

LEAD

By Gerald R. Smith

Domestic lead mine production increased for the third straight year, increasing by about 11% over that of 1995. Alaska and Missouri were the dominant producing States with a 93% share. Other appreciable lead mine production occurred in Colorado, Idaho, and Montana. Lead was produced at 17 mines employing about 1,200 people. The value of domestic mine production was about \$460 million. Primary lead was processed at two smelter-refineries in Missouri, a smelter in Montana, and a refinery in Nebraska.

Secondary lead, derived principally from scrapped lead-acid batteries, accounted for 77% of refined lead production in the United States. Nearly all the secondary lead was produced by 18 companies operating 23 plants.

Two U.S. Government agencies issued several rules and notices pertaining to lead use and lead-based paint abatement. Another Government agency and industry announced a new voluntary initiative to significantly reduce worker exposure to lead. Congress passed an amendment to the Safe Drinking Water Act, thereby placing added restrictions on the use and sale of lead-containing materials in pipes and plumbing fixtures.

Lead was consumed in the manufacture of end-use products, including batteries, ammunition, covering for power and communication cable, building construction materials, and solders for motor vehicles, metal containers, and electrical and electronic components and accessories, in about 180 plants.

Lead-acid batteries continued to be the overwhelmingly dominant use of lead, accounting for about 87% of reported lead consumption. The Battery Council International (BCI) reported starting-lighting-ignition (SLI) battery production of 100 million units. This total included original equipment and replacement automotive-type batteries. An estimated 1.06 million metric tons (tons) of lead was consumed in SLI batteries.

Monthly sales of lead from the National Defense Stockpile (NDS) continued during 1996. Sales totaled about 38,700 tons (42,700 short tons), leaving about 389,000 tons (428,000 short tons) in the NDS at yearend.

Lead prices continued rising during the first 5 months, then generally declined throughout the remainder of the year. Although prices declined for a significant portion of the year, the average annual London Metal Exchange (LME) and North American Producer prices were each up by \$0.065 per pound compared with the average prices of \$0.286 and \$0.423, respectively, in 1995.

Lead was mined in 45 countries; the top 5 accounted for 67% of the world's total production of 2.92 million tons. Australia was the largest producer, with 18% of the world total, followed by China, 17%; the United States, 15%; Peru, 9%; and Canada, 8%.

Legislation and Government Programs

Monthly sales of lead from the NDS continued during 1996. Lead disposal from stockpile inventory as a result of these sales totaled about 38,700 tons (42,700 short tons). The Defense National Stockpile Center's Annual Materials Plan (AMP) approved by the U.S. Congress for fiscal year 1996 (October 1, 1995, to September 30, 1996) included a maximum disposal authority for lead of 54,400 tons (60,000 short tons). Under this authority, disposal of lead from NDS inventory during the first 9 months of calendar year 1996 was 32,500 tons (35,900 short tons). The AMP approved by the U.S. Congress for fiscal year 1997 (October 1, 1996, to September 30, 1997) also included a maximum disposal authority for lead of 54,400 tons (60,000 short tons). Under the fiscal year 1997 authority, disposal of lead from NDS inventory during the last 3 months of 1996 amounted to 6,200 tons (6,800 short tons), leaving about 389,000 tons (428,000 short tons) of lead at yearend.

The U.S. Environmental Protection Agency (EPA) and the U.S. Department of Housing and Urban Development (HUD) issued several rules and notices pertaining to lead use and lead-based paint abatement. In February, EPA published a direct final rule regarding the prohibition on the use of lead or lead additives in gasoline for highway consumption. In that rule, consistent with the statutory regulations of the Clean Air Act, effective January 1, 1996, EPA revised its regulations so as to prohibit the introduction into commerce of gasoline for use as motor vehicle fuel that contains any lead additive or more than 0.05 gram of lead per gallon. The revisions also removed or modified any accompanying regulatory provisions such as recordkeeping and reporting requirements for refiners and importers and the necessity for motor vehicle manufacturers to place "unleaded fuel only" labels on the motor vehicle (U.S. Environmental Protection Agency, 1996c).

In March, EPA and HUD jointly issued a final rule on the requirements for disclosure of known lead-based paint and/or paint hazards in housing. Both agencies were directed under the Residential Lead-based Paint Hazard Reduction Act of 1992 to issue such regulations for persons selling or leasing housing constructed before the phaseout of the use of residential lead-based paint in 1978. According to the final rule, sellers and lessors must disclose the presence of known lead-based paint and/or lead-based paint hazards in the housing. They must also provide purchasers and lessees with a federally approved information pamphlet, as well as any available records or reports pertaining to such paint or hazards. Furthermore, purchasers must be provided with a 10-day opportunity to conduct a risk assessment or inspection for such paint or

hazards before being obligated under any purchase contract. Sales and leasing contracts must also contain certain disclosure and acknowledgment language. Finally, agents must ensure compliance with all the requirements included in this final rule. The requirements were applicable on September 6, 1996, for owners of more than four residential dwellings and on December 6, 1996, for owners of four or fewer dwellings (U.S. Department of Housing and Urban Development and U.S. Environmental Protection Agency, 1996).

In July, HUD issued a request for comments from the general public, as well as affected Federal agencies, on the practical utility of collecting certain lead-based paint information through research grants issued by HUD (U.S. Department of Housing and Urban Development, 1996b). Subsequently, grants or cooperative agreements totaling \$2.5 million were made available in November by HUD for research on specified topics related to the evaluation and control of residential lead-based paint hazards. As many as 10 awards ranging from \$100,000 to \$750,000 were to be issued on a competitive basis for applications received by the deadline of February 5, 1997. The Secretary of HUD was directed under the Residential Lead-Based Paint Hazard Reduction Act, Title X of the Housing and Community Development Act of 1992, to conduct such research in cooperation with other Federal agencies. Guidelines reflecting the Title X framework and describing state-of-the-art procedures for all aspects of lead-based paint hazard evaluation and control had been published by HUD in June 1995. The targeted research and field experience were expected to result in modifications to the original guidelines that would improve the accuracy of lead hazard evaluation and increase the effectiveness, and possibly reduce the cost of lead hazard control measures (U.S. Department of Housing and Urban Development, 1996a).

In other EPA actions, a final rule was issued on the requirements for complying with lead-based paint activities in target housing and facilities likely to be occupied by children. The rule was established, as directed under Title IV of the Toxic Substance Control Act, to ensure that individuals conducting activities involving the abatement of lead-based paint hazards are properly trained and certified, that training programs providing instruction in such activities are accredited, and that these activities are conducted according to reliable, effective, and safe work-practice standards. Starting on October 28, 1996, individual States and Indian Tribes were allowed to seek authorization, to administer and enforce the regulations set forth in the rule. Upon authorization by EPA, the administration and enforcement of the regulations will become effective as specified in the particular State and Indian programs. For States and Indian Tribes that do not apply for and receive authorization, EPA will administer and enforce the regulations no later than August 31, 1998 (U.S. Environmental Protection Agency, 1996a). EPA also announced that its National Lead Laboratory Accreditation Program, mandated by the U.S. Congress in Title X of the Residential Lead-Based Paint Hazard Reduction Act of 1992, had been revised. The specific revisions included expansion of the accreditation program to

cover analysis for lead in field-operation laboratories and revised training requirements for laboratory personnel (U.S. Environmental Protection Agency, 1996b).

The Occupational Safety and Health Administration (OSHA), the Lead Industries Association, Inc., and the BCI jointly announced a new, voluntary, industry, 5-year initiative that will significantly reduce worker exposure to lead. Of the companies that produce or use lead, 33 agreed to participate in the program. Under OSHA's current standards, when the average blood lead concentration is at or above 50 micrograms per 100 grams of whole blood in a worker who is exposed to lead levels above the airborne action level of 30 micrograms per cubic meter, employers are required to relocate that worker to an area of lower lead levels until the blood lead level decreases to 40 micrograms per 100 grams, at which time the worker may be returned to the initial work area. In the new, 5-year initiative, the signatory companies agreed to reduce by 2 micrograms per 100 grams each year the blood lead level at which the worker is required to be relocated, and by 1 microgram per 100 grams each year the level at which the worker is subsequently allowed to return to the initial work area (U.S. Occupational Safety and Health Administration, 1996).

A bill amending the Public Health Service Act [the Safe Drinking Water Act, Public Law 104-182 (110 stat. 1613)] was passed by the U.S. Congress and signed by the President in August 1996. Included in the bill were amendments to the lead plumbing and pipes subsection that placed added restrictions on the use and sale of materials containing lead. Regarding the use of lead in plumbing and pipes, the act now states that no person may use any pipe, pipe or plumbing fitting or fixture, solder, or flux in the installation or repair of any public water system or any plumbing in a residential or nonresidential facility providing water for human consumption, that is not lead free. In the original act, effective June 19, 1986, the restrictions pertained only to the use of pipe and associated solder and flux that are not lead free. The act defines lead free as containing not more than 0.2% lead when referring to solders and flux, and not more than 8% lead when referring to pipes and pipe fittings. Regarding the sale of lead-containing plumbing and pipes, the act now states that it will be unlawful, effective August 6, 1998, for any person to introduce into commerce any pipe or any pipe or plumbing fitting or fixture, that is not lead free, except for pipe that is used in manufacturing or industrial processing. It will also be unlawful for any person engaged in the business of selling plumbing supplies, except manufacturers, to sell solder or flux that is not lead free. Furthermore, it will be unlawful for any person to introduce into commerce any solder or flux that is not lead free unless the solder or flux bears a prominent label stating that it is illegal to use the solder or flux in the installation or repair of any plumbing providing water for human consumption.

Production

Primary.—In 1996, domestic mine production of lead increased for the third straight year and was up by more than

42,000 tons, or 11%, over that of 1995. Increases in production were reported at several of the major mines in Alaska and Missouri. The share of the U.S. mine output of lead derived from production in Alaska and Missouri remained unchanged at 93%. Other appreciable lead mine production occurred in Colorado, Idaho, and Montana. Domestic mine production data were derived from a voluntary survey on Lode-Mine Production of Gold, Silver, Copper, Lead, and Zinc by the U.S. Geological Survey (USGS). All the major lead producing mines responded to this survey. (See tables 1, 2 and 3.)

ASARCO Incorporated, New York, operated two mines, Sweetwater and West Fork, in southern Missouri that provided about 90% of the concentrate feed for its nearby smelter and refinery at Glover; the balance came from purchased lead concentrates. Zinc is an important coproduct of Asarco's mining business. The company's operation of a custom primary lead business at its East Helena, MT, smelter and Omaha, NE, refinery, depended principally on the availability of precious-metal-bearing lead concentrates from the United States and Latin America. In addition, Asarco owned a 60% share in the Leadville Mine in Colorado, managing the production of zinc, lead, and silver. Total production of lead in concentrates from Asarco's U.S. mining operations was about 99,000 tons in 1996, down about 12% from that of 1995 owing to declining ore grades. At yearend, Asarco reported total lead reserves of 14.8 million tons, with 9.5 million tons at a grade of 4.30% lead at its Sweetwater Mine, 5.0 million tons at a grade of 5.21% lead at its West Fork Mine, and 0.3 million tons at a grade of 2.91% at its Leadville Mine. To meet current environmental requirements for air and water emissions, Asarco completed modernization projects at its Glover and East Helena smelters. As a consequence of the company's 1995 decision to forego such an investment in its Omaha refinery, production of refined lead at Omaha was terminated in June. Asarco planned to sell the lead bullion produced at the East Helena custom smelter to refineries located outside of the United States (ASARCO Incorporated, 1996). (See table 4.)

In December, Asarco announced that it had reconsidered a decision made in October to close the Leadville zinc-lead-silver mine indefinitely at the end of 1996. As a result, full production was expected to be resumed by mid-March 1997. According to Asarco, a key factor in the decision to reopen the mine was the likely impact of the shutdown on the local community. The Leadville operation, a principal industry there, employs about 130 people and produces about 14,000 tons of zinc and 4,500 tons of lead in concentrate per year (Platt's Metals Week, 1996b).

The Doe Run Company, St. Louis, MO, operated five lead mines and four mills centered in southeastern Missouri, supplying concentrates to its smelter and refinery at Herculaneum, MO. Doe Run is owned by The Renco Group, a New York-based, privately held company with investments in natural resources and industrial operations.

Cominco Alaska Inc., a wholly owned subsidiary of Cominco Ltd., Toronto, Canada, operated the Red Dog zinc-lead mine in northwestern Alaska under a leasing agreement with NANA

Regional Corp., owner of 100% interest in the property. NANA is a corporation organized under the provisions of the Alaska Native Claims Settlement Act. Recent modifications to the concentrator portion of the ore-processing system effectively increased lead recovery from the ore to 57%, compared with 37% in 1995; this resulted in a greater production of concentrate than that of 1995 but from 157,000 tons less of milled ore. In 1996, about 112,000 tons of lead concentrate (average grade 55.6% lead) was produced compared with about 92,000 tons (average grade 55% lead) in 1995. Ore reserves at the main Red Dog deposit were 50.1 million tons at a grade of 19.5% zinc and 5.3% lead, and inferred ore reserves at the newly discovered Aqqualuk ore body nearby were 76 million tons at a grade of 13.7% zinc and 3.6% lead. As a result of the discovery of Aqqualuk, a plan was approved in 1996 to increase overall production at Red Dog by 40%. The expansion project will be carried out over a period of 3 years with full production at the expanded level expected to begin in 1999. In March, Cominco Ltd. purchased a 100% interest in the Pend Oreille zinc-lead mine near Metaline Falls, WA, from Resource Finance Corp., Toronto, Canada. During the year, excavation work was completed at the mine to provide access for further underground drilling and exploration. Considerable surface drilling was also carried out in an effort to locate possible extensions to the existing ore zone. Current ore reserves at Pend Oreille are estimated to be about 6 million tons at a grade of 7% zinc and 1% lead. According to Cominco, the concentrates derived from the Pend Oreille Mine would be used as an additional feed source for its Trail, Canada, smelter operations (Cominco Ltd., 1996).

Hecla Mining Company, Coeur d'Alene, ID, operated the Lucky Friday Mine in Mullan, ID, throughout 1996. Ore was processed at the rate of about 700 tons per day to produce silver-lead concentrate and zinc concentrate. About 97% of the lead was economically recovered using conventional flotation methods. In mine development activities during the year, Hecla focused on expanding its mining operations into the adjacent Gold Hunter silver-lead ore zone, about 1 mile northwest of the Lucky Friday Mine. An access draft was completed from the Lucky Friday Mine to the Gold Hunter zone, and exploratory drilling was begun in the second quarter of 1996. A final study on the feasibility of mining the Gold Hunter zone is expected to be completed in 1997, at which time a decision will be made on further development of this expansion project (Hecla Mining Company, 1996).

Mining was resumed at the Greens Creek polymetallic mine on Admiralty Island, near Juneau, AK, in the last quarter of 1996, a few months ahead of schedule, and the mine was expected to be back in full operation by the first quarter of 1997. In early 1995, a joint venture comprised of Kennecott Greens Creek Mining Company, a wholly owned subsidiary of Kennecott Minerals Corp., Salt Lake City, UT (70.3%) and Hecla Mining Company (29.7%) had begun redevelopment of Greens Creek, which had been placed on care and maintenance status in 1993 when low metal prices forced the operation to be shut down. The production from Greens Creek was expected to

be about 38,000 tons of zinc and 19,000 tons of lead in concentrate per year in addition to 45,000 ounces of gold and 9 million ounces of silver per year. At these production rates, the combined reserves in three ore zones at Greens Creek were projected to be sufficient for a mine life of 17 years (Mining Journal, 1996d; The Mining Record, 1996).

Pegasus Gold Inc., Spokane, WA, mined and processed 5.08 million tons of gold-silver-lead-zinc ore at its Montana Tunnels Mine in central Montana; this output was approximately equal to that of 1995. About 90% of the lead was recovered from the ore. At yearend, proven and probable reserves totaled 17.1 million tons at a grade of 0.54 gram of gold, 10.6 grams of silver, 0.21% lead, and 0.62% zinc per ton, sufficient for a remaining mine life of about 3.5 years (Pegasus Gold Inc., 1996).

Chief Consolidated Mining Co., New York, NY, Akiko Gold Resources, Vancouver, Canada, and a U.S. subsidiary of Korea Zinc Co. Ltd., Seoul, Republic of Korea, formed a joint venture company, Tintic Utah Metals LLC, to develop the New Burgin lead-zinc-silver deposit in the Tintic district of Utah. The joint venture agreement effectively transferred a 50% interest in this deposit from Chief Consolidated to Akiko Gold (25%) and Korea Zinc (25%). Results of additional exploratory drilling increased the reserves at New Burgin to 1.5 million tons at a grade of 21% lead, 6.7% zinc, and 16.5 ounces of silver per ton. Lead production at New Burgin was expected to exceed 45,000 tons per year over a projected life span of 5 years (The Northern Miner, 1996a). The last reported lead mining activity at New Burgin was in 1978, when the mining operation was known as the Burgin Mine.

Secondary.—Domestic secondary production increased by about 8% in 1996. Secondary lead accounted for 77% of domestic lead refinery production compared with 73% in 1995. Lead recovered from scrap lead-acid batteries continued at a high level and accounted for 90% of all lead produced from secondary sources. The domestic secondary statistics were developed by the USGS from a combined secondary producer and consumer survey that included data from monthly and annual respondents. Of the 141 consuming companies to which a survey request was sent, 125 responded, representing an estimated 90% of the total U.S. lead consumption. Of the 25 companies producing secondary lead, exclusive of that produced from copper-based scrap, to which a survey request was sent, 18 responded, representing an estimated 99% of the total refinery production of secondary lead. Production and consumption for the nonrespondents were estimated by using prior-year levels as a basis. (See tables 1, 5, 6, 7, 8, and 9.)

RSR Corp., Dallas, TX, completed the expansion of its secondary lead production plant in Indianapolis, IN, during the second quarter of 1996. During the last half of the year, a second electric arc furnace, and an additional bag house and scrubber unit were placed into full operation, effectively increasing the production capacity of the plant by about 11,000 tons per year. At RSR's Middletown, NY, secondary lead production plant, work continued on the construction of a desulfurization unit that will produce sodium sulfate crystals as

part of the secondary-lead-processing scheme (American Metal Market, 1996c). RSR also created a new division devoted to research that will improve lead smelting, refining, and fabricating methods. The new division, RSR Technologies, was formed from RSR's existing research and development department. It will service RSR Corp. facilities and the European operations of its parent company, Quexco Ltd., as well as other parties, such as lead-acid battery manufacturers (American Metal Market, 1996b).

General Smelting and Refining, Inc., College Grove, TN, announced plans to build a new secondary lead smelter that would replace the current facility and double the company's lead production capacity to about 27,000 tons per year. Application for a permit to build the new plant was forwarded to State and local authorities, as well as to the EPA during the last half of the year. Pending receipt of the required permits, it was anticipated that the new plant could be in operation within 2 years (American Metal Market, 1996a).

Asset Recovery, Inc., a financial investment and property management company in Wichita, KS, received approval from Oklahoma's Department of Environmental Quality to build a secondary lead smelter near Muskogee. Construction of the plant was scheduled to begin by yearend, with production expected to start by late 1997 or early 1998. The smelter facility will have the capacity to process about 15,000 spent lead-acid batteries per day, producing about 50,000 tons of secondary lead per year (American Metal Market, 1996d).

The Doe Run Company temporarily shut down its Buick secondary lead smelter in Boss, MO, in early December after encountering difficulties with its reverberatory furnace. The smelter was expected to be out of operation for about 6 weeks while the company relined the furnace. About 5,400 tons of lead production was likely to be lost during the shutdown period, according to company estimates. Total production of lead at the Buick facility for the company's fiscal year ended October 31, 1996 was 81,600 tons (Metal Bulletin, 1996e).

Consumption

Reported consumption of lead decreased by about 3% owing to the declining demand for lead in most end uses other than lead-acid storage batteries. Demand declined for uses including shot and bullets in ammunition, bearing metals in motor vehicles, sheet lead in building construction and medical radiation shielding, solder in building construction, motor vehicles and electronics, and pipes, traps and extruded products in building construction. The demand for lead in storage batteries showed a small increase of less than 1%. Consumption of lead in all forms of lead-acid storage batteries, SLI-type and industrial-type, represented 87% of the total reported consumption of lead. Industrial-type batteries include stationary batteries, such as those used in uninterruptible power-supply equipment for hospitals, computer and telecommunications networks, and in load-leveling equipment for commercial electrical power systems; as well as traction batteries, such as those used in industrial forklifts, airline ground equipment, and

mining vehicles.

The BCI reported an SLI battery production of 100 million units in 1996 compared with 96.3 million units in 1995 and 99.2 million units in 1994. The totals include original equipment and replacement automotive-type batteries. By using an estimate of 10.6 kilograms (23.3 pounds) per unit, the SLI offtake for 1996 was about 1.06 million tons of lead. SLI batteries include those used for automobiles, buses, trucks, tractors, motorcycles, and marine craft. (See tables 6, 7, 8, 9, 12, 13, 14, and 15).

World Review

World production of refined lead remained at about 5.6 million tons in 1996, and world consumption increased from about 5.7 million tons in 1995 to 5.8 million tons. Commercial stocks of refined lead in industrialized countries declined to 0.55 million tons, or 4 weeks of consumption, at yearend 1996 compared with 0.59 million tons, or 5 weeks of consumption, at yearend 1995 and 0.75 million tons, or 7 weeks of consumption, at yearend 1994. Significant exports of refined lead to Western consumers from Eastern countries, notably China, continued during 1996, increasing by about 34% from the 1995 level of 247 thousand tons (International Lead and Zinc Study Group, 1996).

Lead prices continued to rise during the first 5 months of 1996 and then followed a generally declining trend throughout the remainder of the year. Although prices declined for a significant portion of the year, the average annual LME and North American producer prices were each up by \$0.065 per pound compared with the average prices of \$0.286 and \$0.423, respectively, in 1995.

A number of changes occurred worldwide to affect the structure of the lead mining and refining industries, including the opening and development of new facilities, as well as the closing, reopening, expanding, selling, and modernizing of existing facilities. (See tables 10 and 11).

New Mines, Plants, Properties, Resources.—The Australian zinc-lead miner Western Metals began its first full year of production at the newly developed Goongewa Mine in Western Australia. In the initial 3 months of operation, 182,000 tons of ore were processed, producing 16,000 tons of zinc and 5,200 tons of lead in concentrate. All the concentrate production from the mine was exported to Asian consumers (Platt's Metals Week, 1996j; Metal Bulletin, 1996p). Additional Resources were discovered at the company's Cadjebut zinc-lead mine in Western Australia that were likely to extend the life of the mine another 4 years. Initial drilling results just south of the existing mine revealed a new ore zone containing 250,000 tons of resources at a grade of 11% zinc and 2% lead. Current production from the Cadjebut Mine is about 63,000 tons of zinc and 16,000 metric tons of lead in concentrate per year (Metal Bulletin, 1996q). The company further reported that it expected to complete final feasibility studies on its Blendevalle zinc-lead mining project in the Kimberley region of Western Australia by early 1997. Western Metals, which holds a 60% interest in the

project, a joint venture with Acacia Resources (40%), estimated that the mine would have a 10-year life, producing 182,000 tons of zinc and 42,000 tons of lead concentrates per year. Plant construction was scheduled to begin in mid-1997 with production of concentrates expected to start in mid-1998 (Metal Bulletin, 1996o).

Ireland's Ivernia West and Minorco Lisheen, joint developers of the Lisheen zinc-lead mine in County Tipperary, Ireland, submitted their application to authorities in January for authorization to develop the Lisheen deposit. The single detailed document sought approval from the Tipperary County Council for planning permission, the Department of Energy for a mining lease, and the Environmental Protection Agency for an environmental license. Pending a timely completion of the approval process, production could begin by mid-1998. Ore reserves at the Lisheen deposit total 2.3 million tons at a grade of 11.5% zinc and 1.9% lead. At the planned production capacity, these reserves will be sufficient for about 13 years of operation (Metal Bulletin, 1996j).

Ireland's Arcon International Resources was on schedule at yearend to begin shipment of concentrates from its Galmoy zinc-lead mine in County Kilkenny, Ireland, by early 1997. During the first year of operation, Arcon expected to process about 500,000 tons of ore, increasing to full capacity of 715,000 tons in the second year (Metal Bulletin, 1996f). The average ore grade, zinc plus lead, at Galmoy is about 12%, but continuing exploration activity during the year at a site adjacent to Galmoy revealed a significant new zone of zinc and lead resources. Drilling results obtained from two separate zones during the first 6 months of a 2-year drilling program increased total resources at Galmoy by an estimated 25%, to 8 million tons (Metal Bulletin, 1996l).

Boliden Mineral AB, Boliden, Sweden, started production during the year at its Los Frailes zinc-lead-copper mine in Sevilla, Spain, near Boliden's existing Aznalcollar Mine. The production at Los Frailes was expected to replace Boliden's source of zinc, lead, and copper now being mined at Aznalcollar, where reserves were nearly depleted by the end of the year. When full production is reached at Los Frailes in mid-1997, about 3.8 million tons of ore per year will be mined, yielding 110,000 tons of zinc, 45,000 tons of lead and 6,000 tons copper (Metal Bulletin, 1996g).

The Metal Mining Agency of Japan (MMAJ) reported the discovery of a significant, high-grade sulfide deposit in Japan's territorial waters west of the island of Okinawa. The hydrothermal deposit, in the form of sulfide mounds, was found to contain an average of 7.7% zinc and 4% lead and appreciable quantities of copper, gold, and silver. The deposit covered an area of 660,000 square meters in the 1,600-meter-deep Okinawa Trough. Scientists at MMAJ stated, however, that development of such a deposit may be more difficult than that of manganese sea nodules, for which experimental recovery and environmental impact studies have been completed (Mining Journal, 1996e).

Rhonda Mining Corp., Calgary, Canada, reported that drilling results from the Esker deposit on its Epworth property,

Northwest Territories, revealed significant lead, zinc, and silver mineralization. Assays of initial drill samples showed ore grades of 1.36% to 10.8% lead, 0.04% to 2.13% zinc, and 0.06 to 0.61 ounces of silver per ton. Company geologists estimated that the Esker deposit could contain as much as 100 million tons of lead, zinc, and silver mineralization. Rhonda Mining owns the Epworth property with Noranda Mining and Exploration, Inc., Toronto, Canada, sharing equally in the development of the property (The Northern Miner, 1996b).

Farallon Resources Ltd., Vancouver, BC, Canada reported the discovery of an appreciable new sulfide deposit at its Campo Morado project in Mexico's Guerrero State. The new deposit, called South Naranjo, is just south of Farallon's Reforma sulfide deposit. Assay results from the company's drill-delineation program showed ore contents of as much as 7.6% zinc and 3.3% lead and significant quantities of copper, gold, and silver, (Mining Journal, 1996b).

Closings, Curtailments.—In October, Société Minière de Bougrine SA suspended mining and milling operations indefinitely at its zinc-lead mine in Tunisia. The decision was made following a determination that the required investment to lower operating costs was not justifiable in light of existing prices. Bougrine had opened its facilities in mid-1994, producing 38,000 tons of zinc and 6,300 tons of lead in concentrates in 1995. Inmet Mining Corp., Toronto, Canada, holds a 48% interest in the Bougrine mining and milling operations (Platt's Metals Week, 1996c).

Anvil Range Mining Corp., Toronto, Canada, temporarily suspended mining operations at its Faro lead-zinc mine, Yukon, Canada, in late December. The company cited weak metal prices, the strengthening Canadian dollar, and production below budgeted levels as reasons for its decision. Anvil expected to continue processing stockpiled ore at its mill during the first quarter of 1997 while company officials further review and assess Faro's operating status (Platt's Metals Week, 1996a).

Reopenings and Expansions.—In February, Peru's largest private lead miner, Compañía Minera Milpo, revealed investment plans to expand capacity by 10% at its Milpo mine and mill in Yanacancha, Pasco Department. The capacity of the Milpo concentrator is about 2,500 tons of ore per day. About 60% of Milpo's investment was to be directed toward exploration, and the remainder was to be used for upgrading the mine and mill. In conjunction with the upgrading, additional power was to be provided to the Milpo facilities through expansion of the company's La Candelaria hydroelectric plant. The added power was expected to be available by mid-1997 (Platt's Metals Week, 1996h).

China completed the expansion of its Shaoguan lead-zinc smelter in Guangdong Province, effectively doubling Shaoguan's lead production capacity to 60,000 tons per year. Although full production at the increased capacity was not projected to be reached until late 1997, about 40,000 tons of lead was expected to be produced in 1996. The expansion project also included the installation of two generators at the company's existing electric powerplant to meet the increased power demands at the smelter (Platt's Metals Week, 1996d).

Early in the year, Dalpolimetall, a lead and zinc producer in the Primorye region of Russia, began efforts to expand mining and milling capacity at its operations. As a result of a feasibility study conducted on behalf of the company's majority shareholder, Glencore International AG, Zug, Switzerland, Dalpolimetall recommended significant mill upgrades and the renewal of mining equipment. Also included in the recommendations was the maintenance and repair of underground mines covering the important Nikolayevsky and Soviet 2 Mines. The recommendations, if implemented, would nearly double the current production of lead in concentrate to 34,000 tons per year during a period of 5 years (Mining Journal, 1996a).

Gold Fields Namibia Ltd. reached agreement in October with its striking mineworkers, allowing for an anticipated resumption of operations at the Tsumeb, Namibia, lead and copper smelters by the end of the year. Gold Fields expected to obtain concentrates for the smelter operations from three of its mines, as well as from outside sources (Metal Bulletin, 1996n). The smelters had been closed for upgrading in August, but damage to the facilities incurred during the strike prevented them from being restarted as originally planned. Lead production capacity at the Tsumeb smelter operations is about 25,000 tons per year (Platt's Metals Week, 1996g).

Zambia's Kabwe Power and Metal Company (KPM) announced in October that it planned to reopen the Kabwe zinc-lead mine, which had been closed since May 1994. The mine had been purchased by KPM from Zambia Consolidated Copper Mines (ZCCM) earlier in the year. KPM was formed as a new company by a group of ZCCM's former Kabwe Mine employees after the mine closure. Production at Kabwe was expected to reach 18,000 tons of zinc and 13,000 tons of lead per year by 1999 and to extend over a 25- to 30-year life span (Metal Bulletin, 1996i).

In late 1996, Sweden's Boliden AB initiated efforts in late 1996 to expand its secondary lead smelter at Landskrona, Sweden. The expansion plan, still in the proposal stage by yearend, would increase Boliden's 40,000-ton-per-year lead and lead alloy production to 50,000 tons per year by 2000, if implemented. Currently about 3.5 million spent lead-acid batteries per year are processed at Landskrona to recover the lead and lead alloys (Metal Bulletin, 1996a).

Transfers of Ownership, Sales Offerings, Mergers.—China's, lead and zinc producer Shaoguan Smelter, Guangdong Province, announced that it planned to merge with the nearby Fankou lead-zinc mine and mill, pending final approval by the provincial government. Shaoguan had increased its demand for concentrate as a result of the addition of its second smelter and hoped to reduce smelter production costs through the use of concentrate from the Fankou mill rather than from other sources. Even with the additional supply of concentrate from Fankou, Shaoguan still expected to purchase about 30,000 tons of lead and zinc in concentrates per year from other domestic and foreign sources to meet the total demands of the smelting operations (Platt's Metals Week, 1996e).

Kazakhstan's Ust-Kamenogorsk lead-zinc smelter and refinery

and Zyryanovsky lead-zinc mining combine were expected to be operated under a new management system, according to information released in midyear. Ridder-Invest, a joint American-Kazakstani investment company, reportedly completed a trustee arrangement with the Government of Kazakstan to take over the two operations in exchange for significant investment to improve the facilities (Platt's Metals Week, 1996i).

In other actions taken by the Government of Kazakstan, the Chymkent lead smelter and refinery in southern Kazakstan will be managed by a new Kazakstani-Austrian joint venture company, RR Kazakstan Trade and Finance. As the manager, the joint venture company will retain a 31% share of Chymkent for a period of 5 years and will have a first option to buy this share at the end of the period. Plant staff will continue to hold a 44% share in Chymkent. The remaining 25% is expected to be sold, consistent with Kazakstan's overall privatization efforts. Production capacity of the smelter-refinery is 160,000 tons of lead per year, but production in 1995 was only 31,000 tons. RR Kazakstan hoped to increase annual production significantly at Chymkent, which was closed indefinitely in January as a result of difficulties in acquiring adequate feed materials and electrical power (Metal Bulletin, 1996h; Mining Journal, 1996c; Platt's Metals Week, 1996f).

Cominco Ltd. acquired a 25.5% interest in the Peruvian mining company Inversiones Colquijirca, whose 51% ownership in Sociedad Minera El Brocal will give Cominco an interest in the 2,100-ton-per-day Colquijirca zinc-lead mine near Tinyahuarco, Pasco Department. The estimated resource at the open pit Colquijirca Mine is 70 million tons at a grade of 7% zinc and 2% lead (Metal Bulletin, 1996d).

In August, Peru's State mining and smelting company, Centromin, announced that it planned to sell the Yauricocha polymetallic mine, Yauyos, Lima Department, as part of its ongoing privatization program. In two subsequent attempts to sell the mine, no firm offers were received by Centromin, although the sale reportedly attracted a number of interested buyers. By yearend, Centromin decided to restructure the sale to include an option for exploration of new deposits that have been discovered near the existing mine. About 350,000 tons of ore per year are processed at the mine, yielding 9,000 tons of zinc and 4,000 tons of lead. Reserves at Yauricocha total 2.8 million tons at a grade of 5.3% zinc and 2.8% lead and significant quantities of copper, gold, and silver (Metal Bulletin, 1996c; Mining Journal, 1996f,g).

Western Metals and Iscor, a South African steel and mining group, failed to reach a final agreement by yearend on Western's purchase of Iscor's Rosh Pinah zinc-lead mine in southwestern Namibia. A memorandum of understanding on the purchase of the mine had been signed in early July. Although negotiations continued throughout the remainder of the year, a Western official was quoted as saying, "...the circumstances of the parties have changed from those originally envisioned in the memorandum of understanding." Western reportedly had not ruled out further discussion, but said, "...any further discussions must take into account these changed circumstances" (Metal

Bulletin, 1996m).

Renovation and Modernization.—In March, Metaleurop SA, Paris, France, resumed operations at its modernized lead smelter in Nordenham, Germany. By using the newly installed Ausmelt technology, production capacity of the smelter will be about 90,000 tons per year. Full production capacity was expected to be reached by the end of the year (Metal Bulletin, 1996b).

Pasminco Metals, Melbourne, Australia, approved the required expenditures to upgrade its primary lead smelter at Port Pirie in South Australia. The upgrades will increase refined lead production from the current 220,000 tons per year to 250,000 tons per year. Construction at Port Pirie was scheduled to begin in April 1997 with completion expected by the fall of 1997. Beginning in 1998, a portion of Port Pirie's concentrate feed will be derived from BHP Mineral's newly developed Cannington lead-zinc-silver mine, Queensland, Australia, beginning in 1998 (Metal Bulletin, 1996k).

Cominco Ltd. reached substantial completion of the construction of its new Kivcet lead smelter and slag fuming plant at the company's Trail facility. Commissioning of parts of the project were well under way in late 1996, and actual commencing of operations was scheduled for the first quarter of 1997 (Cominco Ltd., 1996).

In February, the Environment Ministers of the Organization for Economic Cooperation and Development (OECD) member countries and the European Environment Commissioner met in Paris, France, in February to discuss the subject of environmental management in an era of globalisation. As part of that meeting, the Ministers and the Commissioner adopted a declaration, "Risk Reduction for Lead," to advance national and cooperative efforts to reduce risks from exposure to lead. Highest priority was given to actions such as phasing down the use of lead in gasoline, eliminating exposure of children to lead in toys and other products with which they are in contact, eliminating the exposure to lead from food and beverage containers, and to other actions which address risks of exposure from food and beverages, water, air, and occupational environment (Organization for Economic Cooperation and Development Ministers, 1996). The OECD Council subsequently noted this ministerial-level declaration and instructed its Environmental Policy Committee to review the progress made on lead risk reduction by OECD member countries, to assess the need for further action in conformity with the declaration, and to develop a framework for the cooperation of industry in implementing voluntary industry programs for risk reduction on lead with a view to its wider applicability to other risk-reduction activities (Organization for Economic Cooperation and Development Council, 1996).

Worldwide reserves of lead contained in demonstrated resources from producing and nonproducing deposits at yearend were estimated to be 69 million tons by the USGS. Reserves for the two largest producers in the world, Australia and China, were about 20 million and 7 million tons, respectively. The United States, the third largest producer in the world, had reserves of 8 million tons. The reserve base (reserves plus

marginal economic deposits, measured and indicated) for Australia and China was 34 million and 11 million tons, respectively, and the reserve base for the United States was 20 million tons. The total world reserve base at the end of 1996 was estimated to be 120 million tons.

Outlook

According to Government analysts, the U.S. economy is expected to grow by as much as 2.5% in 1997. Consistent with this growth, motor vehicle production is expected to grow at a rate of about 2%, to 11.9 million new vehicles, and demand for lead in original equipment batteries will increase accordingly. Demand for replacement batteries in the automotive sector is likely to decline in early 1997 following an unusually mild winter, particularly in the more densely populated regions of the Eastern United States. Although the growing U.S. economy will provide the basis for continued strong demand for lead in 1997, any increase will be dependent to an appreciable extent on weather conditions during the summer and early winter. Significant temperature extremes during this period would increase the demand for replacement batteries, which represented about 60% of the U.S. demand for lead in 1996.

Mine production in the United States should increase by about 8% in 1997 as a result of continued higher production at some of the larger facilities. Total metal production from primary and secondary refineries in 1997 is expected to remain at about the level of 1996. Primary refinery production is expected to decrease slightly in 1997 as the industry makes adjustments during the first full year following permanent closure of one of its primary refineries. According to industry analysts, global production of refined lead was expected to increase by 3.4%, to about 5.8 million tons in 1997, and the global consumption of lead was forecast to increase by 2% to about 5.9 million tons. Mine production could decrease by nearly 5% on the basis of estimates that the output from Chinese mines could decline by as much as 28%. European mine production was forecast to increase by as much as 19% as a result of production increases in such countries as Ireland, Spain, and Sweden. Much of the increase in European mine production could be offset, however, by an anticipated 36% decline in Canadian mine production owing to the closing of one of its mines for an indefinite period of time (Mining Journal, 1997).

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- U.S. Department of Commerce.

¹Prior to January 1996, published by the U.S. Bureau of Mines.

TABLE 1
SALIENT LEAD STATISTICS 1/

(Metric tons unless otherwise specified)

	1992	1993	1994	1995	1996	
United States:						
Production:						
Mine, recoverable lead content 2/	397,000	355,000	363,000	386,000	426,000	
Value	thousands \$307,000	\$249,000	\$298,000	\$359,000	\$459,000	
Primary lead (refined):						
Domestic ores and base bullion	284,000	310,000	328,000	374,000	326,000	
Foreign ores and base bullion	20,800	24,900	23,400	W	W	
Secondary lead (lead content)	916,000	893,000	931,000	1,020,000 r/	1,100,000	
Exports (lead content):						
Lead ore and concentrates	72,300	41,800	38,700	65,500	59,700	
Lead materials, excluding scrap	71,700	60,300	74,200	65,300	121,000	
Imports for consumption:						
Lead in ore and concentrates	5,310	483	473	2,600	6,570	
Lead in base bullion	218	18	577	31	5	
Lead in pigs, bars, and reclaimed scrap	191,000	196,000	231,000	264,000	268,000	
Stocks, Dec. 31:						
Primary lead 3/	20,500	14,300	9,270	14,200	8,160	
At consumers and secondary smelters	82,300	80,500	68,800	79,400 r/	71,700	
Consumption of metal, primary and secondary	1,240,000	1,290,000	1,450,000	1,560,000 r/	1,530,000	
Price: North American Producer average, delivered, cents per pound 4/	35.10	31.74	37.17	42.28	48.83	
World:						
Production:						
Mine	thousand metric tons	3,060 r/	2,750 r/	2,790 r/	2,780 r/	2,920 e/
Refinery 5/	do.	2,950	2,980	2,910 r/	2,980 r/	2,830 e/
Secondary refinery	do.	2,350 r/	2,270 r/	2,350 r/	2,610 r/	2,650 e/
Price: London Metal Exchange, pure lead, cash average, cents per pound 4/		24.50	18.42	24.83	28.60	35.10

e/ Estimated. r/ Revised. W Withheld to avoid disclosing company proprietary data; included in "Domestic ores and base bullion."

1/ Data are rounded to three significant digits, except prices.

2/ Lead recoverable after smelting and refining. Number in Table 10 represents lead in concentrate.

3/ American Bureau of Metal Statistics Inc.

4/ Platt's Metals Week.

5/ Primary metal production only; includes secondary metal production, where inseparable.

TABLE 2
MINE PRODUCTION OF RECOVERABLE LEAD IN
THE UNITED STATES, BY STATE 1/

(Metric tons)

State	1995	1996
Missouri 2/	359,000	397,000
Montana	8,350	7,970
Other States 3/	18,200 r/	21,200
Total	386,000	426,000

r/ Revised.

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Includes Alaska.

3/ Includes Colorado, Idaho, Illinois, New York, and Tennessee.

TABLE 3
LEADING LEAD-PRODUCING MINES IN
THE UNITED STATES IN 1996, IN ORDER OF OUTPUT

Rank	Mine	County and State	Operator	Source of lead
1	Red Dog	Northwest Arctic, AK	Cominco Alaska Inc.	Zinc ore.
2	Buick	Iron, MO	The Doe Run Co.	Lead-zinc ore.
3	Casteel 1/	do.	do.	Do.
4	Fletcher	Reynolds, MO	do.	Do.
5	Sweetwater	do.	ASARCO Incorporated	Do.
6	West Fork	do.	do.	Do.
7	Lucky Friday	Shoshone, ID	Hecla Mining Co.	Do.
8	Viburnum No. 29	Washington, MO	The Doe Run Co.	Do.
9	Viburnum No. 28	Iron, MO	do.	Do.
10	Montana Tunnels	Jefferson, MT	Pegasus Gold Corp.	Zinc ore.
11	Greens Creek	Southeastern, AK	Kennecott Minerals Co.	Do.
12	Leadville Unit	Lake, CO	ASARCO Incorporated	Do.
13	Sunshine	Shoshone, ID	Sunshine Mining Company	Silver ore.
14	Balmat	St. Lawrence, NY	Zinc Corporation of America	Lead-zinc ore.
15	Pierrepoint	do.	do.	Do.
16	Coy	Jefferson, TN	ASARCO Incorporated	Zinc ore.
17	Rosiclare	Hardin and Pope, IL	Ozark-Mahoning Co.	Fluorspar.

1/ Includes Brushy Creek Mill.

TABLE 4
REFINED LEAD PRODUCED AT PRIMARY REFINERIES
IN THE UNITED STATES, BY SOURCE MATERIAL 1/ 2/

(Metric tons unless otherwise specified)

Source material	1995	1996
Refined lead:		
Domestic ores and base bullion	374,000	326,000
Foreign ores and base bullion	W	W
Total	374,000	326,000
Calculated value of primary refined lead 3/	\$348,000	\$351,000

W Withheld to avoid disclosing company proprietary data; included with "Domestic ores and base bullion."

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Total refined lead: American Bureau of Metal Statistics Inc.; domestic and foreign ores: U.S. Geological Survey calculations.

3/ Value based on average quoted price.

TABLE 5
LEAD RECOVERED FROM SCRAP PROCESSED IN THE UNITED STATES,
BY KIND OF SCRAP AND FORM OF RECOVERY 1/

(Metric tons)

	1995	1996
Kind of scrap:		
New scrap:		
Lead-base	49,600 r/	36,600
Copper-base	8,350 r/	8,330
Tin-base	--	--
Total	57,900 r/	45,000
Old scrap:		
Battery-lead	905,000 r/	992,000
All other lead-base	49,400 r/	56,400
Copper-base	8,720 r/	8,070
Tin-base	--	--
Total	963,000 r/	1,060,000
Grand total	1,020,000 r/	1,100,000
Form of recovery:		
As soft lead	584,000 r/	652,000
In antimonial lead	400,000 r/	424,000
In other lead alloys	19,200	7,970
In copper-base alloys	17,100	16,400
In tin-base alloys	1	1
Total	1,020,000 r/	1,100,000
Value 2/	thousands \$951,000 r/	\$1,190,000

r/ Revised.

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Value based on average quoted price of common lead.

TABLE 6
U.S. CONSUMPTION OF LEAD, BY PRODUCT 1/

(Metric tons)

SIC Code	Product	1995	1996
	Metal products:		
3482	Ammunition: Shot and bullets	70,900	52,100
	Bearing metals:		
35	Machinery except electrical	W	W
36	Electrical and electronic equipment	298	W
371	Motor vehicles and equipment 2/	5,270	3,620
37	Other transportation equipment	W	W
	Total bearing metals	6,490	4,350
3351	Brass and bronze: Billets and ingots	5,260	5,460
36	Cable covering: Power and communication	5,640	W
15	Calking lead: Building construction	935	767
	Casting metals:		
36	Electrical machinery and equipment	W	W
371	Motor vehicles and equipment	W	W
37	Other transportation equipment	3,480	4,590
3443	Nuclear radiation shielding	W	1,130
	Total casting metals	18,100	18,800
	Pipes, traps, other extruded products:		
15	Building construction	2,210	1,810
3443	Storage tanks, process vessels, etc.	(3/)	(3/)
	Total pipes, traps, other extruded products	2,210	1,810
	Sheet lead:		
15	Building construction	18,000	14,000
3443	Storage tanks, process vessels, etc.	(3/)	(3/)
3693	Medical radiation shielding	9,960	5,400
	Total sheet lead	27,900	19,400

See footnotes at end of table.

TABLE 6--Continued
U.S. CONSUMPTION OF LEAD, BY PRODUCT 1/

(Metric tons)

SIC Code	Product	1995	1996
Solder:			
15	Building construction	3,220	1,650
	Motor vehicles, equipment, metal cans and shipping containers	8,260	4,580
367	Electronic components and accessories	4,190	2,350
36	Other electrical machinery and equipment	482	445
	Total solder	16,200	9,020
Storage batteries:			
3691	Storage battery grids, post, etc.	711,000 r/	655,000
3691	Storage battery oxides	618,000 r/	681,000
	Total storage batteries	1,330,000 r/	1,340,000
371	Terne metal: Motor vehicles and equipment	(4/)	(4/)
27	Type metal: Printing and allied industries	(5/)	(5/)
34	Other metal products 6/	5,140 r/	5,130
	Total metal products	1,490,000 r/	1,460,000
Other oxides:			
285	Paint	W	W
32	Glass and ceramics products	W	W
28	Other pigments and chemicals	7,880	W
	Total other oxides	61,700	56,900
	Miscellaneous uses	18,600 r/	14,000
	Grand total	1,560,000 r/	1,530,000

r/ Revised. W Withheld to avoid disclosing company proprietary data; included in appropriate totals.

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Includes "Terne metal: Motor vehicles and equipment."

3/ Included with "Building construction" to avoid disclosing company proprietary data.

4/ Included with "Bearing metals: Motor vehicles and equipment."

5/ Included with "Other metal products" to avoid disclosing company proprietary data.

6/ Includes lead consumed in foil, collapsible tubes, annealing, galvanizing, plating, electrowinning, and fishing weights.

TABLE 7
U.S. CONSUMPTION OF LEAD IN 1996, BY STATE 1/ 2/

(Metric tons)

State	Refined soft lead	Lead in antimonial lead	Lead in alloys	Lead in copper-base scrap	Total
California, Oregon, Washington	105,000	39,300	63,000	--	208,000
Florida and Georgia	7,840	7,350	--	--	15,200
Illinois	16,700	19,100	10,300	544	46,700
Iowa, Michigan, Missouri	38,700	29,800	31,100	--	99,600
Ohio and Pennsylvania	115,000	42,700	47,800	1,260	207,000
Arkansas and Texas	51,900	15,900	7,430	--	75,200
Alabama, Louisiana, Mississippi, Oklahoma	9,000	327	--	--	9,330
Colorado, Indiana, Kansas, Kentucky, Minnesota, Nebraska, Tennessee, Wisconsin	453,000	222,000	97,000	1,130	773,000
Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, North Carolina, Rhode Island, South Carolina, Vermont	52,100	24,800	19,800	--	96,700
Total	849,000	401,000	276,000	2,930	1,530,000

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Includes lead that went directly from scrap to fabricated products.

TABLE 8
U.S. CONSUMPTION OF LEAD IN 1996, BY CLASS OF PRODUCT 1/ 2/

(Metric tons)

Product	Soft lead	Lead in antimonial lead	Lead in alloys	Lead in copper-base scrap	Total
Metal products	50,600	60,000	9,530	2,890	123,000
Storage batteries	733,000	340,000	263,000	--	1,340,000
Other oxides	W	--	--	--	W
Miscellaneous	65,700	1,040	4,080	--	70,900
Total	849,000	401,000	276,000	2,890	1,530,000

W Withheld to avoid disclosing company proprietary data; included in "Miscellaneous."

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Includes lead that went directly from scrap to fabricated products.

TABLE 9
STOCKS OF LEAD AT CONSUMERS AND SECONDARY SMELTERS
IN THE UNITED STATES, DECEMBER 31 1/

(Metric tons, lead content)

Year	Refined soft lead	Lead in antimonial lead	Lead in alloys	Lead in copper-base scrap	Total
1995	35,400 r/	25,600 r/	18,300 r/	174	79,400 r/
1996	33,000	31,700	6,860	123	71,700

r/ Revised.

1/ Data are rounded to three significant digits; may not add to totals shown.

TABLE 10
LEAD: WORLD MINE PRODUCTION OF LEAD IN CONCENTRATES, BY COUNTRY 1/ 2/

(Metric tons)

Country 3/	1992	1993	1994	1995	1996 e/
Algeria e/	900	900	700	800 r/	900
Argentina	17,956	11,826	9,981 r/	10,521 r/	10,000
Australia	577,000	519,000	537,000	455,000	522,000 4/
Austria	920	1,340	--	--	--
Bolivia	20,002	21,220	19,679	20,387	16,200
Bosnia and Herzegovina e/	800	200	200	200	200
Brazil	2,517	117	806	-- r/	--
Bulgaria e/	39,000 e/	39,000 e/	37,600 r/	35,000 r/	21,000
Burma e/	2,800	2,200	2,300	2,400	2,500
Canada	343,808	182,234	167,584	204,227 r/	240,835 4/
Chile	298	344	1,008	1,010 e/	1,000
China e/	330,000	338,000	462,000	520,000 r/	500,000
Colombia	620	447	290	275 e/	275
Czech Republic e/ 5/	XX	1,000	500	--	--
Czechoslovakia e/ 6/	2,800	XX	XX	XX	XX
Ecuador e/	200	200	200	200	200
Finland	576	--	--	--	--
Georgia e/	800	500	400	300	200
Germany	1,485	--	--	--	--
Greece	28,300	26,400	22,800	20,400 r/	20,000
Honduras	10,797	3,551	2,810	2,619 r/	3,367 4/
India	30,500	26,000	30,500	28,600 r/	31,000 4/
Iran 7/	12,400 r/	14,700 r/	18,300 r/	15,900 r/	15,700
Ireland	42,900	48,300	53,700	46,143	45,344 4/
Italy	21,596 r/	7,404	13,902 r/	14,000 r/ e/	14,000
Japan	18,839	16,470	9,946	9,659	7,753 4/
Kazakstan e/	170,000	160,000	57,000 4/	40,000 4/	40,000
Kenya	--	396	350 r/	4 r/	--
Korea, North e/	75,000	80,000	80,000	80,000	80,000
Korea, Republic of	13,628	7,409 r/	2,173 r/	4,064 r/	5,131 4/

See footnotes at end of table.

TABLE 10--Continued
LEAD: WORLD MINE PRODUCTION OF LEAD IN CONCENTRATES, BY COUNTRY 1/ 2/

(Metric tons)

Country 3/	1992	1993	1994	1995	1996 e/
Macedonia e/	15,000	15,000	15,000	15,000	15,000
Mexico	169,610	154,000	170,322	164,348	173,831 4/
Morocco	76,605	81,684	73,164	67,706 r/	71,668 4/
Namibia	15,000 e/	11,600	13,917	16,084 r/	15,349 4/
Nigeria e/	100	100	3,500 r/ 4/	3,500 r/ e/	3,500
Norway	3,767	1,698	3,096	1,462 r/	1,400
Peru	214,007 r/	224,695 r/	233,510	237,597 r/	248,787 4/
Poland	51,300 r/	49,100 r/	54,700 r/	58,100 r/	58,000
Romania	16,697	16,929	23,838	23,194 r/	18,712 4/
Russia e/	22,000	19,500	17,000	16,000	16,000
Saudi Arabia	-- r/	-- r/	-- r/	-- r/	--
Serbia and Montenegro	22,661	9,229	7,500	10,000 r/	17,000
Slovakia e/ 5/	XX	1,800	1,800	1,800	1,000
Slovenia e/	2,000	--	--	--	--
South Africa	75,806	100,171	95,824	88,449 r/	88,613 4/
Spain	30,447 r/	25,503 r/	23,753	30,346 r/	30,000
Sweden	105,295	111,709	112,787	100,070	100,000
Tajikistan e/	2,000	1,600	1,200	1,000	800
Thailand	11,880	6,050	7,950	9,680	20,000
Tunisia	1,362	2,000 r/ e/	2,856 r/	6,736 r/	4,765 4/
Turkey	10,800 e/	11,448	11,158	10,376 r/	10,000
United Kingdom e/	1,000	1,000	2,000 4/	1,600	1,800
United States	407,000	362,000	370,000	394,000	436,000 4/
Uzbekistan e/	35,000	25,000	15,000	10,000	10,000
Zambia 8/	4,446	7,027	--	--	--
Total	3,060,000 r/	2,750,000 r/	2,790,000 r/	2,780,000 r/	2,920,000

e/ Estimated. r/ Revised. XX Not applicable.

1/ World totals, U.S. data, and estimated data are rounded to three significant digits; may not add to totals shown.

2/ Table includes data available through July 1, 1997.

3/ In addition to the countries listed, Uganda may produce lead, but available information is inadequate to make reliable estimates of output levels.

4/ Reported figure.

5/ Formerly part of Czechoslovakia; data were not reported separately until 1993.

6/ Dissolved Dec. 31, 1992.

7/ Year beginning Mar. 21 of that stated.

8/ Pb content of ore milled in year beginning Apr. 1 of that stated. Mine closed in June 1994.

TABLE 11
LEAD: WORLD REFINERY PRODUCTION, BY COUNTRY 1/ 2/

(Metric tons)

Country	1992	1993	1994	1995	1996 e/
Algeria:					
Primary e/	1,000	1,500	1,000	800	900
Secondary e/	3,500	7,100 r/	8,000 r/	7,800 r/	7,700
Total	4,500	8,600 r/	9,000 r/	8,600 r/	8,600
Argentina:					
Primary	14,597	12,473 r/	7,785 r/	2,430 r/	2,000
Secondary e/	15,000	16,000 r/	17,600 r/	26,298 r/ 3/	26,000
Total	29,597	28,473 r/	25,385 r/	28,728 r/	28,000
Australia:					
Primary	215,000	221,000	212,000	215,000	204,000 3/
Secondary	17,000	22,000	20,500	20,400	20,000
Total	232,000	243,000	232,500	235,400	224,000
Austria:					
Primary	5,727	4,779	410 r/	-- e/	--
Secondary	18,203	17,857	17,165	21,919 r/	22,000
Total	23,930	22,636	17,575 r/	21,919 r/	22,000
Belgium:					
Primary	75,297	105,712 r/	97,200	95,300 r/	94,400
Secondary	41,000	25,400 r/	26,300	26,400 r/	26,400
Total	116,297	131,112 r/	123,500	121,700 r/	120,800
Brazil:					
Primary	24,533	27,663	14,602	13,958 r/	15,000
Secondary	38,267	47,027	3,453	2,800 r/	3,000
Total	62,800	74,690	18,055	16,758 r/	18,000
Bulgaria:					
Primary e/	43,000	47,000	52,000 r/	62,200 r/	60,300
Secondary e/	10,100	10,000	10,000	10,000	10,000
Total	53,099	56,994	61,950 r/	72,150 r/	70,300
Burma: Primary	2,122	1,561	1,797	1,753	1,800
Canada:					
Primary	151,252	147,907	153,035	178,019 r/	194,031 3/
Secondary	101,633	69,107	98,605	103,372 r/	115,348 3/
Total	252,885	217,014	251,640	281,391 r/	309,379 3/
China: e/					
Primary	325,000	372,000	408,000	432,000 r/	430,000
Secondary	40,000	40,000	59,900	176,000 r/	100,000
Total	365,000	412,000	468,000	608,000 r/	530,000
Colombia: Secondary e/	3,600	3,600	3,500	3,500	3,500
Czech Republic: 4/ Secondary e/	XX	15,000 r/	15,000 r/	15,000 r/	15,000
Czechoslovakia: 5/ Secondary	24,000	XX	XX	XX	XX
France:					
Primary	161,000 e/	112,300 r/	105,250 r/	133,580 r/	135,000
Secondary e/	124,000 r/	146,000 r/	155,000 r/	156,000 r/	160,000
Total	284,060 r/	258,700 r/	259,950 r/	290,050 r/	295,000
Germany:					
Primary	175,322	174,595	189,435	190,000 e/	190,000
Secondary	179,000	159,561	142,249	145,000 e/	150,000
Total	354,322	334,156	331,684	335,000 e/	340,000
Hungary: Secondary e/	100	100	100	--	--
India: e/					
Primary	40,800	32,500	38,600	34,000 r/	32,500
Secondary	22,900	18,200	21,700	28,000 r/	27,000
Total	63,700	50,700	60,300	62,000 r/	59,500
Iran:					
Primary e/	--	14,600 r/	10,100 r/	4,000 r/	5,700
Secondary e/	42,000 r/	37,400 r/	41,200 r/	41,200 r/	41,200
Total	42,000 r/	52,000 r/	51,300 r/	45,200 r/	46,900
Ireland: Secondary e/	12,000	12,000	10,000	10,400 r/	10,000

See footnotes at end of table.

TABLE 11--Continued
LEAD: WORLD REFINERY PRODUCTION, BY COUNTRY 1/ 2/

(Metric tons)

Country	1992	1993	1994	1995	1996 e/
Italy:					
Primary	102,000	89,900	91,700	84,900 r/	47,200
Secondary	84,300	92,900	114,200	95,500 r/	96,000
Total	186,300	182,800	205,900	180,400 r/	143,000
Jamaica: Secondary e/	1,000	800	800	800	800
Japan:					
Primary	218,787	212,145	182,621	149,523	140,531 3/
Secondary	111,374	97,307	109,641	137,011	146,842 3/
Total	330,161	309,452	292,262	286,534	287,373 3/
Kazakstan: e/					
Primary	180,000	125,000	75,000	88,500 r/ 3/	68,900 3/
Secondary	30,000	25,000	20,000	10,000	10,000
Total	210,000	150,000	95,000	98,500 r/	78,900
Korea, North: e/					
Primary	70,000	75,000	75,000	75,000	75,000
Secondary	5,000	5,000	5,000	5,000	5,000
Total	75,000	80,000	80,000	80,000	80,000
Korea, Republic of: e/					
Primary	63,000	88,000	86,457 r/ 3/	129,744 r/ 3/	88,556 3/
Secondary	25,000	10,000	10,000 r/	10,000 r/	10,000
Total	88,000	98,000	96,500 r/	140,000 r/	98,600
Macedonia: e/					
Primary	6,000	6,000	6,000	6,000	8,000
Secondary	2,000	2,000	2,000	2,000	2,000
Total	8,000	8,000	8,000	8,000	10,000
Malaysia: Secondary e/	28,500	29,000	33,200	33,600 r/	33,600
Mexico:					
Primary	167,000	178,419	170,322	160,322 r/	144,095 3/
Secondary e/	10,000	10,000	10,000	10,000	10,000
Total e/	177,000	188,000	180,000	170,000 r/	154,000
Morocco:					
Primary e/	69,400 r/	69,400 r/	61,800 r/	60,400 r/	59,700
Secondary e/	2,000	2,000	2,000	2,000	2,000
Total	71,400 r/	71,400 r/	63,800 r/	62,363 r/	61,749 3/
Namibia: Primary 6/	31,655	31,236	23,813	26,752	18,845 3/
Netherlands: Secondary	24,300	24,200	25,000 e/	25,000 e/	25,000
New Zealand: Secondary e/	5,000	3,000	6,000	6,000	6,000
Pakistan: Secondary e/	3,000	3,000	3,000	2,500	2,000
Peru:					
Primary	83,951	87,197	88,071	89,696 r/	94,923 3/
Secondary e/	5,000	5,000	5,000	-- r/	--
Total e/	89,000	92,200	93,100	89,700 r/	94,900
Philippines: Secondary	19,100	24,300	17,200	17,200 e/	17,200
Poland:					
Primary e/	38,700	47,300	46,300	51,400 r/	51,000
Secondary e/	15,000	15,000	15,000	15,000	15,000
Total	53,700	62,300	61,300	66,400 r/	66,000
Portugal: Secondary e/	7,400	8,300 r/	12,000 r/	12,000 r/	12,000
Romania:					
Primary	14,416	11,800	22,000	22,000 e/	20,000
Secondary	1,750	5,610	4,000	4,000 e/	5,000
Total	16,166	17,410	26,000	26,000 e/	25,000
Russia:					
Primary	18,000	17,500	15,700	15,000 e/	15,000
Secondary e/	14,500	14,100	12,700	12,000	12,000
Total e/	32,500	31,600	28,400	27,000	27,000
Serbia and Montenegro:					
Primary	23,265	6,393	4,458	11,468 r/	12,000
Secondary	390	--	--	--	--
Total	23,655	6,393	4,458	11,468 r/	12,000

See footnotes at end of table.

TABLE 11--Continued
LEAD: WORLD REFINERY PRODUCTION, BY COUNTRY 1/ 2/

(Metric tons)

Country	1992	1993	1994	1995	1996 e/
Slovenia: e/					
Primary	1,000	1,000	1,000	--	--
Secondary	3,000	3,000	5,424 r/ 3/	7,425 r/ 3/	7,000
Total	4,000	4,000	6,424 r/ 3/	7,425 r/ 3/	7,000
South Africa: Secondary	29,000	31,800	31,900	32,100	36,000
Spain: e/					
Primary	62,000	62,400	70,400	70,000	75,000
Secondary	58,000	61,000 r/	69,600	80,000 r/	80,000
Total	120,000	123,000 r/	140,000	150,000 r/	155,000
Sweden:					
Primary	54,111	46,752	46,600 e/	46,000 e/	45,000
Secondary	37,078	37,764	36,000 e/	36,000 e/	35,000
Total	91,189	84,516	82,600 e/	82,000 e/	80,000
Switzerland: Secondary	6,400	6,000	6,350	6,400 e/	6,400
Thailand: Secondary	18,906	17,060	16,904	19,070	19,000
Trinidad and Tobago: Secondary e/	1,800	1,700	1,600	1,600	1,600
Tunisia:					
Primary e/	913	500 r/	2,000 r/	2,800 r/	2,800
Secondary	5,400 r/	5,400 r/	5,500 r/	5,400 r/	5,400
Total e/	6,310 r/	5,900 r/	7,500 r/	8,200 r/	8,200
Turkey: e/					
Primary	3,000	3,000	4,000	5,000 r/	5,000
Secondary	2,100	2,000	2,100	2,000	5,000
Total	5,100	5,000	6,100	7,000 r/	10,000
Ukraine: Secondary e/	20,000	17,000	12,000	14,000	12,000
United Kingdom:					
Primary	198,805	209,560	191,036	149,706 r/	168,108 3/
Secondary	147,990	154,453	161,430	170,998 r/	177,466 3/
Total	346,795	364,013	352,466	320,704 r/	345,574 3/
United States:					
Primary	305,000	335,000	351,000	374,000	326,000 3/
Secondary	916,000	893,000	931,000 r/	1,020,000 r/	1,100,000 3/
Total	1,220,000	1,230,000	1,280,000 r/	1,390,000 r/	1,430,000 3/
Venezuela: Secondary e/	15,000	14,000	15,000	15,000	16,000
Zambia: Primary 7/	3,033	2,002	--	--	--
Grand total	5,230,000 r/	5,250,000 r/	5,260,000 r/	5,590,000 r/	5,480,000
Of which:					
Primary	2,950,000	2,980,000	2,910,000 r/	2,980,000 r/	2,830,000
Secondary	2,350,000 r/	2,270,000 r/	2,350,000 r/	2,610,000 r/	2,650,000

e/ Estimated. r/ Revised. XX Not applicable.

1/ World totals, U.S. data, and estimated data are rounded to three significant digits; may not add to totals shown.

2/ Table includes data available through July 1, 1997. Data included represent the total output of refined lead by each country, whether derived from ores and concentrates (primary) or scrap (secondary), and include the lead content of antimonial lead but exclude, to the extent possible, simple remelting of scrap.

3/ Reported figure.

4/ Formerly part of Czechoslovakia; data were not reported separately until 1993.

5/ Dissolved Dec. 31, 1992. All production for Czechoslovakia in 1992 came from the Czech Republic.

6/ Includes products of imported concentrate.

7/ Data are for fiscal year beginning Apr. 1 of that stated. Smelter operation closed Mar. 1993. Production in 1993 includes secondary output and may all simply be remelt.

TABLE 12
 PRODUCTION AND SHIPMENTS OF LEAD PIGMENTS AND OXIDES IN THE UNITED STATES 1/ 2/

(Metric tons unless otherwise specified)

Product	1995				1996			
	Production		Shipments		Production		Shipments	
	Gross weight	Lead content	Quantity	Value 3/	Gross weight	Lead content	Quantity	Value 3/
White lead, dry	W	W	W	W	W	W	W	W
Litharge and red lead	6,230 r/	5,790 r/	15,700	\$13,000,000	6,300	5,860	15,500	\$13,800,000
Leady oxide	612,000 r/	582,000 r/	NA	NA	626,000	595,000	NA	NA
Total	620,000 r/	589,000 r/	NA	NA	634,000	602,000	NA	NA

r/ Revised. NA Not available. W Withheld to avoid disclosing company proprietary data; not included in "Total."

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Excludes basic lead sulfate to avoid disclosing company proprietary data.

3/ At plant, exclusive of container.

TABLE 13
 U.S. IMPORTS FOR CONSUMPTION OF LEAD PIGMENTS AND COMPOUNDS, BY KIND 1/

Kind	Quantity (metric tons)	Value (thousands)
1995:		
White lead carbonate	27	\$63
Red and orange lead	63	174
Chrome yellow and molybdenum orange pigments and lead-zinc chromates	5,770	13,600
Litharge	18,500	14,200
Leady litharge	514	442
Glass frits (undifferentiated)	12,200	13,600
Total	37,000	42,000
1996:		
White lead carbonate	12	49
Red and orange lead	18	102
Chrome yellow and molybdenum orange pigments and lead-zinc chromates	8,970	23,500
Litharge	17,900	15,000
Leady litharge	119	113
Glass frits (undifferentiated)	16,800	17,800
Total	43,800	56,600

1/ Data are rounded to three significant digits; may not add to totals shown.

Source: Bureau of the Census.

TABLE 14
U.S. EXPORTS OF LEAD, BY COUNTRY 1/

(Lead content unless otherwise specified)

Country	1995		1996	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
Ore and concentrates (lead content):				
Australia	103	\$32	90	\$30
Belgium	23,100	6,540	20,300	5,750
Canada	27,000	8,840	24,200	7,250
India	790	106	302	88
Japan	8,670	2,450	11,600	3,290
Korea, Republic of	5,830	1,650	--	--
Netherlands	--	--	2,920	826
Trinidad and Tobago	62	19	144	64
Other	5 r/	10 r/	170	53
Total	65,500	19,600	59,700	17,400
Ash and residues (lead content):				
Belgium	5,580	3,450	7,720	4,690
Canada	2,260	1,150	10,800	5,090
Hong Kong	4	12	29	33
India	124	124	79	58
Other	71 r/	18 r/	742	59
Total	8,040	4,760	19,400	9,930
Unwrought lead and lead alloys (lead content):				
Australia	66	126	38	43
Belgium	1,190	1,880	236	672
Canada	2,850	2,440	25,800	44,100
Chile	496	895	--	--
China	302	234	324	280
Germany	470	413	58	204
Hong Kong	110	256	9	35
Indonesia	231	142	2	4
Israel	1,320	1,020	1,350	1,220
Japan	2,970	2,040	2,040	1,610
Korea, Republic of	19,800	12,800	19,800	16,800
Malaysia	752	493	1	22
Mexico	1,040	1,280	24,900	28,200
Morocco	158	55	--	--
Pakistan	26	29	--	--
Panama	33	69	10	22
Philippines	90	150	45	42
Singapore	18	49	99	107
Taiwan	16,200	10,400	10,000	9,650
United Kingdom	102	149	45	94
Other	32 r/	94 r/	485	926
Total	48,200	35,000	85,200	104,000
Wrought lead and lead alloys (lead content):				
Australia	8	41	160	161
Canada	3,400	3,890	3,090	3,690
Chile	5	30	339	606
China	(2/)	57	78	149
Costa Rica	109	212	29	73
Dominican Republic	144	137	14	29
Ecuador	4	15	102	72
Egypt	371	1,680	2	13
France	225	469	129	514
Germany	45	272	16	102
Guyana	144	85	--	--
Hong Kong	634	2,330	581	1,830
India	21	1,030	353	475
Japan	132	521	98	292
Korea, Republic of	360	1,100	307	938
Kuwait	81	646	89	1,210
Malaysia	24	426	65	498
Mexico	1,860	6,420	4,250	15,000
Netherlands	55	256	130	268
New Zealand	120	259	55	127
Nicaragua	1	5	125	159
Saudi Arabia	331	1,620	289	4,950

See footnotes at end of table.

TABLE 14--Continued
U.S. EXPORTS OF LEAD, BY COUNTRY 1/

(Lead content unless otherwise specified)

Country	1995		1996	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
Wrought lead and lead alloys (lead content):				
Singapore	386	\$609	831	\$977
Sweden	37	122	48	986
Taiwan	104	188	86	482
Thailand	2	180	30	160
United Kingdom	112	485	5,080	5,200
Venezuela	67	128	24	49
Vietnam	37	55	--	--
Other	208 r/	1,200 r/	351	1,580
Total	9,020	24,500	16,700	40,600
Scrap (gross weight):				
Belgium	33	106	--	--
Canada	95,600	17,800	76,800 3/	10,100
China	93	122	47 3/	86
Germany	47	610	14 3/	204
Hong Kong	83	80	82 3/	60
India	407	104	633 3/	174
Israel	187	41	--	--
Japan	59	147	58 3/	71
Korea, Republic of	6,110	6,860	5,620 3/	6,070
Mexico	501	446	201 3/	44
Russia	76	173	--	--
Taiwan	277	388	20 3/	53
United Kingdom	299	461	--	--
Venezuela	609	1,220	728 3/	871
Other	122 r/	2,490 r/	1,090 3/	601
Total	105,000	31,000	85,300 3/	18,400

r/ Revised.

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Less than 1/2 unit.

3/ Includes non-battery scrap data only.

Source: Bureau of the Census.

TABLE 15
U.S. IMPORTS FOR CONSUMPTION OF LEAD, BY COUNTRY 1/

(Lead content unless otherwise specified)

Country	1995		1996	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
Ore and concentrates (lead content): 2/				
Belgium	--	--	--	--
Canada	--	--	4,370	\$941
China	54	\$30	122	85
Korea, Republic of	--	--	--	--
Mexico	2,380	1,890	2,080	1,480
Peru	88	25	--	--
Other	72 r/	17 r/	--	--
Total	2,600	1,960	6,570	2,500
Base bullion (lead content):				
Canada	--	--	--	--
Other	31	27	5	2
Total	31	27	5	2
Pigs and bars (lead content):				
Belgium	25	46	11	32
Bulgaria	1,910	1,110	--	--
Canada	182,000	123,000	192,000	156,000
China	--	--	27	19
Colombia	--	--	239	146
France	25	47	--	--
Germany	3,140	2,270	338	672
India	207	191	607	360
Mexico	54,300	33,800	56,900	42,200
Peru	22,100	14,600	17,100	13,700
Sweden	5	8	--	--
United Arab Emirates	210	838	160	831
United Kingdom	128	82	19	31
Venezuela	364	233	--	--
Other	52 r/	31 r/	--	--
Total	264,000	176,000	268,000	214,000
Reclaimed scrap, including ash and residues (lead content): 3/				
Canada	75	36	106	63
Mexico	--	--	65	13
Other	--	--	21	28
Total	75	36	192	104
Grand total	267,000	178,000	274,000	217,000
Wrought lead, all forms, including wire and powders (gross weight):				
Canada	2,500	4,480	2,260	4,080
China	79	507	67	482
Colombia	20	17	176	95
France	53	86	71	334
Germany	242	1,370	200	1,250
Hong Kong	269	727	137	430
India	--	--	1,620	986
Italy	42	226	25	159
Japan	162	1,040	49	1,310
Mexico	1,970	1,800	2,630	1,740
Netherlands	12	59	132	713
New Zealand	46	538	88	710
Peru	17	14	939	742
Philippines	696	458	641	540
Taiwan	253	685	340	1,100
United Kingdom	93	822	111	878
Other	143 r/	885 r/	553	977
Total	6,600	13,700	10,000	16,500

r/ Revised.

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Also includes other lead-bearing materials containing greater than 5 troy ounces of gold per short ton, or greater than 100 troy ounces of total precious metals per short ton.

3/ Also includes other lead-bearing materials containing greater than 10% by weight of copper, lead, or zinc (any one).

Source: Bureau of the Census.