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LITHIUM

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LITHIUM

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In 2007, lithium consumption in the United States was estimated to be 2,200 metric tons (t) of contained lithium, 12% less than the estimates for 2006 and 2005. Decreased U.S. consumption was likely the result of the tight worldwide supply of lithium during the first half of 2007. Increased demand for lithium from foreign battery manufactures further reduced material available for U.S. consumption. Lithium carbonate consumed and used as a raw material for other lithium compounds in the United States was produced at a domestic brine operation in Nevada and was imported from Argentina and Chile.

Chile has been the world's leading producer of lithium carbonate since 1997, the year that it first surpassed the United States in production. Production in Chile was from two lithium brine operations on the Salar de Atacama in the Andes Mountains. Concentrated brines were processed at two lithium carbonate plants in Antofagasta. In the United States, production continued at a lithium brine operation with an associated lithium carbonate plant in Nevada. Lithium carbonate and lithium chloride also were produced from brines from the Salar del Hombre Muerto in the Andes Mountains in Argentina. In China, lithium carbonate was produced from brines from the Zabayu Salt Lake in western Tibet and the Taijinaier Salt Lake in Qinghai Province. Details on the sources of other production in China were not available.

Australia was, by far, the leading producer of lithium concentrates, and Brazil, Canada, Portugal, and Zimbabwe also produced significant quantities. A large percentage of the lithium carbonate produced in South America was exported to the United States for consumption in industrial applications and as feed material for the production of downstream lithium compounds, such as lithium hydroxide monohydrate, lithium metal, and organic lithium compounds.

Production

The U.S. Geological Survey (USGS) collects domestic production data for lithium from a voluntary canvass of U.S. operations. The single U.S. lithium carbonate producer, Chemetall Foote Corp. (a subsidiary of the German company Chemetall GmbH, which is owned by Rockwood Holdings, Inc., of Princeton, NJ) responded to the survey, representing 100% of total production. Production and stock data were withheld from publication to avoid disclosing company proprietary data (table 1).

Chemetall Foote produced lithium carbonate from brines near Silver Peak, NV. The company's other U.S. lithium operations included a lithium hydroxide plant in Silver Peak; a butyllithium plant in New Johnsonville, TN; and facilities for producing downstream lithium compounds in Kings Mountain, NC. Chemetall Foote's subsidiary in Chile, Sociedad Chilena de Litio Ltda. produces lithium carbonate from a brine deposit.

FMC Corp.'s Lithium Division produced a full range of downstream compounds, lithium metal, and organic lithium compounds at its facilities in Bessemer City, NC, and Bayport, TX. FMC met its lithium carbonate requirements with material produced at its Argentine operation. FMC's long-term contract with Chilean producer Sociedad Química y Minera de Chile S.A. (SQM) to supply FMC with lithium carbonate was thought to have expired in mid-2007 (Sociedad Química y Minera de Chile S.A., 2007; Evans, 2008). FMC also produced lithium chloride in Argentina in 2007.

Western Lithium Corp. (a proposed subsidiary of Canada-based Western Uranium Corp.) tested composite core drill samples of lithium-rich hectorite clay at its Kings Valley location in Nevada. Based on previous exploration of the area performed by Chevron Resources Co. in the 1980s, Western Lithium Corp. estimated that 25 billion pounds of total lithium carbonate resources was available (Western Uranium Corp., 2008).

Consumption

Lithium is sold as brines, compounds, metal, or mineral concentrates depending on the end use. Lithium's electrochemical reactivity and other unique properties have resulted in many commercial lithium products. For many years, the majority of lithium compounds and minerals were used in the production of ceramics, glass, and primary aluminum. Growth in lithium battery use and decreased use of lithium in aluminum production has resulted in batteries gaining market share. In 2007, batteries became the leading end use for lithium for the first time. SQM listed the main markets for lithium as follows—batteries, 25%; ceramics and glass, 18%; lubricating greases, 12%; pharmaceuticals and polymers, 7%; air conditioning, 6%; primary aluminum production, 4%; continuous casting, 3%; chemical processing, 3%; and other uses, 22% (Sociedad Química y Minera de Chile S.A., 2008a, p. 37). The "other uses" category represents several smaller end uses including alloys, construction, dyestuffs, industrial bleaching and sanitation, pool chemicals, and specialty inorganics (FMC Corp., 2008a). These figures represent global markets; domestic end uses for lithium materials may not directly correspond to worldwide consumption, but the data necessary for making more reliable estimates were not available.

The recent decline in lithium consumption can be attributed to decreased consumption in most end uses owing to tight lithium supply and increased consumption by foreign battery manufacturers. If lithium concentrates are included in lithium consumption estimates, the leading use of lithium in the United

States may be in ceramics and glass manufacturing processes. No lithium concentrates were produced in the United States for direct application in ceramics and glass manufacture, and import statistics do not specifically identify lithium ore imports, making it difficult to determine definitive end-use estimates. The production of ceramics and glass was the only commercial use for lithium mineral concentrates.

Most lithium batteries were manufactured in Asia. Many major battery manufacturers marketed some type of lithium battery, exploiting the many advantages of lithium batteries compared with older battery technologies. Battery experts have been working to develop lithium batteries for decades because lithium's natural properties make it the most attractive battery material of all the elements. Lithium battery production represented 66% of the total rechargeable battery market worldwide, and growth was expected to continue **(**Rockwood Holdings, Inc., 2007, p. 100). Worldwide, rechargeable lithium batteries power more than 60% of cellular telephones and 90% of laptop computers (FMC Corp., 2008a). Several automakers were working on lithium batteries for hybrid electric vehicles (HEVs).

The use of lithium in primary aluminum production decreased steadily from 2000 to 2006 in the United States, as domestic aluminum production declined. In 2007, however, domestic aluminum production and lithium consumption in that end use increased considerably when idle aluminum smelters were restarted (Bray, 2008).

An explanation of additional lithium end uses may be found in the lithium chapter of the 2006 U.S. Geological Survey Minerals Yearbook, volume I, Metals and minerals.

Prices

In recent years, customs values for lithium carbonate imports to the United States seemed to be a good indication of the trends in lithium pricing, although they never exactly reflected the producers' prices for lithium carbonate. Import data indicated that lithium carbonate and lithium hydroxide prices increased significantly in 2007. The average customs unit value for imported lithium carbonate, calculated by dividing the total value of imports by the total kilograms, was $3.45 per kilogram, about 49% higher than in 2006, a result of increased global demand, especially for lithium batteries. The average unit value of exported lithium carbonate was 37% higher than in 2006 and more than 31% higher than the average unit value of imported carbonate. This suggests that the material exported from the United States was higher quality lithium carbonate than what was imported.

Admiralty Resources NL (Melbourne, Australia), which was developing a second lithium brine operation in Argentina, reported that the price of lithium carbonate increased to $6,000 per metric ton in 2007 from $5,500 per ton in 2006 as a result of increased demand for lithium use in batteries (Admiralty Resources NL, 2007, p. 32). Established producers were unable to entirely satisfy the expanded demand, causing the escalation of lithium carbonate prices. Japan reported lithium carbonate import prices near $7,000 per ton during the first quarter of 2007 (Roskill's Letters from Japan, 2007). Prices decreased during the second half of 2007 when Chinese producers increased their production and released excess inventory of spodumene-based lithium carbonate, thereby easing some of the supply tightness (FMC Corp., 2008b; Sociedad Química y Minera de Chile S.A., 2008b). Lithium hydroxide was reported to have reached $10,000 per ton (Admiralty Resources NL, 2008a, p. 22).

Foreign Trade

In 2007, total exports of lithium compounds from the United States decreased 3% compared with those of 2006. About 60% of all U.S. exports of lithium compounds went to Germany and Japan. The remainder was divided among many other countries (table 2).

Imports of lithium compounds decreased by 9% in 2007 from those of 2006. Of the 16,000 t of lithium compounds imported, 59% of lithium chemical imports came from Chile, 38% came from Argentina, and 3% from other countries (table 3). Lithium concentrates from Australia, Canada, and Zimbabwe may have entered the United States, but because these materials have no unique import code, no import data were available.

World Review

A small number of countries throughout the world produced lithium concentrates and brine. Argentina, Chile, China, and the United States were the leading producers of lithium carbonate. Significant quantities of lithium compounds and concentrates also were produced in Argentina, Australia, Brazil, Canada, Portugal, Russia, and Zimbabwe. Congo (Kinshasa), Namibia, Rwanda, and South Africa have produced concentrates in the past. A spodumene mining operation was under development in Finland. Production figures for lithium carbonate, lithium chloride, and lithium mineral concentrates are listed in table 4. Pegmatites containing lithium minerals have been identified in Afghanistan, Austria, France, India, Ireland, Mozambique, Spain, Sweden, and Zaire, but economic conditions have not favored development of the deposits. Lithium has been identified in subsurface brines in Bolivia, China, and Israel. Companies in France, Germany, Japan, the Republic of Korea, Taiwan, and the United Kingdom produced downstream lithium compounds from imported lithium carbonate.

Total world lithium market consumption was estimated to be 16,300 t of lithium contained in minerals and compounds in 2007, based on estimated growth of 4% per year since 2005, the latest year for which this type of information was available (Roskill Information Services Ltd., 2006, p. 89). Using earlier information that estimated the lithium chemical market as about 80% of the entire lithium consumption, an estimated 13,000 t was consumed in chemicals and the remainder as mineral concentrates in the ceramics and glass industry in 2007 (Ebensperger and others, 2005). SQM estimated total lithium market consumption for 2007 to be 17,500 t, with a compound annual growth rate of 7.5% for the past 10 years (Sociedad Quimica y Minera de Chile S.A., 2008a, p. 34).

Argentina.—FMC has been operating its Argentine facility at the Salar de Hombre Muerto since 1998. It was designed to produce about 12,000 metric tons per year (t/yr)

of lithium carbonate and about 5,500 t/yr of lithium chloride (North American Mineral News, 1998). Lithium chloride capacity expanded to 7,250 t/yr in 2003 (Minera-Net, 2003). Production of both compounds reached record levels in 2007. Lithium chloride production has exceeded capacity since 2005, indicating that perhaps a further expansion was made to lithium chloride capacity to reach about 8,500 t/yr. Although lithium carbonate production remained below design capacity, production has increased steadily since 2002 when production was first reported, and was estimated to be about 8,500 t in 2007.

Work at Admiralty Resources' lithium brine project at the Salar del Rincón in Salta Province progressed. In 2007, the company made substantial progress in development of a process to recover high-grade lithium carbonate with reduced evaporation lead times, and completion of the hydrologic study of the salar to better understand its porosity and transmissibility characteristics (Admiralty Resources NL, 2008a, p. 11; 2008d**)**. At yearend 2007, construction of Admiralty's pilot plant was completed and put into active service, with the first unrefined lithium carbonate produced in January 2008. Four pilot evaporation ponds were filled, and continuous production of 10 t per month of lithium carbonate was expected to begin in April 2008. Full plant production was scheduled for mid-2009 (Admiralty Resources NL, 2008b; 2008c). At full capacity, Admiralty was designed to produce 10,000 t lithium carbonate, 4,000 t lithium hydroxide, and 3,000 t lithium chloride. Admiralty announced a plan to spin off its Salar del Rincón lithium operation into a separate, wholly owned entity, Rincón Lithium Ltd. The transaction was scheduled for April 2008 (Industrial Minerals, 2007; Admiralty Resources NL, 2008c).

Australia.—In 2007, the assets of Sons of Gwalia Ltd.'s Advanced Minerals Division were sold to a consortium of investors led by mining specialist Resource Capital Fund L.P. (RCF). The new company formed to operate the Greenbushes spodumene mine was Talison Minerals Pty, Ltd. About 60% of the world's supply of lithium minerals was produced by Talison in 2007. The company reported that its deposit is the largest spodumene deposit in the world (Department of Industry and Resources, 2007, p. 37). Throughout the company restructuring process, spodumene production continued at record pace. Spodumene concentrates were sold worldwide for consumption in ceramics and glass and were exported to China, where it is used in glass and as a raw material for the production of lithium carbonate. To help fill the lithium carbonate supply gap in 2007, Talison and other spodumene producers operated at or close to capacity to supply Chinese lithium carbonate producers with spodumene (Talison Minerals Pty, Ltd., 2007).

Canada.—Tantalum Mining Corp. of Canada Ltd. (a subsidiary of Hudson Bay Mining Co.) has operated a spodumene mine and concentrating plant at Bernic Lake, Manitoba, on a commercial scale since 1986. Having worked toward developing the Separation Rapids petalite deposit near Kenora, Ontario, since 1998, Avalon Ventures Ltd., in 2007, began investigating the possibility of applying hydrometallurgical extraction technology to recover a lithium product suitable for the lithium ion battery market (Avalon Ventures Ltd., 2007). In December 2007, GlobeStar Mining Corp. completed a 12-hole diamond drilling program at a pegmatite deposit near Moblan, Quebec. The company was exploring the possibility of producing spodumene and other minerals for use in the ceramics and glass industry. Their next steps include assaying the core, finalizing a resource estimate, and investigating market opportunities (GlobeStar Mining Corp., 2008, p. 12).

Chile.—SQM reported strong revenues from its lithium products as a result of higher prices in 2007. Sales volume was 6% lower than in 2006, at 28,600 t, but the value of sales was up by 39% to $179.8 million as a result of increased prices. The company reported that its share of the world lithium carbonate market is 31%. (Sociedad Química y Minera de Chile S.A., 2008a, p. 34, 49). The company's expansion of its lithium carbonate capacity to 42,000 t/yr was expected to be completed in mid-2008 (Sociedad Química y Minera de Chile S.A., 2008c).

Based on Chemetall Foote's previously published capacity data and an approximated capacity expansion in 2006 and 2007, current lithium carbonate capacity for Chemetall's plant in Antofagasta was estimated to be 23,000 t/yr (Roskill Information Services Ltd., 2006, p. 42; Seeking Alpha, 2008). The capacity was expected to increase an additional 20% by 2008-09 (Moores, 2007). The plant used this lithium carbonate as feedstock for some of its downstream chemical production in the United States and supplied the operations of Chemetall in Germany and Taiwan (Chemetall GmbH, undated).

China.—China is the only country that continued to produce large quantities of lithium carbonate from spodumene. China Xinjuang Nonferrous Metals Corporation of Mingyaun (Jiangsu Province) produced lithium carbonate from domestic and imported Australian ore (Ebensperger and others, 2005). Additional lithium carbonate was imported into China from Chile. Lithium brines were thought to be the largest lithium resources in China, containing 80% of the country's reserves (Crossley, 2003).

The Tibet Lithium New Technology Development Co. began operating a 5,000-t/yr lithium carbonate plant at the Zabayu Salt Lake in western Tibet in 2005. Capacity was expected to eventually increase to 20,000 t/yr. CITIC Guoan Lithium Science & Technology Co., Ltd.'s 35,000-t/yr lithium carbonate plant was brought online in 2007 at the Taijinaier Salt Lake in Qinghai Province. It was the largest lithium carbonate plant in China (Tahil, 2007, p. 10, 13). The Qinghai Salt Lake Industry Group Co., Ltd. began construction of a 10,000-t/yr lithium carbonate project in the Chahar Salt Lake zone in Qinghai Province. The project was expected to come online in early 2008 (Free Library, The, 2007).

Finland.—Norwegian mining company Nordic Mining ASA purchased a controlling stake in Finnish spodumene mining company Keliber Oy. The company received an environmental permit to produce 6,000 t/yr of lithium carbonate. Keliber planned to begin construction of the processing plant in the spring of 2008, and lithium carbonate production was scheduled to begin in early 2010. Keliber would be the first European producer of lithium carbonate from domestic ore (Metals Place, 2008; Keliber Oy, undated).

Outlook

Although traditional markets are still important to the lithium industry, batteries have rapidly gained in importance. Batteries are currently, for the first time, the major market for lithium materials of all kinds.

The global market for lithium batteries has been increasing by more than 20% per year in the last few years. Lithium-ion and lithium-polymer batteries appear to have the greatest potential for growth. The world market for these rechargeable batteries was estimated to be $5.2 billion in 2007 (Klein, 2007, p. 4). Other lithium markets are increasing also, but at lower rates than batteries. Lithium producers had diverse opinions on what other areas offer the most potential for growth. One producer reported growth in construction uses, especially in fast-setting concrete. Another company experienced its largest growth in the use of organic lithium compounds used as pharmaceutical catalysts. Lithium bromide consumption for air conditioning was reported to be increasing by some producers, but on the decline, especially in the United States, by another. Better estimates of actual markets were not possible because details that closely define these markets were not publicly available.

Research in nanotechnology, the understanding and control of matter at dimensions of roughly 1 to 100 nanometers, has advanced lithium-ion battery technology. By altering the nanostructures of the lithium-ion battery's anode and cathode, researchers have been able to increase the battery's capacity, output power, lifespan, and stability, while decreasing the time required to charge the battery, (Harrop, 2008). Used in power tools, nanotechnology has enabled lithium-ion batteries to provide bursts of power up to 10 times that of conventional lithium-ion battery (Bullis, 2008). In hybrid vehicles, bursts of power from the lithium-ion battery enable the vehicles to accelerate faster than other batteries of the same size (Pontin, 2007).

The demand for larger lithium batteries is being driven by the heavy-duty power tool market. Approximately 22% of all heavy-duty battery-powered tools are powered by lithium-ion batteries (Klein, 2007, p. 6). The demand for lithium-ion batteries for power tools is expected to increase 15-fold from 2006 to 2012 (Nanoexa, 2006).

Much research into the development of new lithium battery chemistries to increase their safety is being conducted. Current lithium-ion batteries use lithium cobalt oxide, which degrades over time, reducing battery lifespan and causing the batteries to overheat. Safety issues are still a concern with automakers Honda Motor Co., Ltd. and Toyota Motor Corp., that have delayed launching lithium-ion hybrid vehicles into the market over concerns of continued lithium-ion battery instability, although their research continues (Shirouzu, 2007; Greimel, 2008).

In addition to Honda and Toyota, other automobile manufacturers have announced plans to develop lithium-ion batteries for use in future generations of hybrid HEVs. Daimler AG, General Motors Corp., Mitsubishi Motors Corp., and Volkswagen AG are working on lithium-ion technology. Daimler AG and General Motors Corp. are scheduled to launch HEVs with lithium-ion batteries in 2009 and 2010, respectively. Major automobile manufacturers have also formed partnerships with established Japanese electronics manufacturers to build hybrid battery plants and begin mass production of lithium-ion batteries as early as 2009. In addition, interest was increasing in plug-in hybrid vehicles (PHEVs) that would have a greater pure-electric driving range, meaning that the batteries would be significantly larger than those in the HEVs that were operating in 2007.

Several automobile manufacturers have developed hybrid fuel cell powered vehicles using lithium-ion batteries and hydrogen fuel cells. The vehicles are powered directly by a lithium battery, which is recharged by the fuel cells when needed. It is anticipated that this lithium hybrid approach will reduce the size, weight, cost, and complexity of a conventional fuel cell-only system by approximately 50%, as well as double the lifetime of the fuel cell stack (Ford Motor Company, 2007).

The use of lithium-ion batteries in HEVs and PHEVs could greatly increase demand for lithium. As demand and prices rise, spodumene and other lithium resources that had been considered uneconomic might once again yield economically feasible raw materials for the production of lithium carbonate.

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TABLE 1
SALIENT LITHIUM STATISTICS[1]

(Metric tons of contained lithium)

	2003	2004	2005	2006	2007
United States:					
Production	W	W	W	W	W
Exports[2]	1,520	1,690	1,720	1,500	1,440
Imports[2]	2,200	2,910	3,580	3,260	2,970
Consumption, estimated	1,400	1,900	2,500	2,500	2,200
Rest of world, production[3]	17,200 r	18,400 r	21,500 r	24,400 r	25,800

rRevised. W Withheld to avoid disclosing company proprietary data.

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

[2]Compounds. Source: U.S. Census Bureau.

[3]Mineral concentrate and lithium carbonate.

TABLE 2

U.S. EXPORTS OF LITHIUM CHEMICALS, BY COMPOUND AND COUNTRY[1]

Compound and country	2006 Gross weight (metric tons)	2006 Value[2] (thousands)	2007 Gross weight (metric tons)	2007 Value[2] (thousands)
Lithium carbonate:				
Canada	57	$212	161	$593
China	60	215	1	3
Germany	956	2,910	972	3,290
India	10	47	54	295
Japan	1,310	4,440	790	4,440
Korea, Republic of	45	222	59	463
Malaysia	76	257	114	640
Netherlands	194	543	73	289
United Kingdom	320	1,060	75	428
Other	66 r	324 r	96	429
Total	3,100	10,200	2,400	10,900
Lithium carbonate, U.S.P.:[3]				
Argentina	--	--	36	22
China	17	56	--	--
Saudi Arabia	--	--	13	38
United Kingdom	2	32	94	536
Other	12 r	201 r	11	275
Total	31 r	289 r	154	871
Lithium hydroxide:				
Argentina	91	456	140	1,520
Australia	68	353	54	406
Canada	189	774	259	1,060
China	55	300	118	746
Colombia	79	438	129	934
Egypt	80	407	102	674
Germany	1,040	3,720	904	4,470
Hong Kong	--	--	100	540
India	91	684	10	71
Japan	1,990	11,300	2,340	17,000
Korea, Republic of	263	1,470	313	2,490
Mexico	67	421	75	607
Netherlands	196	774	226	1,110
Russia	424	1,950	378	2,460
Saudi Arabia	56	225	15	70
South Africa	125	1,000	79	823
Sweden	131	506	48	182
Thailand	231	1,290	187	1,210
United Kingdom	116	398	205	2,650
Venezuela	64	263	17	146
Other	179 r	1,110 r	140	1,540
Total	5,540	27,900	5,840	40,700

rRevised. -- Zero.

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

[2]Free alongside ship values.

[3]Pharmaceutical-grade lithium carbonate.

Source: U.S. Census Bureau.

TABLE 3
U.S. IMPORTS FOR CONSUMPTION OF LITHIUM CHEMICALS BY COMPOUND AND COUNTRY[1]

Compound and country	2006 Gross weight (metric tons)	2006 Value[2] (thousands)	2007 Gross weight (metric tons)	2007 Value[2] (thousands)
Lithium carbonate:				
Argentina	6,540	$19,100	6,100	$23,300
Chile	9,840	18,700	8,510	27,100
Other	94	292 r	36	170
Total	16,500	38,200	14,600	50,600
Lithium hydroxide:				
Belgium	2	4	13	302
Chile	591	3,650	865	5,560
China	49	305	296	1,320
Germany	24	316	5	46
India	265	1,510	75	596
Norway	49	94	13	26
Romania	--	--	16	45
United Kingdom	11	62	25	139
Other	8	105 r	(3)	12
Total	999 r	6,040	1,310	8,050

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

Source: U.S. Census Bureau.

TABLE 4
LITHIUM MINERALS AND BRINE: WORLD PRODUCTION, BY COUNTRY[1, 2]

(Metric tons)

Country[3]	2003	2004	2005	2006	2007e
Argentina:[4]					
Lithium carbonate	2,850 e	4,970	7,300	8,240 r	8,500
Lithium chloride	4,700 e	6,303	8,400	8,320 r	8,500
Australia, spodumene	124,410	118,451	173,635	222,101 r	220,000
Brazil, concentrates	9,755 r	9,084 r	8,924 r	8,950 r	9,000
Canada, spodumene[e, 5]	22,500	22,500	22,500	22,500	22,500
Chile:[4]					
Lithim carbonate from subsurface brine	41,667	43,971	43,595	50,035 r	55,500
Lithium chloride	--	494	681	1,166	4,200
China, carbonate e	13,500	14,000	15,000	15,000	16,000
Portugal, lepidolite	24,606 r	28,696 r	26,185 r	28,497 r	28,500
Russia, minerals not specified[6]	-- r	-- r	-- r	-- r	--
United States, subsurface brine	W	W	W	W	W
Zimbabwe, amblygonite, eucryptite, lepidolite, petalite, and spodumene	12,131	13,710	37,499	30,000	15,000

eEstimated rRevised. W Withheld to avoid disclosing company proprietary data. -- Zero.
[1]Table includes data available through April 23, 2008.
[2]Estimated data are rounded to no more than three significant digits.
[3]In addition to the countries listed, other nations may produce small quantities of lithium minerals, but output is not reported, and no valid basis is available for estimating production levels.
[4]New information was available from Argentine and Chilean sources, prompting major revisions in how lithium production was reported.
[5]Based on all Canada's spodumene concentrates (Tantalum Mining Corp. of Canada Ltd.'s Tanco property).
[6]Based on new information from a Russian source, Lithium production was discontinued in Russia during the early 1990s. Other countries from the Commonwealth of Independent States, including Uzbekistan, could have produced or could be producing lithium, but information is not available for estimating production levels.