Lead

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According to preliminary figures from the International Lead and Zinc Study Group (ILZSG), world lead consumption rose to a record level of 5 704 000 t in 1996, an increase of 2.3% over 1995. Although world mine production of lead increased marginally from 1995 to 2 825 000 t, lead metal production fell by 0.5% to 5 585 000 t.

The rise in producer stocks during 1996 was more than offset by a fall in consumer, merchant and London Metal Exchange (LME) lead stocks. The net result was a 22% decline in total stocks at the end of 1996. LME stocks stood at 119 000 t at the end of 1996.

CANADIAN DEVELOPMENTS

Canada's mine production of lead totalled an estimated 257 000 t in 1996 compared to 211 000 t in 1995. The increase was primarily due to the Faro operation completing almost one full year of production since its re-opening in August 1995.

Canadian lead metal production is estimated at 309 000 t in 1996 compared to 281 000 t in 1995. Increases occurred in both the primary and secondary sectors, with secondary lead production expected to increase by about 20% in 1996 from 103 000 t in 1995, and to account for approximately 40% of metal production in Canada.

British Columbia

Cominco Limited's new Kivcet lead smelter is on schedule for start-up in early 1997. The new technology will replace the existing sinter and blast furnace process, reduce emissions, and increase capacity by 20 000 t to 120 000 t/y.

Redfern Resources completed a positive feasibility study at its copper-lead-zinc-gold-silver Tulsequah Chief property in northwestern British Columbia, 70 km northeast of Juneau, Alaska. The study supports the development of an underground mine producing 5000 t/y of lead in concentrate.

Yukon

Anvil Range Mining Corporation closed the Faro mine in December 1996, due partly to low metal prices and lower-than-expected grades and metal recoveries. Milling of stockpiled material was expected to continue for three months after mine closure. The mine was closed and placed into receivership in 1993; it did not re-open until August 1995 when Anvil Range purchased the assets. Located about 170 km northeast of Whitehorse, the Faro operation was one of the largest lead-zinc mines in the world with an annual production capacity of 98 000 t of lead in concentrate.

Cominco continued orebody definition and related studies toward a production decision on its Kudz Ze Kayah property located 115 km southeast of Ross River. Preliminary work indicates the possibility of a new open-pit mine being commissioned early in the next century with a rated capacity of 5000 t/y of lead in concentrate. Reserves are estimated at 11.3 Mt grading 1.5% lead, 5.9% zinc, 0.9% copper, 133 g/t silver and 1.3 g/t gold.

Westmin Resources Limited (60%) and Atna Resources (40%) continued drilling to expand the existing polymetallic deposit that was discovered on the companies' Wolverine Lake property in 1995. Drilling during 1996 intersected additional mineralization down-dip of the existing partially defined resource of 3 Mt grading 1.43% lead, 12.99% zinc, 1.27% copper, 350.2 g/t silver and 1.87 g/t gold. Its mineralization is reported to be similar to Cominco's Kudz Ze Kayah discovery, which is located 20 km to the east.

Northwest Territories

San Andreas Resources continued evaluation of its Prairie Creek lead-zinc-silver project in the Nahanni River area. A geological reserve of 6.2 Mt grading 14% lead, 12% zinc, 218 g/t silver and 0.4% copper has been identified with the possibility of the existing 1200-t/d mill producing 30 000 t/y of lead in concentrate.

Quebec

Nova Pb Inc. initiated plans to double the smelting capacity at its secondary lead facility in Sainte-Catherine. The addition of a second rotary kiln is expected to increase its lead output to 80 000 t/y by the year 2000. The new smelter is scheduled to come on stream in December 1997.

New Brunswick

Noranda Mining and Exploration Inc. cut its output of lead in concentrate by about 10 000 t at its Brunswick mine because seismic activity affected its ability to produce at planned levels. Refined metal production at the company's Belledune smelter is expected to be unaffected and to possibly increase during 1996 because of the throughput of higher-grade concentrates or the purchase of additional material. In December 1996, Heath Steele Mines, a division of Noranda, suspended operations for up to two weeks in order to carry out an independent assessment of its operations following two accidents.

Breakwater Resources obtained permitting approval and financing for re-opening the underground Caribou and open-pit Restigouche mines in New Brunswick. The upgraded mill facility will be able to produce separate lead and zinc concentrates. The mines are expected to produce 70 000 t/y of lead in concentrate and to come on stream during the second half of 1997. Their estimated mine life is reported at 10 years with reserves of 13 Mt grading 3.52% lead, 8.18% zinc, 0.38% copper, 102 g/t silver and 1.4 g/t gold at Caribou, and 1.6 Mt grading 5.38% lead, 6.81% zinc, 122 g/t silver and 1.1 g/t gold at Restigouche.

WORLD DEVELOPMENTS

World mine production of lead totalled 2 825 000 t in 1996, a 2.8% increase from 1995. Strong growth in output in Canada (22%), Australia (13%), the United States (9%) and Peru (4%) offset the 13% decline in China. Despite the limited increase in production in 1996, lead mine capacity expanded by a net 56 000 t with 10 openings, re-openings and expansions totalling 108 000 t compared to 5 closures totalling 52 000 t. Of the new capacity, 45 000 t were added when a new mine was commissioned to replace exhausted reserves at the Aznalcollar operation.

World lead metal production fell to 5 585 000 t in 1996, a 31 000-t decrease from 1995. Substantial production losses in China (-13%), the Republic of Korea (-21%) and Kazakstan (-14%) were partially offset by a 1.4% growth in Western World production, largely from Canada, Europe and the United States. Secondary lead production again surpassed primary production in 1996 due to the continuing scarcity of lead concentrates and the increase in secondary smelter utilization rates with improving lead prices. With world lead consumption of 5 704 000 t being 119 t higher than metal production, the draw-down of lead metal stocks continued during the year.

Primary Production

Asia/Oceania

Pasminco Ltd. opened the new Potosi deposit near Broken Hill in New South Wales in early 1996. The open-pit mine will produce 3500 t/y of lead in concentrate to supplement Broken Hill's underground operations. Potosi has a reserve of 1.1 Mt grading 9% zinc and 2% lead. Pasminco has also planned to complete an environmental upgrade at its Cockle Creek ISF lead-zinc smelter that will also increase its refined lead capacity by 13 000 t to 48 000 t/y. In addition, the company began a feasibility study to double capacity at the Elura mine, which currently produces 46 000 t/y of lead in concentrate.

Broken Hill Proprietary Company Limited (BHP) began construction of a mine at the 40-Mt Cannington deposit in Queensland and associated concentrate-handling facilities at Townsville on the Queensland coast. The mine is expected to come on stream in 1997 and will produce 170 000 t/y of lead in concentrate at full capacity. Cannington has proven, probable and possible reserves of 45 Mt grading 11.1% lead, 4.4% zinc and 500 g/t silver.

RTZ Corporation PLC and CRA Ltd.'s 180-Mt Century zinc-lead-silver deposit requires community, environmental and board approval before mine development can begin. The open-pit mine, which is also located in Queensland, is expected to come on stream in early 1998 and to produce 41 000 t/y of lead in concentrate. The two companies and Pasminco also continued to assess the feasibility of the Dugald River deposit where reserves are reported at 34 Mt averaging 1.5% lead, 10.2% zinc and 36 g/t silver.

MIM Holdings Ltd. committed to undertake a US$17 million feasibility study on its George Fisher (formerly Hilton North) deposit. The exploration, metallurgical and mine design work is expected to be completed in early 1997 to enable a production decision. The deposit, located 22 km north of Mt. Isa, has an indicated reserve of 68 Mt grading 12.5% zinc, 5.8% lead and 92 g/t silver; it is expected to replace depleting reserves at Mt. Isa in 2000.

Western Metals Ltd. and Acacia Resources completed feasibility work at the Blendvale zinc-lead deposit in Western Australia. A new mine producing 33 000 t/y of lead in concentrate may be possible with start-up in 1998/99.

Metal production in Kazakstan continued to decline as financial difficulties and inadequate access to feed resulted in closures and reduced output.

In the Altai region of Russia, the 9000-t/y Zolotushinsky mine closed due to ore reserve depletion, while the Rbtsovskoye mine expanded production by 15 000 t/y through modernization.

In China, the state-owned Shaoguan ISF smelter in Guangdong Province completed a 30 000-t/y expansion with the installation of a second plant. The operation can now produce 70 000 t/y of refined lead.

Americas

In the United States, Kennecott Minerals Company and Hecla Mining Company re-opened the polymetallic Greens Creek mine with a production capacity of 17 000 t/y of lead in concentrate. The operation was closed in April 1993 due to low silver, gold and base-metal prices. Subsequent drilling discovered a new higher-grade orebody comprising 2 Mt grading 13% zinc, 6% lead, 1166 g/t silver and 9.3 g/t gold.

Cominco discovered a new zone of lead-zinc-silver mineralization at depth and north of the Aquallak deposit that was found in 1995 at the company's Red Dog mine in Alaska. Aquallak contains an inferred resource of 76 Mt averaging 13.7% zinc, 3.6% lead and 66 g/t silver. It was reported that its annual lead-in-concentrate production would increase by 18% to 100 000 t in 1996.

Asarco Incorporated permanently closed its ageing 70 000-t/y primary refinery in Omaha, Nebraska, in May.

The U.S. Defense Logistics Agency sold about 30 000 t of lead from its strategic stockpile in fiscal year 1996, which ended September 30, 1996. The amount authorized for sale was 54 000 t, and the same amount is authorized for fiscal year 1997. It is estimated that the stockpile contained about 350 000 t at the end of the 1996 calendar year.

Empresa Minera Especial Iscaycruz opened the Iscaycruz zinc-lead mine in Peru during the third quarter at a capital cost of US$53 million. At full production the mine will produce 5000 t/y of lead in concentrate. Reserves are reported to be 2.8 Mt grading 2.3% lead, 21% zinc, 0.13% copper and 42 g/t silver.

Europe

Metaleurop S.A. closed its 95 000-t/y Nordenham lead blast furnace and commissioned a new 90 000-t/y Isasmelt plant that can process secondary material in March. Its refinery capacity remains unchanged at 120 000 t/y of lead. The new plant was temporarily closed for technical modifications to enhance its performance during August.

Arcon International commissioned the Galmoy lead-zinc mine in Ireland during the fourth quarter of 1996 at a capital cost of US$84 million. The mine will produce 6000 t/y of lead in concentrate with reserves of 6.3 Mt grading 1.1% lead and 11.3% zinc.

Ivernia West Plc submitted a planning application in early January 1996 for its Lisheen project in County Tipperary, Ireland. Ivernia West hopes to bring Lisheen on stream in 1998. At full capacity the mine would produce 25 000 t/y of lead in concentrate.

In Spain, Andalusa de Piritas S.A. opened the Los Frailes polymetallic deposit to replace exhausted reserves at the Aznalcollar mine. When in full production in 1997 the new mine will produce 45 000 t/y of lead in concentrate, an increase of 25 000 t/y over production at Aznalcollar.

TVX Gold Inc. of Canada began modernization of the Stratonio and Olympias lead-zinc mines in Greece. The mine upgrades include the installation of a gold extraction process and environmental rehabilitation. The mines will produce 27 000 t/y of lead in concentrate from reserves of 14 Mt averaging 3.6% lead, 4.8% zinc, 6.3 g/t gold and 100 g/t silver.

Africa

Gold Fields Namibia Ltd. commissioned a new 30 000-t/y Ausmelt smelter to replace the company's lead blast furnace in Tsumeb, Namibia. Start-up and production at the new plant, which can process primary and secondary feed, has been hindered by labour disputes.

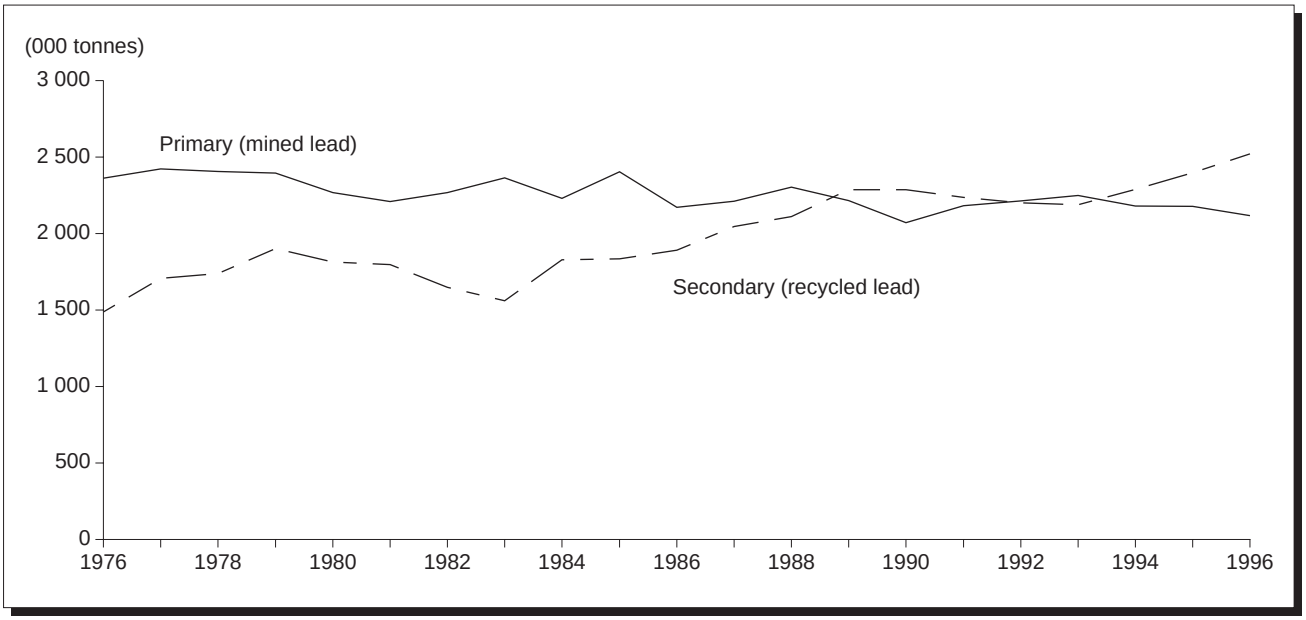
In Morocco, Cie. Miniére de Touissit re-opened the Djebel Aouam zinc-lead-silver mine in May. The mine, which was closed in 1993, will increase output by almost 40% and produce 18 000 t/y of lead in concentrate. Reserves are reported at 2.5 Mt averaging 6.5% lead, 1.5% zinc and 109 g/t silver.

Secondary Production/Recycling

Lead is one of the most recycled nonferrous metals in the world. Secondary production (from recycled materials) has risen steadily and surpassed primary output for the first time in 1989, and accounted for 55% of world metal production in 1996 (Figure 1). This growth reflects the favourable economic conditions associated with lead recycling and the fact that lead retains its physical and chemical properties when recycled. As lead is used worldwide, scrap lead has become a readily renewable resource to which countries without lead mines have access.

In the United States, the cold winter of 1996, preceded by a hot summer in 1995, resulted in a larger number of battery failures and increased replacement battery demand which, in combination with maintenance shut-downs during the summer of 1996, contributed to a surplus of scrap batteries during the third quarter of the year in North America.

Figure 1
World Lead Metal Production,[1] 1976-96



Source: International Lead and Zinc Study Group.
[1] Excludes Eastern European and socialist countries.

RSR Corporation installed a second electric arc furnace and increased capacity by 24 000 t to 110 000 t/y at its secondary lead plant in Indianapolis. A 24 000-t/y expansion is also expected to be completed by the end of the year at the company's 71 000-t/y plant in Middletown, New York.

East Penn Manufacturing Co. Inc. lost 400 000 new batteries when a storage facility's roof collapsed because of heavy snowfall in January.

In China, the Xuzhou Nonferrous Alloy Factory also expanded production from 40 000 t/y to 100 000 t/y at its secondary lead plant in the Jiangsu Province.

Shanghai Jingao Chemical Industry and its Japanese partners continued construction of a 12 000-t/y secondary lead smelter in Shanghai. The facility will also have the capacity to produce 10 000 t/y of lead oxide, which will be shipped to Japan for use in the manufacture of glass for cathode ray tubes.

In Japan, Hosokura Smelting Co. Ltd. switched its 22 000-t/y lead smelter/refinery in Miyagi prefecture from primary to secondary feed with no change in capacity in March. Kamioka Mining and Smelting Co. Ltd. did a similar switch with no change in capacity at its 34 000-t/y lead smelter/refinery in Gifu prefecture in 1995.

In Europe, scrap supplies tightened as excess smelting capacity led to enhanced competition for scrap in some regions, particularly Germany.

Union Minière SA plans to invest US$151 million to build a new Isasmelt lead smelter at its Hoboken plant in Belgium. When the new smelter comes on stream in 1998, it will have a capacity to produce 60 000-70 000 t/y of refined lead, mostly from secondary materials.

Other planned secondary smelter projects in France, Greece, Poland, Romania, Russia, Malaysia and the United States are expected to supply an additional 94 000 t/y of secondary lead capacity by 1999.

CONSUMPTION AND USES

Lead is a dense, bluish-white metal whose physical and chemical properties find application in a variety of uses in the manufacturing, construction and chemical industries.

On the basis of preliminary statistics from the ILZSG, Western World lead consumption rose for the third consecutive year to a record level of 5 090 000 t in 1996, a 2.2% increase from the 1995 level. In Japan, demand declined for the fifth consecutive year by 1.2% from 1995. In contrast, the United States, the Republic of Korea and the Czech Republic boasted the strongest growth of about 6%, 6% and 30% respectively. The substantial growth in the Czech Republic is largely due to the rapid development of the battery and automobile industry. European Union countries and the United States

each accounted for 28% of world lead demand while Japan, China and Korea each consumed over 5%.

Lead-acid batteries constitute the largest market for lead, representing about 70% of total usage in the Western World. In the United States, battery manufacturing constitutes about 80% of total lead demand. The largest market for batteries, representing about 80% of lead used in the industry, is the automotive sector. The average automobile battery contains about 10 kg of lead. Some factors that influence lead demand in the automotive sector are new vehicle production, trends and age in vehicle population, and climatic conditions. Hotter summers and colder winters in North America and Europe during the last few years have contributed to a greater number of battery failures and increased replacement battery demand.

A potential growth area for the lead-acid battery is in energy storage facilities for utilities. These are designed to supplement existing generators during the peak morning and evening hours without drawing on other sources or building new power plants. In addition, the growth in cellular telephone networks has increased the demand for lead-acid batteries for stand-by power applications in the telecommunications industry.

Electric cars may provide the greatest future growth in demand for lead-acid batteries. In 1990, California approved stringent automobile emission standards that will require, by 1998, 2% of new cars sold in the state to be zero-emission or electric-powered vehicles (ZEVs), with the figure increasing to 10% by the year 2003. It has been estimated that this would amount to 20 000 electric vehicles by 1998. It was reported that similar requirements have been adopted by nine northeastern states which, when combined with California, account for about one third of the total U.S. new car and light truck market. The "Big Three" automobile producers (General Motors Corp., Ford Motor Corp. and Chrysler Corp.) are experimenting with different battery prototypes but are concerned that ZEVs will not be commercially viable in sufficient quantities before the year 2000. Studies by California and New York State in 1995 support the view that, based on current technology, the ZEVs may be too expensive to capture a sufficient portion of the market to meet current targets. It was also reported that the Big Three auto producers would have the collective capacity to produce only 14 000 vehicles per year by 1998 and that California is reconsidering its standard.

In December 1996, General Motors Corp. (G.M.) became the first major motor manufacturer to launch an electric vehicle that was developed from the ground up. G.M.'s new "Impact" electric car is currently powered by a lead-acid battery weighing about 270 kg. The vehicle can reportedly travel about 120 km before recharging is required, and it can be 50% recharged in a few minutes and fully charged in 3.5 hours.

This new demand for lead will also increase the incentive to develop a longer-lasting, more efficient and cost-competitive substitute for the lead-acid battery. The Big Three automakers and the Electric Power Research Institute are jointly researching nickel-metal hydride, lithium-ion and polymer batteries. Nissan is developing a future electric vehicle to be powered by a nickel-cadmium battery that is expected to achieve full charge in 15 minutes. Isuzu Motors Ltd. and Fuji Electrochemical Co., Ltd. expect to market a new revolutionary battery made of activated carbon and diluted sulphuric acid that recharges faster and produces more power than conventional batteries. Also competing are Kansai Electric Power Co., Inc. and Japan Storage Battery Co., Ltd., who are developing a new nickel-zinc battery. Other candidates include a zinc-based slurry developed by Luz International that generates energy when combined with oxygen and that can be recharged in minutes by adding fresh slurry. There is also the Australian-designed vanadium redox battery that is reported to be recyclable, more efficient and longer lasting, and which requires one eighth the time to recharge compared to a lead-acid cell. The Canada Centre for Mineral and Energy Technology (CANMET) of Natural Resources Canada is participating with industry in the development of a lithium-aluminum-iron sulphide battery and a sodium-sulphur battery.

Some experts believe that the lead-acid battery is the only technology that can be counted on to meet new electric vehicle demand in the short to medium term. Compared with other battery systems, these batteries are easily recycled, relatively inexpensive and considered to be free from safety concerns.

In March 1992, an Advanced Lead-Acid Battery Consortium was formed to develop an improved lead-acid battery for the electric vehicle. The consortium currently has 37 members representing lead producers, battery companies and an automotive manufacturer. The membership is from 11 countries and Canadian sponsors are Cominco and Noranda.

The "Horizon" lead-acid battery produced by Electrosource Inc. and BDM Technology Inc. is reported to be one of the most promising new technological developments. The battery has plates made of lead wire co-extruded in a woven pattern on a fibreglass core. Therefore, it is lighter than traditional batteries with lead cast plates and reportedly lasts three times longer, can be recharged in minutes, and offers more power.

Hyundai Electronics Industries has developed a new, sealed, rechargeable lead-acid battery for use in personal computers and cellular phones. The new battery has the same capacity as nickel-cadmium batteries but is cheaper.

The second largest use of lead is in pigments and compounds, accounting for 11% of Western World

demand in 1995. The principal uses are in PVC stabilizers, which prevent degradation during processing or from ultraviolet radiation; in colour pigments; and in the manufacture of glass, including crystal, light bulbs, insulators and television/computer screens. While lead is still used for some specific paint applications, its general use in this application has declined significantly due to the potential risk involved in exposure to weathered or flaked paint.

Until the mid-1970s, the production of lead additives for gasoline, including tetraethyl lead, constituted one of the most important markets for the metal. However, with the adoption of environmental regulations that have either prohibited or severely restricted the use of such additives, the demand for lead in this application has declined dramatically. In Canada, lead was eliminated through legislation at the end of 1990 as an additive in gasoline for general consumption.

Lead is alloyed with tin in the production of solder used in both the electronics and plumbing sectors. In the plumbing industry, the demand for lead has decreased primarily as a result of the increasing use of plastic piping. Where metal systems are still used for potable water systems, new regulations that have been adopted or are being considered will reduce the amount of lead in solder. In the electronics field, the move to miniaturization, combined with the replacement of printed circuit boards, has also reduced the demand for lead in solder.

Lead is also used with tin in foil for wine bottle capsules. However, this practice is being phased out in many countries because of environmental and health concerns. The European Union banned the use of tin-lead capsules as of January 1, 1993. Aluminum, plastics (PVC) and tin-based products have been used to replace lead foil.

Other important applications of both lead metal and lead alloys include: the production of free machining steel and brass, rolled sheet and strip for roofing applications, power and communication cable sheathing, especially for underground or submarine environments, and as a sound barrier material in construction.

Lead's high resistance to gamma radiation and X rays makes it the preferred metal for shielding around X-ray equipment and at nuclear installations.

Potential new uses for lead include: nuclear waste disposal applications; liquid metal (magnetohydrodynamics), a method of generating electricity by passing an electrically conducting fluid through a magnetic field; additives to extend the life of asphalt; barriers or shields against radon gas and electromagnetic fields; and as a damper to protect buildings from vibrations during earthquakes.

New uses for lead-acid batteries are also being developed. In Canada, Black & Decker Canada Inc. introduced a new cordless, electric lawn-mower during 1992. The fluidless lead battery can operate for about one hour before running out of power, regains 80% of its power after 3-4 hours of recharging, and can be fully recharged overnight. The new mower was marketed in the United States in 1993.

A new high-tech use for lead was developed in 1992. U.S. and Russian scientists successfully focused cold neutrons into a beam that can penetrate substances and show where contaminants lie in a silicon semiconductor, or discern how quickly atoms diffuse through aerospace alloys. The focused beam was created with a lens constructed of lead-silica glass. It was also reported that companies using advanced materials will benefit the most from cold-neutron focusing.

MARKETS, PRICES AND STOCKS

During 1996, the LME price for lead continued to rise in the first quarter and peaked at US40.9¢/lb in March as LME stocks were drawn down in response to a supply deficit. Increased net exports from China combined with fund selling contributed to rising LME stocks and downward pressure on the price during the second half of the year. The price subsequently fell to a year low of 29.9¢/lb in mid-December, before receiving support to close the year at 31.8¢/lb.

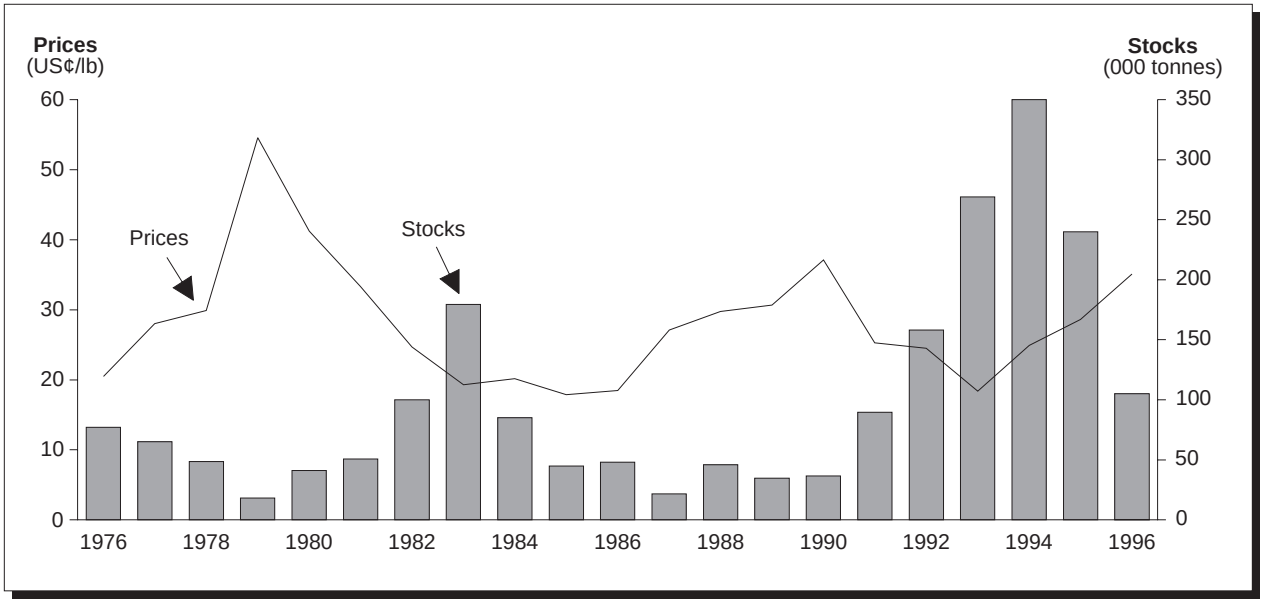
Although Western World mine production of lead increased by 8%, metal output rose by only 1.4%. On a world basis, metal production declined by 0.5% during 1996, according to preliminary ILZSG data. A rise in net imports from Eastern countries, primarily China, and continued sales from the U.S. defense stockpile were insufficient to meet growing Western World demand, which increased by 2.2% in 1996.

At the end of 1995, total lead stocks stood at 444 000 t, including 132 000 t on the LME. Although net imports from Eastern countries grew by 32%, reported consumer, merchant and LME stocks declined by 10%, 25% and 13% respectively in 1996. Preliminary ILZSG figures also indicate that producer stocks rose 26% during the same period. Total lead stocks stood at 422 000 t at the end of 1996.

INTERNATIONAL ORGANIZATIONS

The International Lead and Zinc Study Group was formed in 1959 to improve market information and to provide opportunities for regular intergovernmental consultations on lead and zinc markets. Particular attention is given to providing regular and frequent information on supply and demand and on the outlook for lead and zinc. The Study Group is headquartered in London, England. Its membership includes most major lead and zinc producing and consuming countries.

Figure 2
Lead Prices[1] and Stocks,[2] 1976-96



Source: International Lead and Zinc Study Group.
[1] Annual average London Metal Exchange (LME) prices. [2] Annual average of LME month-end stocks.

The 41st Session of the Study Group was held in Geneva, Switzerland, in October 1996 and was attended by representatives of 28 member countries as well as by observers from several nations and organizations. The 1996 session examined statistical trends, current new mine and smelter projects, trade patterns, changes to the U.S. Strategic Stockpile, and certain environmental issues. The recent Basel Decision to ban exports of hazardous wastes destined for recycling from OECD to non-OECD countries and the industry's response to an OECD Ministerial Declaration for Lead were major topics of discussion.

HEALTH, SAFETY AND THE ENVIRONMENT

The Organization for Economic Co-operation and Development (OECD) published *Risk Reduction Monograph No. 1: Lead* in 1993, which documents lead's commercial life cycle, exposure, releases and control mechanisms in place in various OECD countries. The report revealed lead's high recycling rate (over 50% of refined lead production is derived from scrap). The document also showed how lead is being used more than ever before, while the average levels of lead in air, food and blood in the general population have declined to below national levels of concern in all countries that monitor lead in the environment. Declines in exposure are partly a result of the phase-out of dissipative uses of lead while the overall increase in lead consumption reflects strong demand for batteries and other non-dissipative uses.

In September 1994, Canada hosted an OECD Workshop on Lead Products as part of a process to determine if there were concerns that require international solutions. Approximately 200 experts from 14 countries participated in the workshop in Toronto and agreed that most concerns were not transboundary or international in nature and, for those that were, they could be resolved through national, regional or bilateral initiatives or through existing international institutions (e.g., the International Standards Organization).

In February 1996, OECD Environment Ministers adopted a Ministerial Declaration for Lead that recognizes the value of voluntary industry initiatives to reduce risks from exposure to lead. The Declaration also calls on OECD countries to take action, if they consider it to be necessary, and provides examples of possible exposures that could be considered for action depending on national circumstances.

Lead producers in Canada (Cominco and Noranda) and other OECD countries responded favourably to the Ministerial Declaration and have voluntarily established an International Lead Management Centre (ILMC). This industry-funded non-profit organization with public reporting is designed to assist countries and others to resolve concerns about lead. Activities will range from the identification of country problems and possible solutions to technology-transfer opportunities. Mexico has offered to be a pilot country for the ILMC. Discussions between the ILMC and Mexico have identified a number of possible opportunities for joint cooperation, including ways

to reduce occupational risks from exposure to lead in battery recycling and manufacturing facilities.

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal came into force in May 1992 and, as of October 1996, more than 100 countries had ratified the Convention with the United States being the most notable exception. The Convention is an environmental agreement designed to restrict the transboundary movement of hazardous wastes to protect countries (particularly developing countries) that may not have the capability and technology to properly manage the waste.

The Convention controls the transboundary movement of hazardous wastes via a movement control regime of "prior informed written consent." Exporting countries are required to formally notify the importing state of their intention to export a particular hazardous waste. Exportation can only occur following written acknowledgement and consent by the importing country. A difficulty identified within the Convention has been the ambiguity of exactly which materials would be subject to the Convention. The term "waste" is often defined differently depending on the country.

While "final disposal" operations are identified separately from resource recovery, recycling, reclamation, direct re-use or alternative use operations, both are considered equivalent for transboundary movement control purposes under the Convention. Many non-OECD countries maintain that they do not possess the required infrastructure or technologies to allow the environmentally sound management of hazardous wastes whether destined for final disposal or for recycling operations. Accordingly, many non-OECD countries insist that the only means of controlling the movement of hazardous wastes is via a movement "ban" from developed to developing countries.

In September 1995, at the third Conference of Parties (COP), countries adopted an amendment decision to the Convention which, upon receiving sufficient ratifications to enter into force, will immediately ban, for ratifying countries, all movements of hazardous wastes from countries listed in Annex VII and destined for final disposal in countries not listed in Annex VII. In addition, ratifying countries listed in Annex VII will also have to ban the export of hazardous wastes destined for recovery operations in countries not listed in Annex VII by December 31, 1997. Annex VII countries include Parties and other States that are members of the OECD, the European Union and Liechtenstein. Monaco and Israel have recently applied to be part of Annex VII.

Since the third COP, the Technical Working Group of the Basel Convention has provisionally compiled two lists of recyclable materials: List A recyclables that will be considered as being subject to bans, and List B recyclables that will be considered to be beyond the scope of the Basel Convention. These lists will be presented to Parties at the fourth COP, scheduled for October 1997, for adoption into the Convention.

The following types of lead and lead compounds have provisionally been agreed to be listed in List A and, upon the coming into force of the "ban" amendment, will be subject to the movement ban:

- waste lead or waste lead alloys in a dispersible form;
- wastes having lead as a contaminant or constituent excluding waste lead in massive form; and
- lead-acid batteries, whole or crushed.

The following lead scrap and lead alloys have provisionally been agreed to be listed in List B and would not normally be considered to be subject to the Basel Convention:

- clean, uncontaminated lead scrap, including alloys, in bulk finished form.

OUTLOOK

Western World lead consumption grew by about 2.2% in 1996, and an equivalent increase is expected in 1997. Growth in demand is expected to slow in North America and Western Europe, but to continue to be strong in Asia and to possibly strengthen in Japan where consumption fell for the fifth consecutive year during 1996. The recent increase in lead demand is partially related to weather patterns. As previously noted, hotter summers and colder winters in North America and Europe during the last few years have contributed to a greater number of battery failures and increased replacement battery demand. Lead demand may soften in the short to medium term as fewer batteries may need replacement, and if temperatures return to normal levels. In the longer term, lead demand is expected to maintain an average growth rate of 1.0-1.5%/y into the early part of the next century. The battery sector will account for most of the growth, with the newly industrialized nations of Southeast Asia expected to record the most rapid growth.

During 1997, growth in Western World demand is expected to be met, in part, by increased metal production, net imports from Eastern countries, and continued sales from U.S. Defense stockpiles. At present, inventories are low and LME stocks are predicted to continue to be drawn down in the short term. However, as tightness in the concentrate market eases with new or re-opened mines coming on stream, treatment charges are expected to rise along with toll smelting opportunities and net exports from Eastern countries during the latter half of 1997 and into 1998.

In the short term, prices are forecast to range between 28¢ and 34¢/lb as supplies and inventories remain tight. However, prices could take a downturn if demand softens as the result of a weak replacement battery market. Greater secondary output and primary production (from new and re-opened mines) will likely surpass demand and place minor downward pressure on prices in the medium to long term. The price of lead is expected to range between 23¢ and 30¢/lb, in constant 1995 dollars, in the longer term.

Canadian mine output of lead is forecast to fall to 165 000 t in 1997. The loss in output from the suspension of operations at Faro will be partially offset by the re-opening of the Caribou and Restigouche mines. In the long term, it is expected that production will rise as new mines, such as Cominco's Kudz Ze Kayah project, and previously closed operations (e.g., Sa Dena Hes) come on stream. However, output is expected to fall early in the next century unless additional reserves are found at existing mines or through new discoveries.

Notes: (1) For definitions and valuation of mineral production, shipments and trade, please refer to Chapter 70. (2) Information in this review was current as of January 31, 1997.

TARIFFS

Item No.	Description	Canada			United States	EU	Japan[1]
		MFN	GPT	USA	Canada[1]	MFN	GATT
2607.00	Lead ores and concentrates	Free	Free	Free	0.1¢/kg on Pb	Free	Free
78.01	Unwrought lead						
7801.10	Refined lead						
7801.10.10	Pig and block	Free	Free	Free	0.3% on Pb	2.5%	5.88 yen/kg
7801.10.90	Other	2.9%	Free	1%	0.3% on Pb	2.5%	5.88 yen/kg
7801.91	Containing by weight antimony as the principal other element						
7801.91.10	Lead-antimony-tin alloys	2.9%	Free	0.6%	0.3% on Pb	2.9%	5%
7801.91.90	Other	2.9%	Free	1%	0.3% on Pb	2.9%	5%
7801.99	Other						
7801.99.10	Lead bullion	2.9%	Free	1%	0.3% on Pb	Free	3.6-4.7%
7801.99.20	Lead alloys	2.9%	Free	1%	0.3% on Pb	2.9%	4% or 6.6 yen/kg, whichever is greater
7801.99.90	Other	2.9%	Free	1%	0.3% on Pb	2.5%	5.88 yen/kg
7802.00	Lead waste and scrap	Free	Free	Free	Free	Free	2.8%
7803.00	Lead bars, rods, profiles and wire						
7803.00.10	Bars and rods, not alloyed	3.2%	Free	0.4%	0.1%	6.2%	4.7%
7803.00.20	Bars and rods, of lead-antimony-tin alloys	4.5%	Free	0.6%	0.1%	6.2%	4.7%
7803.00.30	Bars and rods, of other alloys; profiles and wire	5.9%	Free	1%	0.1%	6.2%	4.7%
7804.11	Lead sheets, strip and foil of a thickness (excluding any backing) not exceeding 0.2 mm						
7804.11.10	Of lead-tin alloys, whether or not containing antimony	Free	Free	Free	0.2%	6.2%	5.1%
7804.11.90	Other	5.9%	Free	1%	0.2%	6.2%	5.1%
7804.19	Other						
7804.19.10	Not alloyed, of a thickness exceeding 0.2 mm but not exceeding 5 mm and a width exceeding 600 mm	3.2%	Free	0.4%	0.3%	6.2%	6.1%
7804.19.20	Of lead-antimony-tin alloys	4.5%	Free	0.6%	0.3%	6.2%	6.1%
7804.20	Powders and flakes						
7804.20.10	Powders, not alloyed	3.2%	Free	0.4%	1.1%	0.9%	5.1%
7804.20.20	Alloyed powders; flakes	5.9%	Free	1%	1.1%	0.9%	5.1%

Sources: Customs Tariff, effective January 1997, Revenue Canada; Harmonized Tariff Schedule of the United States, 1997; The Bulletin International des Douanes," Journal Number 14 (18th edition), European Union, 1995-1996, "Conventional" column; Customs Tariff Schedules of Japan, 1996.
[1] GATT rate is shown; lower tariff rates may apply circumstantially.

TABLE 1. CANADA, LEAD PRODUCTION AND TRADE, 1995 AND 1996, AND CONSUMPTION, 1994 AND 1995

Item No.		1995		1996p	
		(tonnes)	($000)	(tonnes)	($000)
SHIPMENTS[1]					
	New Brunswick	86 417	74 751	73 733	78 378
	British Columbia	59 282	51 279	53 431	56 798
	Yukon	27 068	23 414	90 019	95 691
	Northwest Territories	31 459	27 212	28 899	30 720
	Total	204 227	176 656	246 083	261 586
	Mine output[2]	210 876	. .	256 667	. .
	Refined production				
	Primary	178 019r	. .	194 031	. .
	Secondary	103 372r	. .	115 348	. .
	Total	281 391r	. .	309 379	. .
EXPORTS					
2607.00	Lead ores and concentrates				
	South Korea	27 287	13 860	46 688	38 919
	Germany	16 187	10 901	26 409	20 591
	United States	159r	621r	1 819	14 294
	Belgium	2 085	1 796	14 421	13 786
	Sweden	10 565	9 100	10 136	10 537
	Australia	11 946	6 483	15 054	9 179
	Italy	1 190	792	9 515	8 963
	Japan	5 203	1 848	6 408	6 184
	Other countries	4 477	3 028	12 357	7 565
	Total	79 099r	48 429r	142 807	130 018
2607.00.20	Lead content of lead ores and concentrates	69 719r	39 134r	139 942	85 869
2603.00.20	Lead content of copper ores and concentrates	230	148	948	426
2608.00.20	Lead content of zinc ores and concentrates	20 305r	7 502r	39 492	13 420
2616.10.20	Lead content of silver ores and concentrates	–	–	289	178
7801.10	Refined lead, unwrought				
	United States	124 615	112 790	139 921	152 423
	Thailand	2 168	1 768	4 313	4 934
	Malaysia	5 003	4 224	3 371	4 057
	United Kingdom	1 578	1 383	2 846	3 431
	Philippines	1 991	1 537	2 776	3 178
	Indonesia	1 200	1 056	2 229	2 555
	Other countries	2 966r	2 194r	3 448	4 121
	Total	139 521r	124 952r	158 904	174 699
7801.91	Lead, unwrought, containing by weight antimony as the principal other element	11 266	10 900	7 676	8 236
7801.99	Lead, unwrought, n.e.s.	58 130	57 568	47 632	57 138
7802.00	Lead waste and scrap				
	United States	7 783	3 842	9 589	5 450
	Hong Kong	–	–	17	6
	Other countries	89	60	–	–
	Total	7 872	3 902	9 606	5 456
7803.00	Lead bars, rods, profiles and wire				
	United States	633	1 180	528	1 008
	Taiwan	–	–	17	42
	Other countries	5	13	11	28
	Total	638	1 193	556	1 078

TABLE 1 (cont'd)

Item No.		1995		1996p	
		(tonnes)	($000)	(tonnes)	($000)
EXPORTS (cont'd)					
7804.11	Lead sheets, strip and foil of a thickness (excluding any backing) <0.2 mm	220	367	35	67
7804.19	Lead plates, sheet, strip and foil, n.e.s.	99	161	271	425
7804.20	Lead powders and flakes	–	–	4	32
7805.00	Lead tubes, pipes and tube or pipe fittings (i.e., couplings, elbows, sleeves)	5	21	12	27
7806.00	Other articles of lead, n.e.s.				
	United States	..	4 562	..	4 097
	Japan	..	–	..	135
	France	–	–	..	31
	United Kingdom	..	–	..	9
	Australia	..	3	..	8
	Other countries	..	66	..	14
	Total	..	4 631	..	4 294
IMPORTS[3]					
2607.00	Lead ores and concentrates				
	Peru	7 952	7 475	23 540	30 222
	United States	20 565	11 642	24 809	10 725
	Mexico	2 608	3 551	6 247	9 810
	South Africa	4 396	2 784	10 753	8 495
	Morocco	4 171	3 283	3 254	2 410
	Bolivia	–	–	1 184	1 865
	Russia	–	–	102	43
	Chile	3 672	2 756	–	–
	Total	43 364	31 491	69 889	63 570
2607.00.00.20	Lead content of lead ores and concentrates	43 335	26 267	69 342	38 805
2603.00.00.20	Lead content of copper ores and concentrates	113	35	228	109
2608.00.00.20	Lead content of zinc ores and concentrates	12 692	12 944	10 620	15 692
2616.10.00.20	Lead content of silver ores and concentrates	10 969	6 524	9 535	7 994
7801.10.10	Refined lead, unwrought, pig and block	3 115	2 789	2 949	3 294
7801.10.90	Refined lead, unwrought, other	128	129	556	646
7801.91	Lead, unwrought, containing by weight antimony as the principal other element	844	762	3 862	4 363
7801.99	Lead, unwrought, n.e.s.	781	777	20 785	50 459
7802.00	Lead waste and scrap				
	United States	95 705	22 142	76 858	13 655
	Cuba	–	–	112	61
	Other countries	–	–	22	17
	Total	95 705	22 142	76 992	13 733
7803.00	Lead bars, rods, profiles and wire				
	United States	210	349	239	410
	Japan	–	–	3	4
	Other countries	47	74	4	7
	Total	257	423	246	421
7804.11	Lead sheets, strip and foil of a thickness (excluding any backing) <0.2 mm	209	366	237	407
7804.19	Lead plates, sheet, strip and foil, n.e.s.	164	243	101	176
7804.20	Lead powders and flakes	101	155	82	137
7805.00	Lead tubes, pipe and tube or pipe fittings (i.e., couplings, elbows, sleeves)	10	15	1	4

TABLE 1 (cont'd)

Item No.		1995		1996p	
		(tonnes)	($000)	(tonnes)	($000)
IMPORTS (cont'd)					
7806.00	Other articles of lead				
	United States	2 975	4 439r	2 683	4 050
	Germany	32	50	98	113
	Netherlands	3	5	64	113
	Japan	86	73	93	78
	Mexico	12	21	21	37
	Other countries	22	42	33	57
	Total	3 130	4 630r	2 992	4 448

	1994			1995		
	Primary	Secondary[5]	Total	Primary	Secondary[5]	Total
	(tonnes)					
CONSUMPTION[4]						
Lead used for or in the production of:						
Antimonial lead	x	x	35 678	x	x	34 080
Batteries and battery oxides	24 342	11 794	36 136	19 292	16 142	35 434
Chemical uses; white lead, red lead, litharge, tetraethyl lead, etc.	x	x	7 565	x	x	5 802
Copper alloys; brass, bronze, etc.	102	9	111	101	8	109
Lead alloys:						
Solders	596	1 720	2 316	668	1 165	1 834
Others (including babbitt, type metals, etc.)	1 476	4 269	5 745	916	5 006	5 922
Semi-finished products:						
Pipe, sheet, traps, bends, blocks for caulking, ammunition, etc.	1 638	1 085r	2 723r	1 128	1 252	2 380
Other lead products	3 860	1 579	5 440	3 895	1 627	5 522
Total, all categories	42 946	52 768r	95 715r	34 860	56 224	91 083

Sources: Natural Resources Canada; Statistics Canada.
– Nil; . . Not available; p Preliminary; r Revised; x Confidential.
1 Production includes recoverable lead in ores and concentrates shipped valued at the average Montréal price for the year. 2 Lead content of domestic ores and concentrates exported. 3 Imports from "other countries" may include re-imports from Canada. 4 Available data, as reported by consumers. 5 Includes all remelt scrap lead used to make antimonial lead.
Note: Numbers may not add to totals due to rounding.

TABLE 2. CANADA, LEAD PRODUCTION, TRADE[1] AND CONSUMPTION, 1975, 1980 AND 1985-96

	Production				Exports[1]			Imports	
		Refined			In Ores and				
	All Forms[2]	Primary	Secondary	Total	Concentrates	Refined	Total	Refined	Consumption[3]
	(tonnes)								
1975	349 133	171 516	. .	171 516	211 909	110 882	322 791	1 962a	89 192
1980	251 627	162 463	72 117	234 580	147 008	126 539	273 547	2 602a	106 836
1985	268 291	173 220	66 791	240 011	93 657	113 993	207 650	5 675a	104 447
1986	334 342	169 934	87 746	257 680	118 373	111 831	230 204	4 247a	94 680
1987	373 215	139 475	91 186	230 661	207 936	100 204	308 140	12 558a	97 281
1988	351 148	179 461	88 615	268 076	200 822	179 946	380 768	15 132	88 728
1989	268 887	157 330	85 515	242 845	170 568	121 444	292 012	11 708	88 408
1990	233 372	87 180	96 465	183 645	221 565	84 007	305 572	11 756	72 203
1991	248 102	106 420	105 946	212 366	175 150	86 631	261 781	7 553	80 253
1992	339 626	151 252	101 633	252 885	190 822	131 546	322 368	8 289	92 420
1993	183 105	147 907	69 107	217 014	96 428	124 610	221 038	11 612	92 072
1994	167 584	153 035	98 605	251 640	55 922	133 203	189 125	5 117	95 715r
1995	204 227	178 019r	103 372r	281 391r	90 254r	140 478r	230 732r	3 974	91 083
1996p	246 083	194 031	115 348	309 379	180 382	159 770	340 152	4 171	. .

Sources: Natural Resources Canada; Statistics Canada.
. . Not available; p Preliminary; r Revised.
a Lead in pigs, blocks and shot.
1 Beginning in 1988, exports and imports are based on the new Harmonized System and may not be in complete accordance with previous method of reporting. Ores and concentrates include HS classes 2603.00.20, 2607.00.20, 2608.00.20 and 2616.10.20. Refined exports include HS classes 7801.10, 7803.00, 7804.11, 7804.19 and 7804.20. Refined imports include HS classes 7801.10.10, 7801.10.90, 7803.00, 7804.11, 7804.19 and 7804.20. 2 Recoverable lead in ores and concentrates shipped. 3 Consumption of lead, primary and secondary in origin, as measured by a survey of consumers.

TABLE 3. CANADA, LEAD SMELTING AND REFINING CAPACITY, 1996

Company and Location	Annual Rated Capacity	
	Smelting	Refining
	(000 t of refined lead)	
Cominco Ltd.[2] Trail, British Columbia	120	160
Metalex Products Ltd.[1] Burnaby, British Columbia	6	5
Canada Metal Company[1] Winnipeg, Manitoba	5	5
Canada Metal Company[1] Toronto, Ontario	12	12
Tonolli Canada Ltd.[1] Mississauga, Ontario	35	35
Nova Lead Inc.[1] Ville Ste-Catherine, Quebec	60	60
American Iron and Metal Co. (1969) Inc.[1] Montréal, Quebec	–	20
Fonderie Générale du Canada[1] Lachine, Quebec	–	3
Brunswick Mining and Smelting Corporation Limited[2] Belledune, New Brunswick	100	100
Total Canada	338	380

Source: Natural Resources Canada.
– Nil.
[1] Process lead-bearing scrap. [2] Process lead-bearing concentrate and scrap.

TABLE 4. AVERAGE ANNUAL LEAD PRICES, 1975-96

Year	London Metal Exchange			
	Settlement		Three Months	
	(US$/t)	(US¢/lb)	(US$/t)	(US¢/lb)
1975	413.48	18.755	441.93	18.821
1976	451.51	20.480	469.03	21.275
1977	617.78	28.022	626.84	28.433
1978	658.87	29.886	659.07	29.895
1979	1 203.15	54.574	1 149.95	52.161
1980	909.12	41.237	911.46	41.343
1981	734.73	33.327	750.12	34.025
1982	544.08	24.679	562.53	25.516
1983	425.27	19.290	440.55	19.983
1984	444.36	20.156	445.25	20.196
1985	394.10	17.876	394.12	17.877
1986	406.89	18.456	407.26	18.473
1987	597.41	27.098	567.38	25.736
1988	655.83	29.748	635.68	28.834
1989	676.14	30.669	659.36	29.908
1990	817.85	37.097	790.82	35.871
1991	557.84	25.303	568.90	25.805
1992	540.04	24.496	553.56	25.109
1993	406.38	18.433	420.36	19.067
1994	549.01	24.903	564.10	25.587
1995	630.51	28.599	638.88	28.979
1996	773.96	35.106	771.22	34.982

Sources: London Metal Exchange; *Metals Week*.

TABLE 5. AVERAGE MONTHLY LEAD PRICES, 1995 AND 1996

	London Metal Exchange			
	Settlement		Three Months	
	(US$/t)	(US¢/lb)	(US$/t)	(US¢/lb)
1995				
January	423.22	30.24	433.53	30.97
February	368.70	26.30	380.12	27.12
March	365.84	26.56	374.45	27.17
April	378.22	27.60	385.20	28.10
May	375.65	27.06	383.81	27.64
June	383.63	27.75	391.34	28.32
July	389.94	28.21	398.06	28.80
August	397.60	28.29	406.71	28.92
September	380.61	26.89	388.49	27.45
October	404.85	28.99	404.73	28.96
November	456.69	32.37	448.67	31.81
December	475.27	33.19	467.82	32.69
1996				
January	709.50	32.182	702.98	31.887
February	769.67	34.912	765.99	34.745
March	817.93	37.101	785.81	35.644
April	815.00	36.968	802.28	36.391
May	840.24	38.113	834.42	37.849
June	796.50	36.129	800.68	36.318
July	783.65	35.546	790.77	35.869
August	815.67	36.998	814.64	36.951
September	796.36	36.122	796.87	36.145
October	741.89	33.652	747.05	33.886
November	716.55	32.502	722.67	32.780
December	688.78	31.243	693.68	31.465

Source: *Metals Week*.

TABLE 6. NON-SOCIALIST WORLD LEAD CONSUMPTION, 1992-95

	1992		1993		1994		1995	
	(000 t)	(%)	(000 t)	(%)	(000 t)	(%)	(000 t)	(%)
Batteries	2 590.5	64.8	2 609.7	65.7	2 923.6	68.4	3 205.1	69.5
Cable sheathing	147.2	3.7	137.9	3.5	126.2	3.0	112.0	2.4
Rolled and extruded products	273.2	6.8	264.4	6.7	271.1	6.3	294.2	6.4
Shot/ammunition	111.2	2.8	118.6	3.0	115.7	2.7	127.3	2.8
Alloys	137.2	3.4	136.8	3.4	141.5	3.3	131.1	2.8
Pigments and other compounds	535.8	13.4	492.8	12.4	485.3	11.4	515.2	11.2
Gasoline additives	58.1	1.5	55.3	1.4	53.1	1.2	52.1	1.1
Miscellaneous	146.7	3.7	155.0	3.9	158.7	3.7	175.3	3.8
Total	3 999.9	100.0	3 970.5	100.0	4 275.2	100.0	4 612.3	100.0

Source: International Lead and Zinc Study Group.
Note: Statistics are for Australia, Austria, Belgium, Brazil, Canada, Finland, France, Germany, India, Italy, Japan, the Republic of Korea, Mexico, the Netherlands, New Zealand, Scandinavia, South Africa, Southeast Asia, Spain, Switzerland, Thailand, the United Kingdom and the United States.

TABLE 7. REFINED LEAD CONSUMPTION BY COUNTRY, 1992-96

	1992	1993	1994	1995	1996p
			(000 t)		
AMERICAS					
Brazil	69	74	85	92	94
Canada	89	74	73	71	56
Mexico	164	157	161	134	141
United States	1 287	1 382	1 495	1 547	1 637
Other Americas	79	92	89	87	90
Total Americas	1 688	1 779	1 903	1 931	2 018
EUROPE					
Austria	66	62	64	65	58
Belgium	64	74	65	69	72
France	246	226	237	263	266
Germany	412	352	354	360	345
Italy	247	223	230	247	243
Netherlands	52	48	57	62	55
Poland	40	59	55	55	60
Russia	215	92	103	93	96
Spain	105	102	112	131	137
United Kingdom	264	264	268	283	274
Other Europe	238	208	220	244	274
Total Europe	1 949	1 711	1 765	1 872	1 880
ASIA					
China, People's Republic of	240	290	295	300	305
India	60	70	75	96	106
Indonesia	57	75	91	90	92
Iran	56	60	60	67	70
Japan	401	370	346	334	330
Korea, Republic of	177	201	233	272	288
Taiwan	109	117	121	132	125
Thailand	47	48	62	63	80
Other Asia	217	217	210	223	225
Total Asia	1 364	1 448	1 493	1 577	1 621
OCEANIA					
Australia	58	62	78	77	67
New Zealand	4	5	4	4	3
Total Oceania	62	67	82	81	70
AFRICA					
Algeria	18	18	18	19	20
Egypt	11	7	6	6	6
South Africa	54	59	59	60	59
Other Africa	28	24	27	26	30
Total Africa	111	108	110	111	115
Total Western World	4 517	4 507	4 767	4 980	5 090
Total World	5 174	5 113	5 353	5 572	5 704

Source: International Lead and Zinc Study Group.
p Preliminary.

TABLE 8. MINE PRODUCTION OF LEAD BY COUNTRY, 1992-96

	1992	1993	1994	1995	1996p
			(000 t)		
AMERICAS					
Canada	344	183	173	211	257
Mexico	170	141	170	164	170
Peru	214	225	227	238	248
United States	407	362	370	394	428
Other Americas	51	42	37	40	42
Total Americas	1 186	953	977	1 047	1 145
EUROPE					
Bulgaria	38	34	32	28	28
Greece	28	27	20	21	7
Ireland	43	45	54	46	45
Macedonia	22	23	20	25	28
Poland	51	49	52	55	53
Russia	46	34	25	23	20
Spain	31	25	24	30	23
Sweden	106	104	113	100	99
Yugoslavia	–	9	9	12	34
Other Europe	69	32	34	37	35
Total Europe	434	382	383	377	372
ASIA					
China, People's Republic of	330	338	462	520	450
India	31	30	30	34	36
Iran	12	15	18	18	18
Japan	19	17	10	10	8
Kazakstan	130	104	53	40	40
Korea, D.P.R.	70	70	55	50	40
Thailand	13	5	7	12	19
Uzbekistan	30	30	18	12	12
Other Asia	32	20	15	20	20
Total Asia	667	632	668	716	643
OCEANIA					
Australia	575	521	486	424	477
AFRICA					
Morocco	72	79	70	68	72
South Africa	77	100	96	88	89
Other Africa	28	27	24	29	27
Total Africa	177	206	190	185	188
Total Western World	2 322	2 013	1 985	2 000	2 161
Total World	3 039	2 694	2 704	2 749	2 825

Source: International Lead and Zinc Study Group.
– Nil; p Preliminary.

TABLE 9. REFINED LEAD PRODUCTION BY COUNTRY, 1992-96

	1992	1993	1994	1995	1996p
			(000 t)		
AMERICAS					
Brazil	63	67	64	50	38
Canada	253	220	252	281	309
Mexico	288	256	214	230	223
Peru	83	86	88	90	95
United States	1 182	1 196	1 232	1 309	1 348
Other Americas	50	47	47	51	54
Total Americas	1 919	1 872	1 897	2 011	2 067
EUROPE					
Belgium	99	112	123	122	121
Bulgaria	53	60	62	72	73
France	284	259	260	297	301
Germany	354	334	332	314	237
Italy	186	183	204	180	214
Poland	54	65	63	70	67
Russia	38	45	34	30	32
Spain	55	62	75	82	76
Sweden	91	82	83	83	85
United Kingdom	347	364	353	321	354
Other Europe	213	171	164	184	226
Total Europe	1 774	1 737	1 753	1 755	1 786
ASIA					
China, People's Republic of	366	412	468	608	529
India	53	51	65	66	73
Iran	42	52	51	30	31
Japan	330	309	292	288	287
Kazakstan	284	245	145	93	80
Korea, D.P.R.	65	65	50	45	40
Korea, Republic of	90	128	130	181	143
Taiwan	20	31	36	36	39
Other Asia	118	125	119	129	144
Total Asia	1 368	1 418	1 356	1 476	1 366
OCEANIA					
Australia	232	236	236	237	232
New Zealand	5	5	6	6	6
Total Oceania	237	241	242	243	238
AFRICA					
Morocco	71	72	64	62	64
Namibia	32	31	24	27	18
South Africa	29	32	32	32	35
Other Africa	14	13	10	10	11
Total Africa	146	148	130	131	128
Total Western World	4 508	4 465	4 505	4 639	4 702
Total World	5 444	5 416	5 378	5 616	5 585

Source: International Lead and Zinc Study Group.
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