MERCURY

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As has been the case for more than a decade, recycled mercury-containing devices accounted for essentially all domestic mercury production in 2000. No domestic mine produced mercury as its primary product. Several companies were engaged in mercury refining, the three largest being in the Eastern and Central United States. Chlorine-caustic soda production was again the largest end use for mercury.

Legislation and Government Programs

The U.S. Geological Survey (USGS) in 2000 was directly involved in a broad range of national and international studies related to mercury and its distribution and mobility in the environment. Activities included data collection, long-term assessments, ecosystem analysis, predictive modeling, and process research on the occurrence, distribution, recycling, and fate of mercury. Much of this work was conducted in partnership with other Federal and State agencies.

During 2000, the USGS published a map showing the distribution of mercury in the Warrior coalfield in Alabama (Goldhaber and others, 2000). Using data from over 900 chemical analyses contained in the USGS National Coal Resources Data System, the authors found that the Warrior coal field contained higher levels of mercury and a suite of other trace elements when compared with the average for all U.S. coal. The map used three-dimensional plots of Warrior coalbeds to show mercury abundance and concentration.

On November 2, the U.S. Environmental Protection Agency (EPA) announced a ban on discharges of various bio-accumulative chemicals, including mercury, in the Great Lakes Basin. Under the ban, the discharges into mixing zones would be phased out over a 10-year period, while new discharges were banned immediately. Mixing zones are areas where toxic chemical discharges are permitted to mix with receiving waters and be diluted. EPA also announced plans to develop regulations covering discharges of bioaccumulative chemicals, including mercury, through mixing zones in 2001 (U.S. Environmental Protection Agency, 2000a).

On December 14, EPA announced plans to begin regulating mercury emissions from coal-fired powerplants. The Agency plans to announce proposed regulations during 2003 and to issue final regulations in 2004 (U.S. Environmental Protection Agency, 2000b).

Production

Since 1990, no domestic mine has produced mercury as its primary product. Owing in part to regulations controlling mercury discharges to the environment, however, some domestic mines and plants recovered small amounts of mercury. These mines and plants were located in areas that historically produced large amounts of mercury, such as California, Nevada, and Utah.

Nearly all the mercury produced in the United States was derived from secondary sources, including spent batteries, mercury vapor and fluorescent lamps, switches, dental amalgams, measuring devices, control instruments, and laboratory and electrolytic refining wastes. The secondary processors typically use high-temperature retorting to recover mercury from compounds and distillation to purify the contaminated liquid mercury metal. Among the largest producers of refined mercury from scrap material were the following companies: Bethlehem Apparatus Co. Inc., Hellertown, PA; D.F. Goldsmith Chemical and Metal Corp., Evanston, IL; and Mercury Waste Solutions, Inc., Minneapolis, MN.

Consumption

The USGS estimated that the electrolytic production of chlorine and caustic soda and electrical applications were the largest uses for mercury in the United States, accounting for approximately 50% and 25% of domestic consumption, respectively. Only in dental applications, where it is the most

Mercury in the 20th Century

In 1901, the United States, with an output of more than 1,000 metric tons, was the world's largest mercury producer. Mercury imports were insignificant, and with shipments of nearly 390 tons, the United States was a net mercury exporter. Among the largest uses for mercury during the first half of the century were the production of explosives, pharmaceuticals, various fungicides and bactericides, dental amalgams, batteries, switches, and measuring and control instruments such as barometers. For much of the century, the United States remained among the largest mercury-producing countries. Because of mercury's toxic nature, however, various rules and regulations were enacted, especially in the 1970s, to eliminate or curtail human exposure to mercury.

By the end of the century, there were no longer any producing mercury mines in the United States, and domestic production was limited to the metal recovered from scrap materials. In 2000, the United States was a net mercury exporter, with most of the material shipped to India and the Netherlands. It is estimated that the largest domestic use for mercury is in the production of chlorine and caustic soda.

cost-effective and longest lasting dental cavity-filler, has the quantity of mercury consumed remained steady.

World Review

During the past 10 years, annual world mercury production has averaged about 2,500 t, nearly all of which was produced at mines where mercury is the primary product. Most countries do not report their mercury production, and world production values have a high degree of uncertainty. In 2000, about 10 countries produced mercury, with Kyrgyzstan and Spain the dominant producing nations. In some countries, a few base-metal operations recover small quantities of mercury to meet environmental standards and avoid environmental releases of the metal.

In June, a contract transporter for the Yanacocha gold mine in Peru spilled about 151 kilograms of mercury near the town of Choropampa. Minera Yanacocha S.R.L. undertook a comprehensive health and environmental remediation program, agreed to provide a number of public works for nearby communities, and paid a fine of approximately $500,000 as compensation for the spill (Newmont Mining Corp., 2001, p. 24).

Outlook

Ever stricter environmental regulations and the development of new technology are expected to be the primary factors affecting mercury supply and demand in the near future. Environmental standards and technological advances likely will work in tandem to reduce the demand for mercury in commercial products. Even as the per-unit mercury product content declines, regulations on the disposal of mercury will prompt more recycling of mercury-bearing material to recover the contained mercury. Consequently, secondary mercury is expected to remain the principal component of domestic supply. Other potential sources of domestic supply could include mercury in the National Defense Stockpile and the mercury recovered from the dismantling of mercury cells in some chloralkali operations.

References Cited

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Other

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TABLE 1
SALIENT MERCURY STATISTICS 1/

(Metric tons, unless otherwise specified)

	1996	1997	1998	1999	2000
United States:					
Secondary production, industrial	446	389	NA	NA	NA
Imports for consumption	340	164	128	62	103
Exports	45	134	63	181	178
Industry stocks, yearend 2/	446	203	NA	NA	NA
Industrial consumption	372	346	NA	NA	NA
Price, average per flask: 3/					
D.F. Goldsmith	$261.65	NA	NA	NA	NA
Free market	NA	$159.52	$139.84	$140.00	$155.00
World mine production	2,560	2,950 r/	1,950 r/	1,630 r/	1,640 e/

e/ Estimated. r/ Revised. NA Not available.
1/ Data are rounded to no more than three significant digits, except prices.
2/ Stocks at consumers and dealers only. Mine stocks withheld to avoid disclosing company proprietary data.
3/ Source: Platt's Metals Week.

TABLE 2
U.S. IMPORTS AND EXPORTS OF MERCURY, BY COUNTRY 1/

(Gross weight, unless otherwise specified)

	1999		2000	
Country	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
Imports:				
Australia	--	--	25	$58
Canada	2	$6	4	16
Chile	16	28	--	--
Germany	4	114	25	797
Netherlands	(2/)	10	--	--
Peru	7	14	11	21
Russia	--	--	17	64
Taiwan	--	--	4	101
United Kingdom	32	129	17	70
Total	62	301	103	1,130
Exports:				
Brazil	1	10	--	--
Canada	4	32	7	48
China	1	4	--	--
France	5	70	2	27
Germany	1	13	2	17
India	85	228	65	175
Israel	1	12	1	10
Italy	3	44	--	--
Japan	1	8	14	181
Korea, Republic of	4	33	14	68
Malaysia	1	10	1	7
Mexico	4	47	7	56
Netherlands	9	251	51	1,210
Peru	--	--	4	30
Singapore	19	93	1	11
Spain	17	126	--	--
Thailand	2	22	3	26
United Kingdom	1	10	4	58
Other	22 r/	103 r/	2	109
Total	181	1,120	178	2,040

r/ Revised. -- Zero.
1/ Data are rounded to no more than three significant digits; may not add to totals shown.
2/ Less than 1/2 unit.

Source: U.S. Census Bureau.

TABLE 3
MERCURY: WORLD MINE PRODUCTION, BY COUNTRY 1/ 2/

(Metric tons)

Country	1996	1997	1998	1999	2000 e/
Algeria	368	447	224	240 r/	240
China e/	510	830	230	200	200
Finland	88	63 r/	54 r/	40 r/	45
Kyrgyzstan	584	610 e/	620	620	550
Mexico e/	15	15	15	15	25
Russia e/	50	50	50	50	50
Slovakia	--	--	20 e/	--	--
Slovenia	5	5 e/	5 e/	--	--
Spain	862	863	675	433 r/	500
Tajikistan e/	45	40	35	35	40
Ukraine e/	30	25	20	NA	NA
United States 3/	W	W	NA	NA	NA
Total	2,560	2,950 r/	1,950 r/	1,630 r/	1,640

e/ Estimated. r/ Revised. NA Not available. W Withheld to avoid disclosing company proprietary data; not included in "Total." -- 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 2, 2001.

3/ Mercury was produced only as a byproduct of gold mining.