LITHIUM

(Data in metric tons of contained lithium, unless otherwise noted)

<u>Domestic Production and Use</u>: Chile was the largest lithium chemical producer in the world, followed by China, Russia, the United States, and Argentina, in descending order of production. Australia and Canada were major producers of lithium ore concentrates. The U.S. remained the leading consumer of lithium minerals and compounds and the leading producer of value-added lithium materials. Because only two companies produced lithium compounds for domestic consumption as well as for export to other countries, reported production and value of production data cannot be published. Estimation of value for the lithium mineral compounds produced in the United States is extremely difficult because of the large number of compounds used in a wide variety of end uses and the great variability of the prices for the different compounds.

The use of lithium compounds in ceramics, glass, and primary aluminum production represented more than 60% of estimated domestic consumption. Other major end uses for lithium were in the manufacture of lubricants and greases and in the production of synthetic rubber.

Salient Statistics—United States:	<u> 1994</u>	<u> 1995</u>	<u> 1996</u>	<u> 1997</u>	1998 ^e
Production	W	W	W	W	W
Imports for consumption	851	1,140	884	978	2,100
Exports	1,700	1,900	2,310	2,010	1,400
Consumption: Apparent	W	W	W	W	W
Estimated	2,500	2,600	2,700	2,800	2,900
Price, yearend, dollars per kilogram:					
Lithium carbonate	4.41	4.34	4.34	4.47	4.47
Lithium hydroxide, monohydrate	5.62	5.62	5.51	5.74	5.74
Stocks, producer, yearend	W	W	W	W	W
Employment, mine and mill, numbere	230	230	230	230	100
Net import reliance ¹ as a percent of					
apparent consumption	E	Е	Е	Е	W

Recycling: Insignificant, but growing through the recycling of lithium batteries.

Import Sources (1994-97): Chile, 96%; and other, 4%.

Tariff: Item	Number	Normal Trade Relations (NTR) 12/31/98	Non-NTR ² <u>12/31/98</u>
Other alkali metals	2805.19.0000	5.7% ad val.	25% ad val.
Lithium oxide and hydroxide	2825.20.0000	3.7% ad val.	25% ad val.
Lithium carbonate:			
U.S.P. grade	2836.91.0010	3.7% ad val.	25% ad val.
Other	2836.91.0050	3.7% ad val.	25% ad val.

Depletion Allowance: 22% (Domestic), 14% (Foreign).

Government Stockpile: None.

LITHIUM

Events, Trends, and Issues: One U.S. lithium company closed its spodumene mine and lithium carbonate plant in North Carolina. As a result, the only active lithium carbonate plant remaining in the United States was at a brine operation in Nevada. The North Carolina operations were closed when the company's brine operation in Argentina was able to supply the lithium carbonate required for production of downstream lithium compounds and to meet customer requirements. Subsurface brines have become the dominant raw material for lithium carbonate production worldwide. Most of the lithium minerals mined in the world were used as ore concentrates rather than feedstock for lithium carbonate and other lithium compounds.

The U.S. company with lithium carbonate operations in Nevada and Chile sold all its lithium concerns to a German company. The German firm had been one the U.S. company's major lithium customers and a long-time producer and supplier of lithium chemicals in Europe.

The increased production in Argentina and Chile continued an oversupply situation that resulted in lower prices for lithium carbonate over the past two years, although company price lists do not reflect that trend. Actual prices paid may have been as much as 50% lower than list prices. Reprocessed lithium salts from battery recycling and lithium hydroxide monohydrate from former Department of Energy stocks also were available at discounted prices, causing further downward pressure on lithium prices. Lower prices may benefit the lithium industry in the long run by expanding the use of lithium materials into new high-volume, but price sensitive markets.

Interest in lithium batteries for electric vehicles (EV's) continued to grow and research was ongoing. Lithium batteries could power the majority of future EV's, but the precise battery type and the timetable for implementation was still in question.

World Mine Production, Reserves, and Reserve Base:

	Mine production		Reserves ³	Reserve base ³
	<u> 1997</u>	<u>1998°</u>		
United States	W	W	38,000	410,000
Argentinae	8	1,000	NA	NA
Australiae	2,800	2,800	150,000	160,000
Bolivia	_	_	_	5,400,00
Brazil	32	30	910	NA
Canada	1,600	1,600	180,000	360,000
Chile	4,100	4,500	3,000,000	3,000,000
China	2,900	2,900	NA	NA
Namibia ^e	40	40	NA	NA
Portugal	180	160	NA	NA
Russia ^e	2,000	2,000	NA	NA
Zimbabwe	<u>700</u>	<u>500</u>	23,000	27,000
World total (may be rounded)	⁴ 14,000	⁴ 16,000	53,400,000	⁶ 9,400,000

<u>World Resources</u>: The identified lithium resources total 760,000 tons in the United States and more than 12 million tons in other countries.

<u>Substitutes</u>: Substitutes for lithium compounds are possible in manufactured glass, ceramics, greases, and batteries. Examples are sodic and potassic fluxes in ceramics and glass manufacture; calcium and aluminum soaps as substitutes for stearates in greases; and zinc, magnesium, calcium, and mercury as anode material in primary batteries. Lithium carbonate is not considered an essential ingredient in aluminum potlines. Substitutes for aluminum-lithium alloys as structural materials are composite materials consisting of glass, polymer, or boron fibers in engineering resins.

^eEstimated. E Net exporter. NA Not available. W Withheld to avoid disclosing company proprietary data.

¹Defined as imports - exports + adjustments for Government and industry stock changes.

²See Appendix B.

³See Appendix D for definitions.

⁴Excludes U.S. production.

⁵Excludes Argentina, China, Namibia, Portugal, and Russia.

⁶Excludes Argentina, Brazil, China, Namibia, Portugal, and Russia.