

RARE EARTHS¹

(Data in metric tons of rare-earth oxide (REO) content, unless noted)

Domestic Production and Use: Rare earths were mined by one company in 1995. Bastnasite, a rare-earth fluocarbonate mineral, was mined as a primary product in California. Domestic production of monazite ceased at yearend 1994 as a result of decreased demand for thorium-bearing minerals. The United States was a leading producer and processor of rare earths and continued to be a major exporter and consumer of rare-earth products. Domestic ore production was valued at an estimated \$82 million. Refined rare-earth products were produced primarily by three companies; one with a plant in Mountain Pass, CA, another with operations in Phoenix, AZ, and Freeport, TX, and a third with a plant in Chattanooga, TN. The estimated value of refined rare earths consumed in the United States was more than \$500 million. Principal uses were in petroleum fluid cracking catalysts, automotive pollution control systems, metallurgical applications, glass polishing, glass additives, ceramics, permanent magnets, phosphors for color television and fluorescent lighting, laser crystals, and electronics.

Salient Statistics—United States:	1991	1992	1993	1994	1995^e
Production:					
Bastnasite concentrates ²	16,500	20,700	17,800	20,700	28,700
Monazite concentrates	W	W	W	W	W
Imports: ³					
Thorium ore (monazite)	—	—	—	—	22
Rare-earth metals, alloys	271	352	235	284	406
Cerium compounds	545	806	1,270	1,890	3,230
Mixed REO's	892	295	249	354	570
Rare-earth chlorides	1,550	728	1,080	2,410	1,270
Rare-earth oxide, compounds	2,770	3,100	3,730	5,140	5,470
Ferrocerium, alloys	83	94	105	92	88
Exports: ³					
Thorium ore, monazite	—	—	3	27	—
Rare-earth metals, alloys	71	44	194	329	456
Cerium compounds	1,370	1,930	1,620	4,460	4,750
Other rare-earth compounds	1,790	1,310	1,090	2,410	1,610
Ferrocerium, alloys	1,860	2,430	4,270	3,020	4,040
Consumption, apparent ⁴	22,100	21,400	17,000	18,200	29,400
Price, dollars per kilogram, yearend:					
Bastnasite concentrate, REO basis	2.87	2.87	2.87	2.87	2.87
Monazite concentrate, REO basis	.93	.41	.40	.46	.45
Mischmetal, metal basis	11.02	12.68	12.68	12.68	12.68
Stocks, producer and processor, yearend	W	W	NA	NA	NA
Employment, mine and mill	411	372	352	350	280
Net import reliance ^{4,5} as a percent of apparent consumption	25	33	E	E	2

Recycling: Small quantities, mostly permanent magnet scrap.

Import Sources (1991-94): Monazite: Australia, 100%.

Tariff:	Item	Number	Most favored nation (MFN)	Non-MFN⁶
			12/31/95	12/31/95
	Thorium ores and concentrates (monazite)	2612.20.0000	Free	Free.
	Rare-earth metals, whether or not intermixed or interalloyed	2805.30.0000	5.0% ad val.	31.3% ad val.
	Cerium compounds	2846.10.0000	6.9% ad val.	35% ad val.
	Mixtures of REO's except cerium oxide	2846.90.2010	Free	25% ad val.
	Mixtures of rare-earth chlorides, except cerium chloride	2846.90.2050	Free	25% ad val.
	Rare-earth compounds, individual REO's (excludes cerium compounds)	2846.90.8000	3.7% ad val.	25% ad val.
	Ferrocerium and other pyrophoric alloys	3606.90.3000	5.9% ad val.	56.7% ad val.

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Depletion Allowance: Percentage method, Monazite, 22% on thorium content and 14% on rare-earth content (Domestic), 14% (Foreign). Bastnasite and xenotime, 14% (Domestic and Foreign).

Government Stockpile:

Stockpile Status—9-30-95

Material	Uncommitted inventory	Committed inventory	Authorized for disposal	Disposals Jan.-Sept. 95
REO in sodium sulfate	—	457	—	457

Events, Trends, and Issues: Domestic demand for rare earths in 1995 was estimated to be higher than in 1994. Compared with 1994, the use of rare earths in most end uses increased as the domestic economy improved. Rare-earth prices remained competitive throughout 1995, although a slight firming of the prices from China was reported in the first half of the year. China remained a major source of separated rare-earth compounds and alloys and is expected to continue as a major world supplier.

The *Third International Conference on Rare Earths Development & Application* was held in Baotou, Inner Mongolia, China, on August 21-25, 1995. The *21st Rare Earth Research Conference* is scheduled to meet in the United States in Duluth, MN, on July 7-11, 1996.

World Mine Production, Reserves, and Reserve Base:

	Mine production ^e		Reserves ⁷	Reserve base ⁷
	1994	1995		
United States	⁸ 20,700	⁸ 28,700	13,000,000	14,000,000
Australia	3,300	3,000	5,200,000	5,800,000
Brazil	400	400	280,000	310,000
Canada	—	—	940,000	1,000,000
China	⁸ 30,600	30,000	43,000,000	48,000,000
India	2,500	2,500	1,100,000	1,300,000
Malaysia	⁸ 234	250	30,000	35,000
South Africa	400	400	390,000	400,000
Sri Lanka	120	120	12,000	13,000
Thailand	150	150	1,000	1,100
Former Soviet Union	6,000	6,000	19,000,000	21,000,000
Zaire	28	30	1,000	1,000
Other countries	5	5	21,000,000	21,000,000
World total (rounded)	64,500	72,000	100,000,000	110,000,000

World Resources: Rare earths are relatively abundant in the Earth's crust, but discovered minable concentrations are less common than for most other ores. It is expected that substantial additional resources will be discovered as the industry enters its fourth decade of major industrial expansion. U.S. and world resources are contained primarily in bastnasite and monazite. Bastnasite deposits in China and the United States constitute the largest percentage of the world's rare-earth economic resources, while monazite deposits in Australia, Brazil, China, India, Malaysia, South Africa, Sri Lanka, Thailand, and the United States constitute the second largest segment. Xenotime, rare-earth-bearing clays, loparite, phosphorites, apatite, eudyalite, secondary monazite, cheralite, and spent uranium solutions comprise most of the remaining resources. Undiscovered resources of rare earths are believed to be very large relative to expected demand.

Substitutes: Substitutes are available for many applications, but generally are less effective.

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

¹Data includes lanthanides and yttrium, but excludes most scandium. See also Scandium and Yttrium.

²As reported in Unocal Corp. annual reports and as authorized from Molycorp personnel. Data rounded to three significant digits.

³REO equivalent or contents of various materials were estimated. Data from Bureau of the Census. Data rounded to three significant digits.

⁴Monazite concentrate production was not included in the calculation of apparent domestic consumption and net import reliance. Data rounded to three significant digits.

⁵Defined as imports - exports + adjustments for Government and industry stock changes.

⁶See Appendix B.

⁷See Appendix C for definitions.

⁸Number reported in literature or from company representatives.