicals.

TABLE 2
U.S. GOVERNMENT NATIONAL DEFENSE STOCKPILE TUNGSTEN STATISTICS IN 2006^{1,2}

(Metric tons of tungsten content)

Material	Inventory, yearend ³		Annual Materials Plan ⁵	Sales		Inventory decrease ⁴	
	Fiscal year ⁵	Calendar year		Fiscal year ⁵	Calendar year	Fiscal year ⁵	Calendar year
	Ores and concentrates	23,300	22,900	3,630	3,630	3,710	3,400
Ferrotungsten	--	--	136	133	--	105	--
Tungsten metal powder	266	266	136	--	--	147	16
Total	23,500	23,200	3,900	3,760	3,710	3,650	3,130

-- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Includes stockpile- and nonstockpile-grade materials.

³Includes material committed for sale pending shipment.

⁴From previous year.

⁵Twelve-month period ending September 30, 2006.

Source: Defense National Stockpile Center.

TABLE 3
U.S. NET PRODUCTION AND STOCKS OF TUNGSTEN PRODUCTS^{1,2,3}

(Metric tons of tungsten content)

	Tungsten metal powder	Tungsten carbide powder	Total
Net production:			
2005	3,150	4,660	7,810
2006	3,260	4,800	8,050
Producer stocks:			
December 31, 2005	395	405	800
December 31, 2006	411	415	827

¹Net production equals receipts plus gross production less quantity used to make other products in table.

²Data are rounded to no more than three significant digits; may not add to totals shown.

³Data for cast and crystalline tungsten carbide powder and tungsten chemicals are withheld to avoid disclosing company proprietary data; not included in "Total."

TABLE 4
U.S. REPORTED CONSUMPTION AND STOCKS OF TUNGSTEN PRODUCTS^{1, 2, 3}

(Metric tons of tungsten content)

	2005	2006
Consumption by end use:		
Steels	280	292
Superalloys	W	W
Other alloys ⁴	W	W
Cemented carbides ⁵	6,020	6,590
Mill products made from metal powder	W	W
Chemical uses	130	118
Total	11,100^r	12,200
Consumption by form:		
Ferrotungsten	250	280
Tungsten metal powder	W	W
Tungsten carbide powder	5,930	6,490
Tungsten scrap	W	W
Other tungsten materials ⁶	130	118
Total	11,100^r	12,200
Consumer stocks, December 31:		
Ferrotungsten	24	20
Tungsten metal powder	27	27
Tungsten carbide powder	394	355
Tungsten scrap	32 ^r	35
Other tungsten materials ⁶	30	31
Total	508^r	469

^rRevised. W Withheld to avoid disclosing company proprietary data; included in "Total."

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Does not include materials used in making primary tungsten products.

³Includes estimates.

⁴Includes welding and hard-facing rods and materials, wear- and corrosion-resistant alloys, and nonferrous alloys.

⁵Includes diamond tool matrices, cemented and sintered carbides, and cast carbide dies or parts.

⁶Includes tungsten chemicals.

TABLE 5
MONTHLY PRICE QUOTATIONS OF TUNGSTEN CONCENTRATES IN 2006

Month	Metal Bulletin, European market, 65% WO ₃ basis, c.i.f. ^{1,2}			Platts Metals Week, U.S. spot quotations, 65% WO ₃ basis, c.i.f. ¹ U.S. ports, including duty ³				
	Dollars per metric ton unit			Dollars per short ton unit,	Dollars per short ton unit			Dollars per metric ton unit,
	Low	High	Average	average	Low	High	Average	average
January	130	160	145	132	180	200	190	209
February	130	220	175	159	180	210	195	215
March	160	220	190	172	175	210	193	212
April	160	200	180	163	160	185	173	190
May	160	200	180	163	150	170	160	176
June	150	170	160	145	150	190	170	187
July	150	170	160	145	180	200	190	209
August	150	170	160	145	190	210	200	220
September	160	170	165	150	180	210	195	215
October	160	170	165	150	170	200	185	204
November	160	170	165	150	150	200	175	193
December	160	170	165	150	150	170	160	176

¹Cost, insurance, and freight.

²Combined wolframite and scheelite quotations. Low and high prices are reported semiweekly. Monthly averages are arithmetic averages of semiweekly low and high prices. The annual average price per metric ton unit of WO₃ of all semiweekly low and high prices was \$166 in 2006. The average equivalent price per short ton unit of WO₃ was \$151 in 2006.

³Low and high prices are reported weekly. Monthly averages are arithmetic averages of weekly low and high prices. The annual average price per short ton unit of WO₃ of all weekly low and high prices was \$181 in 2006. The average equivalent price per metric ton unit of WO₃ was \$200 in 2006.

TABLE 6
U.S. EXPORTS OF TUNGSTEN ORES AND CONCENTRATES, BY COUNTRY¹

Country of destination	2005			2006		
	Quantity		Value (thousands)	Quantity		Value (thousands)
	Gross weight (metric tons)	Tungsten content ² (metric tons)		Gross weight (metric tons)	Tungsten content ² (metric tons)	
Argentina	(3)	(3)	\$3	--	--	--
Bulgaria	(3)	(3)	6	--	--	--
Canada	--	--	--	1	(3)	\$11
China	63	33	861	210	108	3,160
Czech Republic	--	--	--	(3)	(3)	7
France	(3)	(3)	4	(3)	(3)	3
Germany	--	--	--	1	1	47
Hong Kong	(3)	(3)	6	--	--	--
Indonesia	--	--	--	(3)	(3)	3
Ireland	(3)	(3)	17	--	--	--
Japan	(3)	(3)	12	--	--	--
Korea, Republic of	2	1	24	2	1	28
Malaysia	(3)	(3)	3	--	--	--
Netherlands	28	14	552	37	19	269
Singapore	--	--	--	(3)	(3)	10
Sweden	--	--	--	(3)	(3)	3
Switzerland	(3)	(3)	6	--	--	--
Taiwan	--	--	--	(3)	(3)	5
United Kingdom	7	4	106	--	--	--
Total	102	52	1,600	252	130	3,550

-- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Content estimated from reported gross weight.

³Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 7
U.S. EXPORTS OF AMMONIUM PARATUNGSTATE, BY COUNTRY¹

Country of destination	2005		2006	
	Quantity, tungsten content (metric tons)	Value (thousands)	Quantity, tungsten content (metric tons)	Value (thousands)
China	291	\$3,220	--	--
Germany	461	5,390	322	\$4,480
Iceland	--	--	(2)	4
India	4	33	3	25
Mexico	4	35	6	51
Netherlands	--	--	19	414
Spain	15	132	--	--
Total	774	8,810	350	4,970

-- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 8
U.S. EXPORTS OF TUNGSTEN METAL POWDERS, BY COUNTRY^{1, 2}

Country of destination	2005			2006		
	Quantity			Quantity		
	Gross weight (metric tons)	Tungsten content ³ (metric tons)	Value (thousands)	Gross weight (metric tons)	Tungsten content ³ (metric tons)	Value (thousands)
Australia	10	8	\$330	17	14	\$725
Austria	5	4	103	13	10	384
Brazil	13	11	618	12	10	760
Canada	92	74	3,280	104	83	4,180
Chile	2	2	105	2	2	157
China	32	26	1,430	6	5	373
Czech Republic	50	40	766	74	59	1,440
France	22	18	1,340	30	24	2,350
Germany	319	255	8,810	464	372	15,000
India	4	3	199	2	2	141
Israel	41	33	590	18	15	530
Italy	39	31	1,970	28	22	1,940
Japan	28	22	1,180	27	22	1,340
Korea, Republic of	2	2	159	1	1	83
Martinique	4	4	115	--	--	--
Mexico	19	15	216	141	113	5,210
Morocco	--	--	--	6	4	199
Netherlands	3	3	98	21	17	510
New Zealand	(4)	(4)	23	8	6	131
Peru	1	(4)	24	2	1	99
Serbia and Montenegro	5	4	85	--	--	--
Singapore	20	16	908	15	12	1,190
South Africa	2	2	112	4	3	241
Spain	11	9	245	3	3	237
Switzerland	8	6	264	5	4	233
Taiwan	54	43	1,830	74	60	3,690
Thailand	2	2	103	2	1	80
Turkey	4	3	247	2	2	165
United Arab Emirates	1	1	50	2	1	130
United Kingdom	77	62	2,130	93	74	2,980
Venezuela	61	49	1,030	17	14	311
Other	4	3	174 ^r	7	6	423
Total	937	750	28,500	1,200	959	45,300

^rRevised. -- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²May include tungsten alloy powders.

³Content estimated from reported gross weight.

⁴Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 9
U.S. EXPORTS OF TUNGSTEN CARBIDE POWDER, BY COUNTRY¹

Country of destination	2005		2006	
	Quantity, tungsten content (metric tons)	Value (thousands)	Quantity, tungsten content (metric tons)	Value (thousands)
Argentina	1	\$59	1	\$81
Australia	19	596	14	618
Belgium	3	173	8	486
Brazil	5	137	14	321
Canada	101	3,620	89	4,080
China	2	183	7	325
Denmark	(2)	51	5	166
France	134	3,180	97	3,380
Georgia	--	--	2	320
Germany	308	5,090	285	6,320
India	20	586	33	1,050
Ireland	12	721	11	820
Israel	7	126	5	152
Italy	3	171	5	210
Japan	14	484	27	1,710
Korea, Republic of	6	360	7	546
Luxembourg	2	63	2	97
Malaysia	3	97	1	47
Mexico	3	219	(2)	70
Norway	4	307	2	154
Peru	1	38	2	110
Russia	3	38	(2)	125
Singapore	4	266	3	274
South Africa	120	3,330	29	981
Sweden	252	4,520	14	919
Switzerland	7	248	5	153
Taiwan	17	412	8	232
United Kingdom	480	11,800	277	10,300
Venezuela	3	50	56	849
Other	23 ^r	910 ^r	2	213
Total	1,560	37,800	1,010	35,100

^rRevised. -- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 10
U.S. EXPORTS OF MISCELLANEOUS TUNGSTEN-BEARING MATERIALS, BY COUNTRY¹

Product and country of destination	2005		2006	
	Quantity, tungsten content (metric tons)	Value (thousands)	Quantity, tungsten content (metric tons)	Value (thousands)
Ferrotungsten and ferrosilicon tungsten:				
Canada	4	\$108	1	\$19
Japan	--	--	3	181
Mexico	25	88	(2)	29
Total	29	196	4	229
Unwrought tungsten:^{3, 4, 5}				
Australia	19	79	5	20
Belgium	--	--	11	105
Brazil	8	49	10	46
Canada	54	517	106	786
China	7	28	68	294
Denmark	10	48	5	29
France	(2)	6 ^r	15	62
Germany	130	546	124	522
Hungary	16	84	15	65
Israel	2	8	23	99
Italy	4	17	6	27
Japan	51	215	33	137
Korea, Republic of	28	136	5	22
Malaysia	30	141	18	75
Mexico	28	146	38	170
Netherlands	12	52	2	9
New Zealand	--	--	4	17
Peru	3	13	2	9
Philippines	8	32	51	215
Singapore	13	54	59	247
Sweden	25	103	44	190
Taiwan	340	1,630	181	779
United Kingdom	129	656	401	1,800
Yemen	41	174	--	--
Other	8 ^r	71 ^r	9	49
Total	966	4,800	1,230	5,780
Waste and scrap:⁴				
Armenia	13	48	--	--
Austria	148	916	--	--
Belgium	20	351	21	348
Brazil	7	100	2	36
Canada	56	411	129	1,060
China	5	26	44	590
France	--	--	38	364
Germany	145	1,780	238	3,310
Hong Kong	--	--	13	256
Japan	277	4,380	148	2,240
Mexico	6	37	1	5
Netherlands	45	260	10	108
Peru	--	--	7	56
Singapore	4	21	2	17
Taiwan	(2)	4	31	763
United Kingdom	124	1,050	159	3,300
Vietnam	--	--	472	1,040
Other	8	40	1	4
Total	858	9,420	1,310	13,500

See footnotes at end of table.

TABLE 10—Continued
U.S. EXPORTS OF MISCELLANEOUS TUNGSTEN-BEARING MATERIALS, BY COUNTRY¹

Product and country of destination	2005		2006	
	Quantity, tungsten content (metric tons)	Value (thousands)	Quantity, tungsten content (metric tons)	Value (thousands)
Wrought tungsten: ^{3,4,6}				
Australia	1	\$134	2	\$297
Brazil	11	1,370	7	1,410
Canada	35	2,440	32	2,520
China	4	1,090	12	2,000
Colombia	7	2,470	4	1,600
Costa Rica	(2)	3	2	236
Czech Republic	18	2,780	26	4,620
France	4	1,070	14	2,160
Germany	82	5,940 ^r	44	5,800
Hungary	6	1,380	9	1,810
India	8	444	4	277
Indonesia	1	311	2	583
Ireland	1	54	3	389
Israel	4	797	7	1,880
Italy	3	674	4	512
Japan	119	13,200	79	14,300
Korea, Republic of	2	829	2	545
Mexico	33	4,180	27	3,870
Netherlands	2	571	3	874
Philippines	4	275	1	180
Saudi Arabia	1	326	6	1,390
Singapore	2	355	1	490
Spain	18	808	8	599
Sweden	2	278	17	879
Taiwan	3	595	2	542
United Kingdom	26	1,930	37	2,340
Other	8 ^r	2,130 ^r	11	2,180
Total	404	46,500	364	54,300
Tungsten compounds: ⁷				
Canada	454	1,330	26	88
China	39	264	150	2,430
Netherlands	20	456	896	15,500
United Kingdom	38	410	(2)	3
Other	1	66 ^r	(2)	14
Total	553	2,530	1,070	18,100

^rRevised. -- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Less than ½ unit.

³May include alloys.

⁴Content estimated from reported gross weight.

⁵Includes bars and rods produced simply by sintering; excludes powders and waste and scrap.

⁶Includes bars and rods other than those produced simply by sintering; profiles, plates, sheets, strip, and foil; wire; and other wrought products.

⁷Includes only other tungstates.

Source: U.S. Census Bureau.

TABLE 11
U.S. IMPORTS FOR CONSUMPTION OF TUNGSTEN ORES AND
CONCENTRATES, BY COUNTRY¹

Country of origin	2005		2006	
	Quantity, tungsten content (metric tons)	Value (thousands)	Quantity, tungsten content (metric tons)	Value (thousands)
Australia	--	--	24	\$551
Austria	--	--	(2)	5
Bolivia	547	\$10,200	845	20,400
Canada	270	1,300	205	1,780
China	1	2	--	--
Congo (Kinshasa)	57	500	34	439
Hong Kong	(2)	5	--	--
Mexico	30	221	35	426
Mongolia	13	76	43	367
Peru	--	--	18	455
Portugal	764	16,200	713	20,700
Russia	97	593	--	--
Rwanda	140	871	228	1,740
Thailand	146	1,430	108	1,410
Uganda	--	--	32	811
United Kingdom	--	--	9	290
Vietnam	19	74	--	--
Total	2,080	31,400	2,290	49,500

-- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 12
U.S. IMPORTS FOR CONSUMPTION OF AMMONIUM PARATUNGSTATE, BY COUNTRY¹

Country of origin	2005		2006	
	Quantity, tungsten content (metric tons)	Value (thousands)	Quantity, tungsten content (metric tons)	Value (thousands)
China	1,790	\$28,600	2,670	\$72,300
Germany	69	811	188	4,500
Hong Kong	60	494	--	--
Netherlands	--	--	(2)	418
Russia	--	--	27	686
United Kingdom	--	--	15	371
Total	1,920	29,900	2,900	78,200

-- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 13
 U.S. IMPORTS FOR CONSUMPTION OF FERROTUNGSTEN AND
 FERROSILICON TUNGSTEN, BY COUNTRY¹

Country of origin	2005		2006	
	Quantity, tungsten content (metric tons)	Value (thousands)	Quantity, tungsten content (metric tons)	Value (thousands)
Brazil	42	\$474	--	--
China	342	4,920	254	\$7,640
Netherlands	--	--	10	302
United Kingdom	--	--	2	47
Total	385	5,390	265	7,990

-- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

Source: U.S. Census Bureau.

TABLE 14
U.S. IMPORTS FOR CONSUMPTION OF MISCELLANEOUS TUNGSTEN-BEARING MATERIALS, BY COUNTRY¹

Product and country of origin	2005		2006	
	Quantity, tungsten content (metric tons)	Value (thousands)	Quantity, tungsten content (metric tons)	Value (thousands)
Tungsten metal powders:²				
Austria	8	\$161	(3)	\$20
Belgium	10	206	1	33
Canada	100	3,140	155	4,700
China	614	12,600	410	14,200
Czech Republic	--	--	14	438
France	--	--	1	40
Germany	405	12,400	604	20,900
Iceland	8	16	--	--
Israel	237	7,370	308	12,500
Japan	16	1,280	15	1,400
Korea, Republic of	135	4,310	216	9,360
South Africa	--	--	9	149
United Kingdom	(3)	19	6	196
Other	1	71 ^r	1	30
Total	1,530	41,500	1,740	63,900
Tungsten carbide powder:				
Belgium	--	--	2	128
Canada	486	14,700	373	14,800
China	829	19,000	799	32,800
Czech Republic	9	636	19	1,240
France	7	454	3	235
Germany	20	846	60	2,980
Hong Kong	40	376	2	49
India	7	63	5	32
Israel	282	6,730	291	9,480
Japan	1	144	(3)	44
Korea, Republic of	6	168	12	559
Sweden	--	--	17	565
Vietnam	--	--	16	536
Other	(3)	55	(3)	101
Total	1,690	43,200	1,600	63,500
Unwrought tungsten:^{2, 4, 5}				
Austria	--	--	1	88
China	182	2,820	245	6,220
Germany	(3)	14	51	2,890
Russia	34	537	--	--
Singapore	26	276	19	371
Spain	--	--	3	39
Other	1	131	2	154
Total	243	3,780	321	9,760
Waste and scrap:				
Canada	265	1,330	60	649
China	174	2,670	132	3,670
France	54	679	32	565
Germany	682	8,580	376	6,100
Hong Kong	62	948	33	1,050
India	82	762	34	389
Israel	8	47	28	325
Japan	235	3,250	122	1,860
Korea, Republic of	45	336	--	--
Mexico	57	488	58	740
Netherlands	109	1,000	--	--

See footnotes at end of table.

TABLE 14—Continued
U.S. IMPORTS FOR CONSUMPTION OF MISCELLANEOUS TUNGSTEN-BEARING MATERIALS, BY COUNTRY¹

Product and country of origin	2005		2006	
	Quantity, tungsten content (metric tons)	Value (thousands)	Quantity, tungsten content (metric tons)	Value (thousands)
Waste and scrap—Continued:				
Pakistan	--	--	70	\$1,470
Singapore	4	\$38	21	382
South Africa	48	482	37	560
Sweden	39	261	23	97
Switzerland	16	369	--	--
Thailand	3	36	39	583
United Arab Emirates	142	2,180	37	731
United Kingdom	23	418	317	2,840
Other	17 ^r	207 ^r	8	105
Total	2,070	24,100	1,430	22,100
Wrought tungsten: ^{2, 4, 6}				
Austria	25	4,070	21	3,640
Belgium	11	581	11	809
China	123	7,200	300	16,500
Czech Republic	1	337	1	1,200
France	9	997	5	976
Germany	20	2,730	60	5,380
Hong Kong	7	633	6	475
Hungary	5	643	5	1,020
India	7	465	3	468
Israel	28	1,590	53	3,560
Japan	41	5,220	17	4,800
Korea, Republic of	(3)	115	5	399
Russia	9	869	9	1,280
South Africa	8	118	10	181
Spain	1	308	2	373
United Kingdom	5	296	2	489
Uzbekistan	--	--	114	3,800
Other	5 ^r	1,210 ^r	4	1,440
Total	306	27,400	629	46,700
Tungsten oxides:				
China	680	17,300	711	23,300
Germany	3	119	8	351
Russia	233	5,500	63	1,120
Other	1	36 ^r	(3)	25
Total	917	23,000	782	24,800
Other tungstates:				
China	--	--	18	520
Hong Kong	--	--	5	125
India	(3)	12	8	201
United Kingdom	2	50	--	--
Other	(3) ^r	51 ^r	(3)	68
Total	3	113	31	914
Other tungsten compounds: ⁷				
Germany	(3)	114	2	220
Japan	4	681	3	503
Ukraine	(3)	7	1	31
Total	4	802	5	753

See footnotes at end of table.

TABLE 14—Continued

U.S. IMPORTS FOR CONSUMPTION OF MISCELLANEOUS TUNGSTEN-BEARING MATERIALS, BY COUNTRY¹^rRevised. -- Zero.¹Data are rounded to no more than three significant digits; may not add to totals shown.²May include alloys.³Less than ½ unit.⁴Content estimated from reported gross weight.⁵Includes bars and rods produced simply by sintering; excludes powders and waste and scrap.⁶Includes bars and rods other than those produced simply by sintering; profiles, plates, sheets, strip, and foil; wire; and other wrought products.⁷Includes tungsten chlorides.

Source: U.S. Census Bureau.

TABLE 15
TUNGSTEN: WORLD CONCENTRATE PRODUCTION, BY COUNTRY^{1,2}

(Metric tons, tungsten content)

Country ³	2002	2003	2004	2005	2006 ^c
Australia	7	2	2	2	2 ⁴
Austria	1,377	1,381	1,335	1,280 ^r	1,300
Bolivia	399	441	403 ^r	531 ^r	868 ⁴
Brazil	24	30	262	458 ^{r, p}	460
Burma ⁵	83	93	106	166 ^r	200
Burundi	--	13	8 ^r	94 ^r	100
Canada ⁶	2,295	3,636	--	484 ^r	2,561 ^p
China ^{c, 7}	55,100	55,500	92,200 ^r	78,800 ^r	79,000
Congo (Kinshasa) ^c	100	120	20	180	500
Korea, North ^c	600	600	600	600	600
Mongolia	35	40 ^c	77	78	80
Portugal	693	715	746	816 ^r	778 ⁴
Russia ^c	5,300	5,450	5,500	4,400	4,000
Rwanda	153	78	120 ^c	120 ^c	120
Thailand ^c	31	208	180	190 ^r	180
Uganda	16	1	52	36 ^r	40
Total	66,200 ^r	68,300 ^r	102,000 ^r	88,200 ^r	90,800

^cEstimated. ^pPreliminary. ^rRevised. -- Zero.¹World totals and estimated data are rounded to no more than three significant digits; may not add to totals shown.²Table includes data available through May 25, 2007.³Tungsten concentrates are thought to be produced in Nigeria, Peru, and Turkey and may be produced from tin-tungsten ores in Kyrgyzstan, but information is inadequate to make reliable estimates of production.⁴Reported figure.⁵Includes tungsten content of tin-tungsten concentrate produced by state-owned mining enterprises under the Ministry of Mines.⁶Tungsten content of concentrates shipped.⁷Based upon data published in the Yearbook of Nonferrous Metals Industry of China.