TUNGSTEN

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In 2007, one U.S. tungsten operation restarted and shipped some concentrates. The majority of 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 slightly higher in 2007 than in 2006. Salient U.S. tungsten statistics and world tungsten concentrate production for 2007 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. During fiscal year 2007 (October 1, 2006, through September 30, 2007), 1,310 metric tons (t) of contained tungsten was sold. At the end of the fiscal year, all of the tungsten that had been sold had been shipped from the stockpile. During the calendar year, 1,140 t of tungsten was sold. The quantities of uncommitted tungsten materials remaining in the stockpile at the end of the calendar year are listed in tables 1 and 2 (U.S. Department of Defense, 2008, p. 59-60).

The Annual Materials Plan (AMP) for fiscal year 2007, which represented the maximum quantities of tungsten materials that could be sold, is listed in table 2. The AMP for fiscal year 2008 (October 1, 2007, through September 30, 2008) was to remain unchanged for ores and concentrates and metal powder, the two tungsten materials remaining in the stockpile (U.S. Department of Defense, 2008, p. 6, 8).

The Toxic Substances Control Act's Preliminary Assessment Information Reporting Program included five tungsten compounds. The program required producers and importers of listed materials to report production, importation, and exposure data to the U.S. Environmental Protection Agency (EPA) (U.S. Environmental Protection Agency, 2008).

The EPA announced that tungsten had been nominated for inclusion in its Integrated Risk Information System, a database of qualitative and quantitative human health effects information (U.S. Environmental Protection Agency, 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, purchase, disposition, and stocks of tungsten ores and concentrates. In late 2007, Curtis Tungsten, Inc. restarted operations at the Andrew Mine in California, and shipped some concentrates.

Golden Predator Mines Inc. acquired Springer Mining Co. from General Electric Co. in late 2006. Springer's main assets were the Springer underground scheelite mine and a mill complex designed to produce either ammonium paratungstate (APT) or calcium tungstate (also known as synthetic scheelite). The mine and mill, located in Pershing County, NV, have been on care-and-maintenance status since 1982. Golden Predator initiated the permitting process for restarting operations, began surface exploration drilling, and started to refurbish the mill. The company planned to start processing ore from the mine by late 2008 (Golden Predator Mines Inc., 2008, p. iv, 8-9, 11).

The USGS monthly "Tungsten Concentrate and Tungsten Products Survey" canvassed companies that produced tungsten carbide powder, tungsten chemicals, and/or tungsten metal powder from APT, tungsten-bearing scrap, and tungsten concentrate. U.S. processors of tungsten materials operating in 2007 are listed in table 4.

Allegheny Technologies Inc.'s Metalworking Products unit completed an expansion of the APT production capacity of its Huntsville, AL, facility. The new plant, which became fully

operational in 2007, could process ore concentrates and hard or soft scrap. Allegheny Technologies stated that the plant would generate all the APT needed by the unit for its downstream tungsten production (Allegheny Technologies Inc., 2008, p. 22, 32).

Tungsten Joint Venture LLC (a subsidiary of Canadian tungsten mining company North American Tungsten Corp. Ltd.) owned and operated a pilot plant in White Bear Lake, MN. The plant used processing technology developed by Tundra Composites LLC to convert North American Tungsten's low-grade tungsten concentrates to APT, which was sold to the U.S. market. Tungsten Joint Venture also planned to produce downstream products, such as tungsten metal powders. If the pilot plant proved to be successful, North American Tungsten planned to form a joint venture with Tundra Composites LLC to build a full-scale commercial plant in Hoyt Lakes, MN (North American Tungsten Corp. Ltd., 2008a, p. 10, 13, 15).

In 2007, U.S. processors consumed more APT and less tungsten concentrates and scrap than they did in 2006. Domestic production of APT was higher than that of 2006. Total net production of tungsten metal powder and tungsten carbide powder increased by 4% in 2007 compared with that of 2006 (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 13,300 t in 2007, which was slightly higher than the 2006 apparent consumption of 13,200 t. An increase in net imports in 2007 was offset by a decrease in 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, nearly 60 tungsten consumers were canvassed on a monthly or annual basis. Reported consumption and stock data in tables 1 and 5 include estimates to account for nonrespondents.

Total U.S. reported consumption of tungsten materials to make end-use products in 2007 was 8% lower than that of 2006. Nearly all end-use industries used less tungsten in 2007 than in 2006; tungsten consumption by steelmakers increased slightly from that of 2006, and consumption by producers of alloys other than superalloys increased significantly. Compared with consumption in 2006, U.S. end-users consumed less ferrotungsten, tungsten carbide powder, tungsten chemicals, tungsten metal powder, and tungsten scrap in 2007.

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 produce oil and natural gas. The number of rigs that operated in the United States continued to trend upward during 2007. The average number of operating rigs in the United States was 1,768, 7% higher than the average 1,649 operating rigs in 2006 (Baker Hughes Inc., undated).

In 2007, total consumption of tungsten scrap by U.S. processors and consumers was 4,310 t of contained tungsten, which was 3% less than the 4,450 t (revised) consumed in 2006.

Prices

APT 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 APT prices decreased slightly from those of 2006 (table 1). The U.S. APT price reported by Platts Metals Week fluctuated within the range of $210 to $265 per short ton unit ($231 to $292 per metric ton unit). U.S. APT prices reported by Metal Bulletin fluctuated within the range of $250 to $265 per short ton unit ($276 to $292 per metric ton unit).

Annual average tungsten ore concentrate prices decreased from those of 2006 (table 1). The U.S. spot tungsten ore concentrate prices reported by Platts Metals Week fluctuated within the range of $145 to $190 per short ton unit ($160 to $209 per metric ton unit). Platts' annual average ferrotungsten price increased by 4% from $31.47 per kilogram of contained tungsten in 2006 to $32.71 per kilogram in 2007. In 2007, the ferrotungsten price ranged between $31 and $34 per kilogram.

Foreign Trade

The total tungsten content of U.S. exports was 6,050 t, 6% lower than the 6,440 t exported in 2006. The decrease was primarily a result of significant decreases in exports of tungsten compounds and unwrought tungsten compared with those of 2006. Exports of most other tungsten materials were higher than those of 2006 (tables 6-10).

The total tungsten content of U.S. imports was 12,900 t, 8% higher than the 12,000 t imported in 2006. China, which continued to be the leading supplier of imported tungsten to the United States, provided 39% of all tungsten imports in 2007. In 2007, the total tungsten content of imports from China decreased by 9% to 5,050 t from 5,540 t in 2006. The distribution of materials imported from China was as follows: APT, 51%; tungsten carbide powder, 15%; tungsten oxide, 8%; tungsten metal powder, 6%; ferrotungsten and wrought tungsten, 5% each; tungsten waste and scrap and unwrought tungsten, 4% each; and other tungstates and other tungsten compounds, minor amounts. Other significant suppliers of tungsten materials were as follows: Germany, with 10% of the total tungsten imports to the United States; Bolivia and Canada, 9% each; and Israel and Portugal, 6% each.

The tungsten contained in U.S. imports of ores and concentrates was 69% higher than that of 2006 (table 11). In 2007, the leading suppliers of U.S. imports of tungsten ores and concentrates were Bolivia (30%), Canada (21%), Portugal (19%), Peru (11%), Rwanda (7%), and Brazil (6%).

U.S. imports of APT decreased by 7% compared with those of 2006 (table 12). China continued to be the dominant supplier, providing 96% of U.S. APT imports. Imports of other tungsten materials are presented in tables 13-14.

In 2007, 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 only limited U.S. mine production in 2007, 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 has decreased every year since 2004, primarily owing to a decrease in estimated production from China (table 15). In addition to mine production and tungsten recovered from scrap, tungsten materials from the NDS contributed to supply in 2007.

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. stockpiled ore produced during the development of its Hillgrove underground gold-antimony mine near Armidale, New South Wales. The company built and began commissioning a demonstration plant to produce metallic antimony and gold and about 30 metric tons per year (t/yr) of byproduct tungsten in concentrate; the plant was to be expanded following ramp up to full capacity in 2008 (Straits Resources Ltd., 2008, p. 3-4, 19).

Queensland Ores Ltd. began construction at its Wolfram Camp project west of Cairns, Queensland. The project comprised an open pit mine and mill operation that was expected to produce approximately 333 t/yr of tungsten in wolframite concentrate and 100 t/yr molybdenum in molybdenite concentrate. The company signed offtake agreements with Citic Australia Commodity Trading Pty. Ltd. (China) and planned to begin shipping concentrates in mid-2008 (Queensland Ores Ltd., 2007a; 2007b, p. 14).

King Island Scheelite Ltd. (KIS) and Hunan Nonferrous Metals Corp. (China) signed agreements to form a joint venture to redevelop the former King Island Scheelite Mine at Grassy, King Island, northwest of Tasmania. Project construction was to begin immediately after receiving the final approvals from Australian and Chinese authorities and shareholders, so that first production could begin during the fourth quarter of 2009. During the first 11 years of production, KIS would operate an open pit mine and mill complex to produce scheelite concentrates containing an average of 2,400 t/yr of tungsten. Extending production beyond this first phase would depend on the results of studies by the joint-venture partners (King Island Scheelite Ltd., 2007).

Vital Metals Ltd. studied the feasibility of developing an open pit mine and beneficiation plant at its Watershed tungsten deposit northwest of Cairns, Queensland. The company was considering production at a rate of approximately 3,200 t/yr of tungsten in scheelite concentrate for a minimum of 10 years, beginning in late 2009 (Environmental and Licensing Professionals Pty. Ltd., 2008, p. i, 89, 102-103).

Thor Mining PLC prepared a revised reserve estimate for its Molyhil tungsten-molybdenum project northeast of Alice Springs in the Northern Territory and increased the planned ore throughput at the mill. As a result, the open pit mine was expected to produce an average 975 t/yr of tungsten in scheelite concentrate and 390 t/yr of molybdenum in molybdenite concentrate during a 5.7-year life. Thor proceeded with the approval process, considered financing alternatives for the project and worked on securing an offtake agreement for the concentrates (Thor Mining PLC, 2008).

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.

Brazil.—Six national companies were active in tungsten mining. Slightly more than one-half (54%) of the contained tungsen production was in wolframite concentrates, and the remainder (46%) was in scheelite concentrates (Cano and Nesi, 2008).

Canada.—North American Tungsten Corp. Ltd. produced 2,305 t of tungsten in concentrates from its Cantung Mine in the Northwest Territories, a 16% increase from the 1,983 t produced in 2006. Two grades of scheelite concentrate were produced at the mill—a low-grade flotation concentrate and a high-grade gravity concentrate. North American Tungsten established a tolling arrangement to convert its flotation concentrate to APT in China and entered a marketing agreement to sell the APT to the Asian market. The company also began a feasibility study on developing its Mactung deposit on the Yukon and Northwest Territories border; the deposit has been called one of the largest known undeveloped high-grade tungsten skarn deposits in the world (North American Tungsten Corp. Ltd., 2007, 2008b, c).

China.—China's capacity to produce tungsten materials and products continued to increase. China Tungsten Industry Association reported the following capacities for 2007: 161,000 t/yr of APT, 57,600 t/yr of tungsten metal powder, 33,900 t/yr of cemented carbide, and 29.56 billion meters per year of tungsten filament. China produced 163,580 t of tungsten contained in materials and products, distributed as follows: tungsten concentrate, 41,250 t; APT, 38,330 t; tungsten oxides, 36,400 t; tungsten metal and tungsten carbide powders, 21,900 t; tungsten alloys, 13,400 t; ferrotungsten, 9,000 t; and tungsten bars and wire, 3,300 t. China's exports of tungsten contained in products, including cemented carbides, decreased by 4% to 33,065 t, from 34,336 t in 2006 (Huang, 2008).

In spite of its position as the world's leading miner of tungsten, China has imported significant amounts of tungsten concentrates in recent years. In 2007, China imported an estimated 4,800 t of tungsten in concentrates. Chinese companies were involved in tungsten mine projects in Australia, Canada, and Vietnam. In addition, China was considering a proposal to build a stockpile of tungsten and other strategic metals (Beijing Antaike Information Development Co., Ltd., 2007, 2008b).

China's Government had a program to conserve its tungsten resources and to try to stabilize world tungsten prices. In the mining sector, the Government regulated the production of

tungsten concentrates by banning foreign investment in tungsten exploration and mining; closing mines that did not meet certain energy, environmental, production, and safety standards; establishing a minimum price for tungsten concentrates; increasing the resource tax on tungsten ores; not issuing new mining licenses; and setting production quotas. For 2007, the tungsten concentrate production quota was 59,270 t (65% WO_3). Eight percent of the quota was to be from concentrates recovered from gangue, and the remaining production was distributed by province or autonomous region as follows: Jiangxi (54%), Hunan (19%), Yunnan (6%), Guangdong (5%), Fujian, Guangxi, and Inner Mongolia (2% each), Anhui and Zhejiang (1% each), and Qinghai (0.1%) (Interfax Ltd., 2007a, b; Zhang, 2007; Beijing Antaike Information Development Co., Ltd., 2008c; Huang, 2008).

In the processing sector, the Government encouraged the recovery of tungsten from low-grade ores, mixed scheelite-wolframite concentrates, and scrap; banned tolling of tungsten concentrate; restricted foreign investment in processing plants; and established new requirements to limit the building or expansion of plants. These new requirements included minimum capacities, the ability to secure reliable supplies of raw materials, the use of the company's own funds for 50% or more of the investment, and meeting environmental, energy, production, and safety standards (Beijing Antaike Information Development Co., Ltd., 2006, 2008c; Fu, 2007; Interfax Ltd., 2007a; Metal Bulletin, 2007a; Zhang, 2007; Huang, 2008).

With respect to trade, the Government regulated tungsten exports by restricting the volumes and types of materials and products that could be sent out of the country, limiting the number of producers and traders authorized to export tungsten materials and products, adjusting the export tax system, and establishing a reference price for ferrotungsten. The 2007 export quota for tungsten materials was set at 15,400 t of contained tungsten. To qualify for an export license, companies were required to have minimum production capacities and recycling rates. The Government reduced or removed export tax rebates from most tungsten products in 2007, and then imposed export taxes of 5% to 15%. It also removed the tax benefits of toll trading tungsten materials. In addition to discouraging tungsten exports, China's Government planned to expand tungsten imports (Metal Bulletin, 2007a, b; Zhang, 2007; Huang, 2008).

Germany.—The Bayer Group completed the sale of H.C. Starck GmbH & Co. KG to a consortium comprising 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 (H.C. Starck GmbH & Co. KG, 2007).

Israel.—Metal-Tech Ltd.'s tungsten plant in Ramat Hovav reached full production capacity during the first half of the year. The plant recycled various types of metal-based wastes to produce tungsten carbide powder, tungsten metal powder, and tungsten oxide. The company evaluated a new tungsten recycling process for use at the plant (Metal-Tech Ltd., 2007).

Korea, Republic of.—The Government reportedly purchased 10 t of ferrotungsten and 10 t of tungsten metal powder from China for its stockpile of strategic metals (Metal-Pages Ltd., 2007b).

Japan.—The Ministry of Economy, Trade and Industry (METI) developed a strategy to reduce Japan's dependence on China for its supply of tungsten raw materials. It comprised providing assistance to develop new mine production in other countries, increasing recycling rates, promoting research to reduce consumption by increasing the life of tungsten products or developing substitutes, and making improvements to the stockpiling program. As part of the strategy, METI sent a delegation to Vietnam to investigate the development of tungsten resources; it assisted Advanced Material Japan Corp. to ship 2,000 t of surface ore from the Kiwada tungsten mine in Yamaguchi Prefecture to Russia's Far East for processing; and Sojitz Tungsten Resources, Inc. (a leading Japanese trading company) acquired Primary Metals Inc. (Canada), owner of the Panasqueira tungsten mine in Portugal (Roskill's Letter from Japan, 2007a, b; Takemoto, 2008).

Kyrgyzstan.—Sarydzhaz Mineral Mining Co. planned to open old mine workings in the Trudovoye tin-tungsten deposit, develop a mine at the Kensu tin-tungsten deposit, and construct a concentration plant to process the ore mined (Interfax Ltd., 2008a).

Peru.—Malaga Inc. (formerly named Dynacor Mines Inc., Canada) began commercial production from the Pasto Bueno mine and mill complex in the Ancash region. Mill capacity was increased to 250 metric tons per day of ore, and concentrates containing 348 t of tungsten were produced by yearend. The company had an offtake agreement to supply Osram with up to 100% of the tungsten concentrates produced during the mine's initial 3-year life. Malaga planned to continue upgrading the mill to double its capacity in 2009 and to continue exploration and development to increase reserves (Malaga Inc., 2008, p. 3, 9-10, 15).

Portugal.—Beralt Tin & Wolfram S.A. (a subsidiary of Primary Metals) made improvements at its Panasqueira Mine and concentrating plant in central Portugal. The company worked to access new areas of tungsten resources, introduced additional low-profile underground mining equipment, and installed a new underground primary crusher in the mine. Plant equipment was replaced or refurbished during the annual summer shutdown. Tungsten concentrates from Panasqueira were sold to Osram under a multiyear contract. At yearend, Primary Metals was acquired by Sojitz (Primary Metals Inc., 2007a, b).

Russia.—In 2007, tungsten concentrates were produced by more than five companies in Russia. The companies, with the locations of their operations and their share of 2007 Russian production, were as follows: JSC A&IR Mining, which produced concentrates from ores mined by Primorsky GOK in Primorskiy Kray, 60%; prospectors' cooperative Artel Quartz Ltd. and ZAO Novoorlovsky GOK, both in Chita Oblast, 14% each; JSC Lermontovskaya GRK in Primorskiy Kray, 5%; Kalgutinskoe Rudoupravlenie Ltd. in Altai Kray, 4%; and various prospectors, 3%. Scheelite concentrates were produced from Primorskiy Kray and wolframite concentrates were produced from other areas. In addition to tungsten concentrates, Russian processors consumed approximately 1,500 to 2,000 t/yr of tungsten scrap (Makulov, 2008).

Spain.—Heemskirk Consolidated Ltd. (Australia) worked on developing the Los Santos tungsten project in the Castillia

y Leon region, with the goal of beginning production in early 2008. The company agreed to supply Osram with 100% of the tungsten concentrates produced from Los Santos under a 6-year offtake agreement. Heemskirk planned to mine a series of open pits for a minimum of 10 years and process 400,000 t/yr of scheelite ore with a life-of-mine average grade of 0.3% WO_3. This would result in an average production of 950 t/yr of tungsten (Heemskirk Consolidated Ltd., 2008a, p. 6; 2008b).

Ormonde Mining plc (Ireland) evaluated the viability of developing a high-grade underground mine in the Barruecopardo deposit in Salamanca Province. The company decided to fast-track its evaluation and development of the mine, so that production could begin by the end of 2009. Initial production was to be 200,000 t/yr of ore and could result in concentrates containing about 90,000 metric ton units per year of WO_3 (approximately 715 t/yr of tungsten). Production in later years was expected to increase following exploration of other mineralized zones (Ormonde Mining plc, 2008, p. 2-6).

Tajikistan.—Former fluorspar producer OJSC Takob Mining Plant planned to develop the polymetallic Maikhura deposit and produce scheelite and bismuth concentrates (Metal-Pages Ltd., 2007a).

United Kingdom.—Wolf Minerals Ltd. (Australia) acquired the mineral and mining rights to the Hemerdon Ball tungsten and tin mine northeast of Plymouth in southwestern England. The company planned to update a 1982 feasibility study and bring the mine into production as soon as possible. Production from Hemerdon Ball took place briefly during World War II (Wolf Minerals Ltd., 2008).

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. Ingichki Metals (a joint venture of Navoi Mining and Metallurgy Combine and Russia's Integra Group) reportedly began producing scheelite concentrates from tailings at the Ingichki tungsten deposit. The concentrates were to be supplied to Uzbek (Interfax Ltd., 2007c, 2008b).

Vietnam.—Illegal tungsten mining in the Phuoc Trung commune of Ninh Thuan Province's Bac Ai district reportedly was stopped in early 2008 (Vietnam News Agency, 2008).

Dragon Capital Management Ltd. (a subsidiary of Chinese investment banking institution Dragon Capital Group) acquired Tiberon Minerals Ltd. (Canada), the majority partner in the joint venture to develop the Nui Phao project in Thai Nguyen Province. The project comprised the development of an open pit mine and milling operation to produce an estimated 3,800 t/yr of tungsten in concentrate as well as copper and fluorite concentrates and bismuth cement during an expected mine life of more than 16 years. Production was forecast to begin in late 2010 (Tiberon Minerals Ltd., 2007, p. 6, 13-14, 19-20; VietNamNet Bridge, 2008).

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. The Chinese tungsten concentrate production quota for 2008 was increased by 13% to 66,850 t (65% WO_3). Production from ores was increased by 8% to 59,440 t and production from gangue was increased by 66% to 7,410 t. Export licenses for 2008 were limited to a total of 14,900 t of all tungsten products, a decrease of 3% from the quota of 15,400 t in 2007. The Government increased many existing export taxes on tungsten products and established new export taxes on tungsten products not formerly taxed (Beijing Antaike Information Development Co., Ltd., 2008a, c; Platts Metals Week, 2008).

As a result of anticipated future growth in demand for tungsten, numerous companies worked towards developing tungsten deposits or reopening inactive tungsten mines in Asia, Australia, Europe, and North America. In 2008, new production of tungsten concentrates began in Australia and Spain. The serious downturn in the global financial markets in late 2008 could delay the startup of additional proposed production, however.

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TABLE 1
SALIENT TUNGSTEN STATISTICS[1]

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

	2003	2004	2005	2006	2007
United States:					
Concentrates:					
Production	--	--	--	--	W
Consumption	W	W	W	W	W
Exports	20	43	52	130	109
Imports for consumption	4,690	2,310	2,080	2,290	3,880
Stocks, December 31:					
Consumer	W	W	W	W	W
U.S. Government[2]	29,400	28,400	26,100	22,900	21,200
Price:					
U.S. spot quotation[3]	50	49	146	200	189
European[4]	45	55	123	166	165
Ammonium paratungstate:					
Production	W	W	W	W	W
Consumption[5]	9,450	8,790	9,530	11,300	12,000
Stocks, December 31, producer and consumer	W	W	W	W	W
Price:					
U.S. free market[6]	69	92	237	293	284
U.S. market[3]	72	91	240	273	262
European free market[6]	62	84	223	261	248
Primary products:					
Net production[7]	9,420	7,400	7,810	8,050	8,360
Consumption[8]	9,600	11,200	11,100	12,300 r	11,300
Stocks, December 31:					
Producer[9]	793	787	800	827	825
Consumer[8]	423	406	508	450 r	481
U.S. Government[2]	765	685	282	266	235
World, production of concentrate	47,200 r	66,600 r	59,600 r	56,600 r	54,500 e

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

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

[2]Defense National Stockpile Center. Data through 2006 include material committed for sale pending shipment; data for 2007 are uncommitted material only.

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

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

[5]Reported by tungsten processors.

[6]Annual average calculated from annual average high and low prices reported by Metal Bulletin for 2003-06 and from semiweekly prices reported by Metal Bulletin for 2007.

[7]Includes only tungsten metal powder and tungsten carbide powder.

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

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

TABLE 2
U.S. GOVERNMENT NATIONAL DEFENSE STOCKPILE TUNGSTEN STATISTICS IN 2007[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	21,300	21,200	3,630	1,280	1,100	1,980	1,740
Ferrotungsten	--	--	136	--	--	--	--
Tungsten metal powder	268	235	136	34	34	-3	31
Total	21,600	21,400	3,900	1,310	1,140	1,980	1,780

-- Zero.

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

[2]Includes stockpile- and nonstockpile-grade materials.

[3]Uncommitted inventory only. Does not include material committed for sale pending shipment.

[4]From previous year. Yearend inventories for 2006 included committed material; yearend inventories for 2007 did not. Negative number represents inventory increase.

[5]Twelve-month period ending September 30, 2007.

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:			
2006	3,260	4,800	8,050
2007	3,880	4,480	8,360
Producer stocks:			
December 31, 2006	411	415	827
December 31, 2007	406	419	825

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

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

[3]Data 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. PROCESSORS OF TUNGSTEN IN 2007[1]

Company	Plant location
ATI Alldyne[2]	Huntsville, AL.
Buffalo Tungsten Inc.	Depew, NY.
Chem-Met Co., The	Clinton, MD.
Elmet Technologies, Inc.	Lewiston, ME.
General Electric Co.	Euclid, OH.
Kennametal Inc.	Fallon, NV.
Do.	Latrobe, PA.
Osram Sylvania Inc.	Towanda, PA.
Tungsten Heavy Powder, Inc.	San Diego, CA.
Tungsten Joint Venture LLC[3]	White Bear Lake, MN.[4]

Do. Ditto

[1]Consumers of ammonium paratungstate, tungsten-bearing scrap, tungsten concentrates, and/or tungsten oxides.

[2]An Allegheny Technologies Inc. company.

[3]Subsidiary of North American Tungsten Corp. Ltd.

[4]Pilot-scale operation.

TABLE 5
U.S. REPORTED CONSUMPTION AND STOCKS OF TUNGSTEN PRODUCTS[1, 2, 3]

(Metric tons of tungsten content)

	2006	2007
Consumption by end use:		
Steels	292	295
Superalloys	W	W
Other alloys[4]	W	W
Cemented carbides[5]	6,710 r	6,090
Mill products made from metal powder	W	W
Chemical uses	118	89
Total	12,300 r	11,300
Consumption by form:		
Ferrotungsten	280	267
Tungsten metal powder	W	W
Tungsten carbide powder	6,610 r	6,190
Tungsten scrap[6]	W	W
Other tungsten materials[7]	118	89
Total	12,300 r	11,300
Consumer stocks, December 31:		
Ferrotungsten	20	16
Tungsten metal powder	28 r	27
Tungsten carbide powder	351 r	398
Tungsten scrap[6]	35	25
Other tungsten materials[7]	16 r	14
Total	450 r	481

rRevised. W Withheld to avoid disclosing company proprietary data; included in "Total."
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Does not include materials used in making primary tungsten products.
[3]Includes estimates.
[4]Includes welding and hard-facing rods and materials, wear- and corrosion-resistant alloys, and nonferrous alloys.
[5]Includes diamond tool matrices, cemented and sintered carbides, and cast carbide dies or parts.
[6]Includes tungsten bars.
[7]Includes tungsten chemicals.

TABLE 6
U.S. EXPORTS OF TUNGSTEN ORES AND CONCENTRATES, BY COUNTRY[1]

	2006			2007		
	Quantity			Quantity		
Country of destination	Gross weight (metric tons)	Tungsten content[2] (metric tons)	Value (thousands)	Gross weight (metric tons)	Tungsten content[2] (metric tons)	Value (thousands)
Bolivia	--	--	--	33	17	$432
Brazil	--	--	--	2	1	54
Canada	1	(3)	$11	--	--	--
China	210	108	3,160	29	15	372
Czech Republic	(3)	(3)	7	--	--	--
France	(3)	(3)	3	--	--	--
Germany	1	1	47	--	--	--
Indonesia	(3)	(3)	3	--	--	--
Ireland	--	--	--	(3)	(3)	6
Japan	--	--	--	1	(3)	8
Korea, Republic of	2	1	28	--	--	--
Malaysia	--	--	--	(3)	(3)	10
Mexico	--	--	--	4	2	60
Netherlands	37	19	269	119	61	1,270
Portugal	--	--	--	(3)	(3)	3
Singapore	(3)	(3)	10	--	--	--
Sweden	(3)	(3)	3	18	9	444
Taiwan	(3)	(3)	5	(3)	(3)	3
Thailand	--	--	--	(3)	(3)	3
United Arab Emirates	--	--	--	(3)	(3)	5
United Kingdom	--	--	--	4	2	52
Total	252	130	3,550	210	109	2,720

-- Zero.

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

[2]Content estimated from reported gross weight.

[3]Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 7
U.S. EXPORTS OF AMMONIUM PARATUNGSTATE, BY COUNTRY[1]

	2006		2007	
Country of destination	Quantity, tungsten content (metric tons)	Value (thousands)	Quantity, tungsten content (metric tons)	Value (thousands)
France	--	--	3	$26
Germany	322	$4,480	697	11,400
Iceland	(2)	4	--	--
India	3	25	1	10
Italy	--	--	2	14
Korea, Republic of	--	--	(2)	4
Mexico	6	51	2	21
Netherlands	19	414	--	--
Spain	--	--	22	269
Taiwan	--	--	5	45
Total	350	4,970	731	11,700

-- Zero.

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

[2]Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 8
U.S. EXPORTS OF TUNGSTEN METAL POWDERS, BY COUNTRY[1, 2]

	2006			2007		
	Quantity			Quantity		
Country of destination	Gross weight (metric tons)	Tungsten content[3] (metric tons)	Value (thousands)	Gross weight (metric tons)	Tungsten content[3] (metric tons)	Value (thousands)
Australia	17	14	$725	15	12	$694
Austria	13	10	384	--	--	--
Brazil	12	10	760	20	16	1,310
Canada	104	83	4,180	105	84	4,500
Chile	2	2	157	4	3	235
China	6	5	373	23	18	1,200
Czech Republic	74	59	1,440	55	44	1,130
France	30	24	2,350	27	22	1,720
Germany	464	372	15,000	485	388	14,500
Hong Kong	1	1	26	2	1	182
India	2	2	141	2	2	155
Indonesia	1	1	41	1	1	41
Israel	18	15	530	7	6	269
Italy	28	22	1,940	14	11	1,160
Japan	27	22	1,340	11	9	863
Korea, Republic of	1	1	83	2	1	121
Mexico	141	113	5,210	328	262	12,200
Morocco	6	4	199	--	--	--
Netherlands	21	17	510	--	--	--
New Zealand	8	6	131	(4)	(4)	5
Peru	2	1	99	7	6	291
Saudi Arabia	--	--	--	3	2	127
Singapore	15	12	1,190	41	33	2,020
South Africa	4	3	241	2	2	143
Spain	3	3	237	3	2	208
Sweden	(4)	(4)	6	57	46	3,090
Switzerland	5	4	233	3	2	187
Taiwan	74	60	3,690	62	49	2,690
Thailand	2	1	80	(4)	(4)	26
Turkey	2	2	165	--	--	--
United Arab Emirates	2	1	130	3	2	237
United Kingdom	93	74	2,980	25	20	2,240
Venezuela	17	14	311	3	2	80
Other	6 r	5 r	349 r	5	4	316
Total	1,200	959	45,300	1,310	1,050	51,900

rRevised. -- Zero.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]May include tungsten alloy powders.
[3]Content estimated from reported gross weight.
[4]Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 9
U.S. EXPORTS OF TUNGSTEN CARBIDE POWDER, BY COUNTRY[1]

	2006		2007	
Country of destination	Quantity, tungsten content (metric tons)	Value (thousands)	Quantity, tungsten content (metric tons)	Value (thousands)
Argentina	1	$81	(2)	$24
Australia	14	618	17	745
Belgium	8	486	2	174
Brazil	14	321	18	422
Canada	89	4,080	95	4,520
China	7	325	4	290
Denmark	5	166	3	45
France	97	3,380	139	3,990
Georgia	2	320	(2)	5
Germany	285	6,320	431	14,200
India	33	1,050	30	1,010
Ireland	11	820	5	245
Israel	5	152	11	125
Italy	5	210	4	188
Japan	27	1,710	9	487
Korea, Republic of	7	546	4	313
Luxembourg	2	97	2	140
Malaysia	1	47	2	82
Mexico	(2)	70	2	126
Norway	2	154	1	30
Peru	2	110	4	287
Singapore	3	274	5	381
South Africa	29	981	86	3,010
Sweden	14	919	16	632
Switzerland	5	153	4	242
Taiwan	8	232	25	899
United Kingdom	277	10,300	306	9,000
Venezuela	56	849	44	1,650
Other	3 r	338 r	7	400
Total	1,010	35,100	1,280	43,700

rRevised.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 10
U.S. EXPORTS OF MISCELLANEOUS TUNGSTEN-BEARING MATERIALS, BY COUNTRY[1]

Product and country of destination	2006 Quantity, tungsten content (metric tons)	2006 Value (thousands)	2007 Quantity, tungsten content (metric tons)	2007 Value (thousands)
Ferrotungsten and ferrosilicon tungsten:				
Canada	1	$19	2	$100
India	--	--	2	5
Japan	3	181	--	--
Mexico	(2)	29	--	--
Netherlands	--	--	10	454
Total	4	229	14	559
Unwrought tungsten:[3, 4, 5]				
Australia	5	20	1	17
Belgium	11	105	4	16
Brazil	10	46	18	86
Canada	106	786	144	1,190
China	68	294	19	81
Czech Republic	3	11	15	62
Denmark	5	29	9	47
France	15	62	3	12
Germany	124	522	105	453
Hungary	15	65	17	76
Ireland	--	--	4	17
Israel	23	99	25	111
Italy	6	27	--	--
Japan	33	137	22	92
Korea, Republic of	5	22	4	22
Malaysia	18	75	11	46
Mexico	38	170	85	366
Netherlands	2	9	10	190
New Zealand	4	17	--	--
Philippines	51	215	13	56
Singapore	59	247	18	74
Sweden	44	190	21	88
Taiwan	181	779	42	198
United Kingdom	401	1,800	186	805
Other	9	46 r	3	25
Total	1,230	5,780	777	4,130
Waste and scrap:[4]				
Belgium	21	348	2	53
Brazil	2	36	6	99
Canada	129	1,060	304	2,740
China	44	590	50	767
France	38	364	5	170
Germany	238	3,310	608	12,300
Hong Kong	13	256	72	1,030
Israel	--	--	13	97
Japan	148	2,240	2	28
Korea, Republic of	--	--	23	200
Mexico	1	5	7	55
Netherlands	10	108	154	1,300

See footnotes at end of table.

TABLE 10—Continued

U.S. EXPORTS OF MISCELLANEOUS TUNGSTEN-BEARING MATERIALS, BY COUNTRY[1]

Product and country of destination	2006 Quantity, tungsten content (metric tons)	2006 Value (thousands)	2007 Quantity, tungsten content (metric tons)	2007 Value (thousands)
Waste and scrap—Continued:[4]				
Peru	7	$56	--	--
Singapore	2	17	4	$30
Taiwan	31	763	--	--
United Kingdom	159	3,300	365	3,310
Vietnam	472	1,040	--	--
Other	1	4	3	25
Total	1,310	13,500	1,620	22,200
Wrought tungsten:[3, 4, 6]				
Australia	2	297	8	1,170
Brazil	7	1,410	7	960
Canada	32	2,520	41	3,380
China	12	2,000	14	2,760
Colombia	4	1,600	4	1,350
Costa Rica	2	236	4	552
Czech Republic	26	4,620	18	3,270
France	14	2,160	4	507
Germany	44	5,800	87	7,590
Hungary	9	1,810	5	892
India	4	277	1	154
Indonesia	2	583	2	407
Ireland	3	389	(2)	21
Israel	7	1,880	4	1,700
Italy	4	512	4	785
Japan	79	14,300	83	12,100
Korea, Republic of	2	545	2	231
Mexico	27	3,870	20	3,610
Netherlands	3	874	7	1,120
Saudi Arabia	6	1,390	(2)	114
Singapore	1	490	2	368
Spain	8	599	16	1,420
Sweden	17	879	1	304
Taiwan	2	542	1	70
United Kingdom	37	2,340	16	3,400
Other	12 r	2,360 r	6	1,040
Total	364	54,300	357	49,300
Tungsten compounds:[7]				
Canada	26	88	27	104
China	150	2,430	2	12
Germany	(2)	6	17	248
Netherlands	896	15,500	75	1,240
United Kingdom	(2)	3	--	--
Other	(2)	11 r	(2)	37
Total	1,070	18,100	122	1,640

See footnotes at end of table.

TABLE 10—Continued
U.S. EXPORTS OF MISCELLANEOUS TUNGSTEN-BEARING MATERIALS, BY COUNTRY[1]

[r]Revised. -- Zero.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Less than ½ unit.
[3]May include alloys.
[4]Content estimated from reported gross weight.
[5]Includes bars and rods produced simply by sintering; excludes powders and waste and scrap.
[6]Includes bars and rods other than those produced simply by sintering; profiles, plates, sheets, strip, and foil; wire; and other wrought products.
[7]Includes only other tungstates.

Source: U.S. Census Bureau.

TABLE 11
U.S. IMPORTS FOR CONSUMPTION OF TUNGSTEN ORES AND CONCENTRATES, BY COUNTRY[1]

	2006		2007	
Country of origin	Quantity, tungsten content (metric tons)	Value (thousands)	Quantity, tungsten content (metric tons)	Value (thousands)
Australia	24	$551	--	--
Austria	(2)	5	--	--
Bolivia	845	20,400	1,150	$26,100
Brazil	--	--	216	5,670
Canada	205	1,780	797	16,400
China	--	--	(2)	3
Congo (Kinshasa)	34	439	--	--
Germany	--	--	1	44
Mexico	35	426	25	255
Mongolia	43	367	77	861
Netherlands	--	--	(2)	4
Nigeria	--	--	8	132
Peru	18	455	410	10,300
Portugal	713	20,700	733	20,300
Russia	--	--	26	436
Rwanda	228	1,740	270	4,200
Thailand	108	1,410	157	1,970
Uganda	32	811	14	340
United Kingdom	9	290	--	--
Total	2,290	49,500	3,880	87,000

-- Zero.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 12
U.S. IMPORTS FOR CONSUMPTION OF AMMONIUM PARATUNGSTATE, BY COUNTRY[1]

	2006		2007	
Country of origin	Quantity, tungsten content (metric tons)	Value (thousands)	Quantity, tungsten content (metric tons)	Value (thousands)
China	2,670	$72,300	2,570	$66,900
Germany	188	4,500	121	2,590
Netherlands	(2)	418	--	--
Russia	27	686	--	--
United Kingdom	15	371	--	--
Total	2,900	78,200	2,700	69,400

-- Zero.

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

[2]Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 13
U.S. IMPORTS FOR CONSUMPTION OF FERROTUNGSTEN AND FERROSILICON TUNGSTEN, BY COUNTRY[1]

	2006		2007	
Country of origin	Quantity, tungsten content (metric tons)	Value (thousands)	Quantity, tungsten content (metric tons)	Value (thousands)
China	254	$7,640	256	$8,060
Japan	--	--	8	50
Mexico	--	--	9	61
Netherlands	10	302	84	1,410
United Kingdom	2	47	--	--
Total	265	7,990	357	9,580

-- Zero.

[1]Data 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 COUNTRY[1]

Product and country of origin	2006 Quantity, tungsten content (metric tons)	2006 Value (thousands)	2007 Quantity, tungsten content (metric tons)	2007 Value (thousands)
Tungsten metal powders:[2]				
Austria	(3)	$20	(3)	$8
Belgium	1	33	(3)	4
Canada	155	4,700	115	4,550
China	410	14,200	304	10,100
Czech Republic	14	438	1	29
France	1	40	--	--
Germany	604	20,900	480	17,300
Israel	308	12,500	408	16,500
Japan	15	1,400	14	1,330
Korea, Republic of	216	9,360	160	6,890
South Africa	9	149	--	--
United Kingdom	6	196	(3)	13
Other	1	30	(3)	9
Total	1,740	63,900	1,480	56,800
Tungsten carbide powder:				
Belgium	2	128	2	135
Canada	373	14,800	265	10,200
China	799	32,800	735	27,800
Czech Republic	19	1,240	3	171
France	3	235	1	95
Germany	60	2,980	88	5,180
Hong Kong	2	49	--	--
India	5	32	35	1,040
Israel	291	9,480	238	8,370
Korea, Republic of	12	559	17	753
South Africa	--	--	7	108
Sweden	17	565	48	1,780
United Kingdom	(3)	61	16	964
Vietnam	16	536	--	--
Other	(3)	84 r	1	60
Total	1,600	63,500	1,450	56,700
Unwrought tungsten:[2, 4, 5]				
China	245	6,220	187	6,030
France	--	--	6	108
Germany	51	2,890	46	3,040
Netherlands	--	--	3	5
Singapore	19	371	30	502
Spain	3	39	--	--
United Kingdom	(3)	18	4	308
Vietnam	--	--	10	349
Other	2	225 r	1	111
Total	321	9,760	286	10,500
Waste and scrap:				
Canada	60	649	20	385
China	132	3,670	211	6,830
France	32	565	--	--
Germany	376	6,100	473	6,050
Hong Kong	33	1,050	6	202
India	34	389	3	42
Israel	28	325	106	2,060
Japan	122	1,860	59	1,030
Korea, Republic of	--	--	66	854

See footnotes at end of table.

TABLE 14—Continued

U.S. IMPORTS FOR CONSUMPTION OF MISCELLANEOUS TUNGSTEN-BEARING MATERIALS, BY COUNTRY[1]

Product and country of origin	2006		2007	
	Quantity, tungsten content (metric tons)	Value (thousands)	Quantity, tungsten content (metric tons)	Value (thousands)
Waste and scrap—Continued:				
Mexico	58	$740	122	$1,490
Pakistan	70	1,470	34	909
Singapore	21	382	5	103
South Africa	37	560	19	342
Sweden	23	97	--	--
Thailand	39	583	68	524
United Arab Emirates	37	731	34	384
United Kingdom	317	2,840	112	1,850
Other	8	105	52	795
Total	1,430	22,100	1,390	23,800
Wrought tungsten:[2, 4, 6]				
Austria	21	3,640	26	4,610
Belgium	11	809	8	817
China	300	16,500	260	15,400
France	5	976	6	1,220
Germany	60	5,380	53	4,680
Hong Kong	6	475	11	811
Hungary	5	1,020	4	930
India	3	468	3	505
Israel	53	3,560	74	4,820
Italy	1	47	11	455
Japan	17	4,800	27	5,300
Korea, Republic of	5	399	4	341
Mexico	(3)	19	4	140
Russia	9	1,280	5	644
South Africa	10	181	22	589
Uzbekistan	114	3,800	64	2,550
Other	8 r	3,430 r	8	3,650
Total	629	46,700	590	47,400
Tungsten oxides:				
China	711	23,300	418	11,600
Germany	8	351	75	2,290
Netherlands	--	--	8	112
Russia	63	1,120	148	4,130
Other	(3)	25	4	42
Total	782	24,800	653	18,100
Other tungstates:				
China	18	520	77	2,120
Hong Kong	5	125	--	--
India	8	201	11	285
Other	(3)	68	(3)	96
Total	31	914	88	2,500
Other tungsten compounds:[7]				
China	--	--	31	849
Germany	2	220	12	223
Japan	3	503	5	1,050
Ukraine	1	31	--	--
Total	5	753	48	2,120

See footnotes at end of table.

TABLE 14—Continued

U.S. IMPORTS FOR CONSUMPTION OF MISCELLANEOUS TUNGSTEN-BEARING MATERIALS, BY COUNTRY[1]

[r]Revised. -- Zero.

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

[2]May include alloys.

[3]Less than ½ unit.

[4]Content estimated from reported gross weight.

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

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

[7]Includes tungsten chlorides.

Source: U.S. Census Bureau.

TABLE 15

TUNGSTEN: WORLD CONCENTRATE PRODUCTION, BY COUNTRY[1, 2]

(Metric tons, tungsten content)

Country[3]	2003	2004	2005	2006	2007[e]
Australia	7 [r]	12 [r]	7 [r]	15 [r]	7 [4]
Austria	1,381	1,335	1,280	1,153 [r]	1,200
Bolivia	441	403	531	868	1,107 [4]
Brazil	30	262	577 [r]	525 [r]	537 [p, 4]
Burma[5]	96 [r]	107 [r]	168 [r]	197 [r]	183 [4]
Burundi	13	8	94	238 [r]	144
Canada[6]	3,636	--	484	2,500 [r]	2,700 [p]
China[e, 7]	36,200 [r]	59,900 [r]	51,200 [r]	45,000 [r]	41,000
Congo (Kinshasa)[e]	120	20	180	500	500
Korea, North[e]	600	600	600	600	600
Mongolia	40 [e]	77	54 [r]	85 [r]	250
Peru	20	--	--	50	348 [4]
Portugal	715	746	816	778	846 [4]
Russia[e]	3,600 [r]	2,800 [r]	2,900 [r]	2,900 [r]	3,200
Rwanda	69 [r]	90 [r]	318 [r]	820 [r]	1,534 [4]
Thailand[e]	216 [r]	187 [r]	345 [r]	303 [r]	300
Uganda	1	52	36	75 [r]	75
United States	--	--	--	--	W
Total	47,200 [r]	66,600 [r]	59,600 [r]	56,600 [r]	54,500

[e]Estimated. [p]Preliminary. [r]Revised. W Withheld to avoid disclosing company proprietary data. -- Zero.

[1]World totals and estimated data are rounded to no more than three significant digits; may not add to totals shown.

[2]Table includes data available through May 25, 2008.

[3]Tungsten concentrates are thought to be produced in Nigeria, Turkey, and Uzbekistan, and may be produced from tin-tungsten ores in Kyrgyzstan, but information is inadequate to make reliable estimates of production. Illegal tungsten (wolfram) mining in the Phuoc Trung Commune of the Bac Ai District, Ninh Thuan Province, in southern Vietnam reportedly was halted by the District People's Committee in April 2008.

[4]Reported figure.

[5]Includes tungsten content of tin-tungsten concentrate produced by state-owned mining enterprises under the Ministry of Mines.

[6]Tungsten content of concentrates shipped.

[7]Based upon data published in the Yearbook of Nonferrous Metals Industry of China.