

Zinc

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World zinc consumption reached 7 356 000 t in 1995 according to preliminary figures from the International Lead and Zinc Study Group (ILZSG), an increase for the third consecutive year. Demand continued to be strong, especially in North America and Southeast Asia, with the exception of Japan, and despite a weakening in the United States in the latter part of the year.

World mine production of zinc increased to 6 948 000 t in 1995, compared to 6 819 000 t in 1994, as new and previously idled mine capacity came on stream. Major increases occurred in North America but were countered by declines in China and Australia.

World zinc metal production increased to 7 191 000 t in 1995 from a total of 7 128 000 t in 1994. Increases in several countries, especially Russia, Spain and Canada, were partially offset by decreases in Germany and Peru. London Metal Exchange (LME) stocks fell by 520 000 t during the year to 665 000 t.

CANADIAN DEVELOPMENTS

Preliminary figures indicate that Canadian mine production of zinc reached 1 125 000 t in 1995, an 11% increase over 1994. The increase was primarily due to the re-opening of the Faro lead-zinc facilities in the Yukon and the Bouchard-Hébert mine in Quebec, and full production at the Myra Falls mine in British Columbia in 1995 after a labour dispute in 1994. Canada was again the world's largest producer of zinc concentrates in 1995.

Zinc metal production reached 724 000 t, an increase of 5% over 1994 as smelters operated at 99% of capacity to meet strong North American and world demand.

Yukon

Anvil Range Mining Corp. completed stripping the Grum lead-zinc orebody at its Faro operations; milling commenced in August and its full capacity of 150 000 t/y of zinc in concentrate was reached late that month. Concentrate shipments from the port of Skagway, Alaska, began in September. Half of the zinc concentrates from Faro are shipped to Korea. Cominco Ltd. has an agreement with Anvil Range to market 40% in Europe while the remaining 10% is shipped to the Asturiana de Zinc smelter in Spain.

Advanced exploration continued at Cominco's Kudz Ze Kayah zinc-copper-lead project 115 km southeast of Ross River. Permits were acquired during the year in preparation for an environmental review of the project. A production decision is expected in early 1996. Meanwhile, Westmin Resources Limited continued outlining a polymetallic deposit on its Wolverine Lake property located 20 km to the east of Kudz Ze Kayah. The volcanogenic massive sulphide mineralization is similar at both deposits.

British Columbia

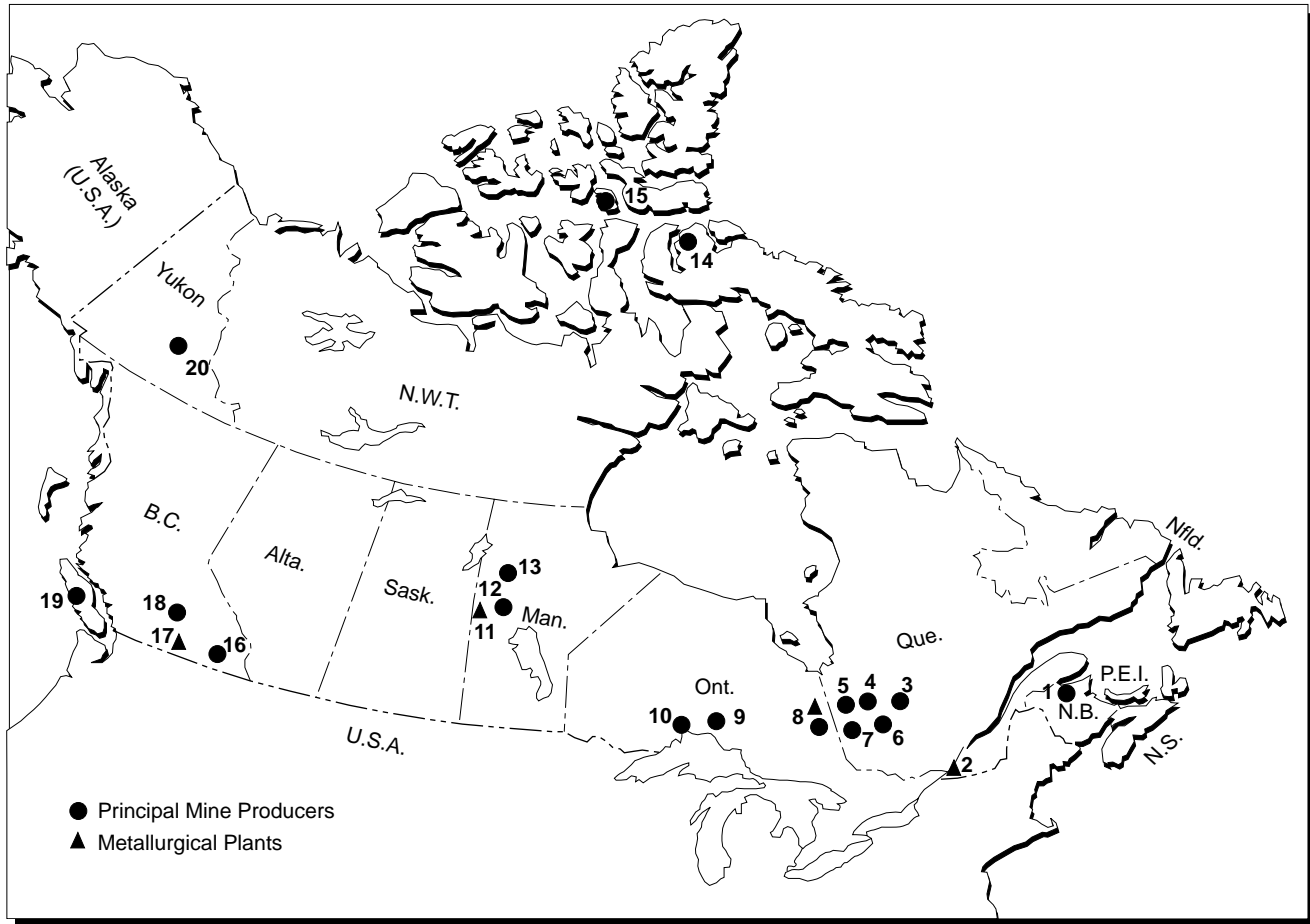
Westmin began production from the high-grade Battle Zone at its Myra Falls mine in April. With an increased milling rate and higher zinc grades, zinc concentrate production increased in the latter part of the year.

Redfern Resources Ltd. completed a positive feasibility study on its Tulsequah Chief copper-zinc project 70 km northeast of Juneau, Alaska. The study identified a diluted mineable reserve of 7.9 Mt grading 1.3% copper, 6.4% zinc, 1.2% lead, 100.9 g/t silver and 2.4 g/t gold. The Tulsequah Chief property was mined by Cominco in the 1950s. Redfern has applied for a mine development certificate, on which a decision is expected in April 1996. The mine could commence in early 1998 with an annual production of 54 000 t of zinc in concentrate.

Northwest Territories

San Andreas Resources Corporation continued drilling on its Prairie Creek lead-zinc-silver project in the Nahanni River area. A geological resource of 10.6 Mt grading 11.3% lead, 13.1% zinc and 188 g/t silver has

Figure 1
Zinc Producers in Canada, 1995



Numbers refer to locations on map above.

ZINC MINES

1.	Brunswick #12 Heath Steele Caribou	Brunswick Mining and Smelting Corporation Limited Brunswick Mining and Smelting Corporation Limited Breakwater Resources Ltd. (to open 1996)	11.	Flin Flon Callinan Trout lake	Hudson Bay Mining & Smelting Co., Limited Hudson Bay Mining & Smelting Co., Limited Hudson Bay Mining & Smelting Co., Limited
3.	Grevet	Cambior Inc. (to open 1996)	12.	Photo Lake	Hudson Bay Mining & Smelting Co., Limited
4.	Isle Dieu Norita-East	Noranda Inc. Noranda Inc.	13.	Ruttan	Hudson Bay Mining & Smelting Co., Limited
5.	Selbaie	Les Mines Selbaie	14.	Nanisivik	Nanisivik Mines Ltd.
6.	Louvicourt	Aur Resources Inc./Novicourt Inc.	15.	Polaris	Cominco Ltd.
7.	Bouchard-Hébert	Les Ressources Audrey Inc.	16.	Sullivan	Cominco Ltd.
8.	Kidd Creek	Falconbridge Limited	18.	Goldstream	Bethlehem Resources Corporation
9.	Geco	Noranda Inc. (closed Nov. 1995)	19.	Myra Falls	Westmin Resources Limited
10.	Winston Lake	Inmet Mining Corporation	20.	Faro (Grum)	Anvil Range Mining Corporation

ZINC METALLURGICAL PLANTS

2.	Valleyfield	Canadian Electrolytic Zinc Limited
8.	Kidd Creek	Falconbridge Limited
11.	Flin Flon	Hudson Bay Mining & Smelting Co., Limited
17.	Trail	Cominco Ltd.

been established with the vein system open along strike. San Andreas plans to conduct in-fill drilling in 1996 toward a feasibility study and permitting. The Prairie Creek orebody was developed in 1969 and again in the early 1980s when a 1200-t/d mill was constructed on site.

Manitoba

Hudson Bay Mining and Smelting Co., Limited opened its Photo Lake copper-zinc mine near Snow Lake in August. Ore from Photo Lake is treated in the reactivated Snow Lake mill, which was shut with the closing of the nearby Stall Lake and Chisel mines in 1994. Photo Lake has a capacity of 7000 t/y of zinc in concentrate from a mineable reserve of 534 000 t grading 4.5% copper, 6.0% zinc, 33.0 g/t silver and 4.7 g/t gold.

Ontario

Noranda Inc. closed its Geco copper-zinc mine at Manitouage in early November due to exhaustion of reserves. The mine had a capacity of 25 000 t/y of zinc in concentrate.

Inmet Mining Corporation began a \$27 million capital development project to access the Pick Lake zinc-copper orebody at its Winston Lake mine near Schreiber. The orebody, containing 1.3 Mt grading 16.7% zinc and 0.9% copper, will be accessed from an internal winze from the Winston Lake workings. Development also includes a separate ventilation shaft. Production is expected in 1996 to coincide with exhaustion of the main Winston Lake orebody with a net production loss of 8000 t/y to a rate of 36 000 t/y of zinc in concentrate.

Quebec

Commercial production began in early January at Audrey Resources Inc.'s Bouchard-Hébert (formerly Mobrún) zinc-copper mine near Rouyn-Noranda. The mine has a capacity of 27 000 t/y of zinc in concentrate. The original Mobrún mine closed in 1992 but exploration and development continued on the 1100 lens located beneath the existing workings, and it is now the principal orebody at Bouchard-Hébert. In October, Cambior inc. increased its interest in Audrey Resources to 98%.

Development of the Grevet zinc-copper mine near Lebel-sur-Quévillon continued throughout 1995 with start-up scheduled for January 1996. Cambior approved the \$62 million final pre-production phase in January after receiving the appropriate environmental permits. At full capacity Grevet will produce 72 000 t/y of zinc in concentrate. Mineable reserves are 12 Mt grading 8.5% zinc, 0.5% copper, 37 g/t silver and 0.1 g/t gold.

Noranda Inc. began development of its Bell Allard zinc-copper project near Matagami. The Bell Allard orebody exists at an average depth of 1100 m below surface. Work will consist of construction of surface facilities, followed by shaft sinking and underground development in preparation for start-up in 1998 to coincide with exhaustion of the Isle Dieu and Norita East orebodies. At full production Bell Allard will have a capacity of 80 000 t/y of zinc in concentrate.

New Brunswick

Noranda acquired a 100% interest in Brunswick Mining and Smelting Corporation Limited. The latter operates the Brunswick and Heath Steele lead-zinc-copper mines in the Bathurst area and the Belledune lead smelter. Brunswick Mining and Smelting announced that it planned to move its concentrate-handling facilities from Dalhousie to Belledune in 1996 to consolidate its shipping close to existing operations.

Breakwater Resources Ltd. plans to re-open its Caribou lead-zinc mine near Bathurst in late 1996, after receiving a positive feasibility study on the project. Milling would be at a rate of 3000 t/d to produce separate lead and zinc concentrates. Caribou previously produced a bulk lead-zinc concentrate, but the mine closed in 1990 due to low lead and zinc prices. Its capacity would be 62 000 t/y of zinc in concentrate. Breakwater also acquired the nearby open-pit Restigouche lead-zinc deposit from Marshall Minerals Corp. and the company plans to mine this orebody in conjunction with Caribou.

Noranda continued in-fill drilling on its Half Mile Lake zinc-lead-copper massive sulphide deposit near Bathurst. If put into production, the deposit could produce up to 35 000 t/y of zinc in concentrate.

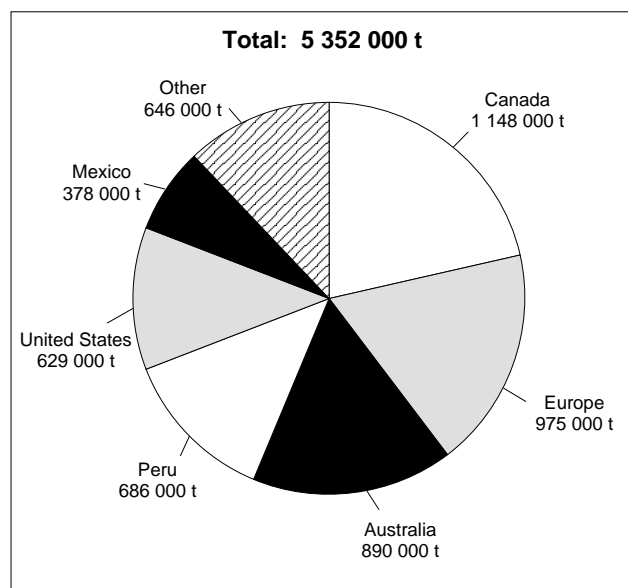
WORLD DEVELOPMENTS

World mine production of zinc was 6 948 000 t in 1995 compared to 6 819 000 t in 1994. Increased production in Canada and the United States was partially offset by declines in Australia and China.

Europe

Arcon International Resources Plc began construction of its Galmoy mine in County Kilkenny, Ireland, at the end of March after receiving a state mining licence in February. Capital costs for the mine are expected to be US\$23 million with production starting at the end of August 1996. At full capacity the mine would mill 1800 t/d of ore to produce 66 000 t/y of zinc in concentrate. Current reserves at Galmoy will support a 10-year operation with the potential for further reserves considered to be excellent.

Figure 2
Western World Mine Production of Zinc, 1995^P



Source: International Lead and Zinc Study Group.

^P Preliminary.

Also in Ireland, Ivernia West Plc submitted a planning application in early January 1996 for its Lisheen project in County Tipperary. Development of Lisheen is expected to take 18 months with a production capacity of 180 000 t/y of zinc in concentrate.

In Spain, Andaluza de Piritas S.A. plans to develop the Los Frailes polymetallic deposit after receiving a regional government grant. The deposit is located one kilometre from the company's Aznalcollar mine, which will be depleted at the end of 1996. Los Frailes is scheduled to come on stream at the beginning of 1997, and produce 90 000 t/y of zinc in concentrate, an increase of 37 000 t/y over production at Aznalcollar. Meanwhile, Navan Resources Plc awaits environmental approval to develop its Mazarron zinc-lead deposit, which could produce 20 000 t/y of zinc in concentrate.

TVX Gold Inc. of Canada acquired the Kassandra mines of Ethniki Kephaleou S.A. in Greece. These include the Stratonio and Olympias lead-zinc mines that produce 25 000 t/y of zinc in concentrate, a mill with capacity to treat 1.1 Mt/y of ore, and shiploading facilities. TVX will spend \$180 million over three years on development and modernization of the mines, a process to extract gold from the ores, and environmental rehabilitation.

Australia

MIM Holdings Ltd. commissioned its McArthur River underground lead-zinc-silver mine in the Northern

Territory in May and began shipping concentrates in August. The underground mine treats 1.5 Mt/y of ore to produce 350 000 t of bulk lead-zinc concentrate containing 160 000 t of zinc. The majority of the concentrate is shipped to MIM-owned ISF smelters at Avonmouth, United Kingdom, and Duisburg, Germany, as well as to Japan. The mine is owned 70% by MIM and 30% by a consortium of Japanese smelting companies.

CRA Ltd. approved development of its Century zinc-lead-silver project in Queensland in December. The approval is subject to final agreement with local Aboriginal communities. The open-pit mine would produce 450 000 t/y of zinc in concentrate when in full production in 1998, making the US\$815 million project the world's largest zinc producer. As well, zinc concentrates produced at Century would contain low amounts of iron, an important consideration for smelters faced with storage and disposal of iron-rich residues.

An industrial dispute that began in February at MIM's Mt. Isa mine ended in August after the mine's labour union accepted a new package of wages and working conditions. In December, production was again halted by a strike in support of three suspended employees. MIM also experienced production losses at its nearby Hilton mine due to a shortage of ore caused by the past deferral of mine development. In the second quarter of 1995, zinc production at the Mt. Isa complex fell by 55% from the same period in 1994.

Meanwhile, development of the ISAMILL fine-grinding technology progressed to satisfactory performance testing at full scale. Production units have been installed in the lead-zinc concentrator at Mt. Isa and have considerably improved zinc metallurgical performance.

MIM 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.

The Broken Hill Proprietary Company Limited (BHP) announced approval for the development of its Cannington lead-zinc-silver deposit in Queensland. The mine, with proven, probable and possible reserves of 45 Mt grading 11.1% lead, 4.4% zinc and 500 g/t silver, could start up in 1997 producing 50 000 t/y of zinc in concentrate. BHP also plans to construct concentrate-handling facilities at Townsville on the Queensland coast.

Pasminco Ltd. plans to mine its Potosi deposit near Broken Hill, New South Wales, starting in early 1996. The open-pit mine would produce 15 000 t/y of

zinc in concentrate to supplement Broken Hill's underground operations. Potosi has a reserve of 1.1 Mt grading 9% zinc and 2% lead.

Western Metals Ltd. opened its Goongewa zinc-lead mine in the Kimberley region of Western Australia. The mine replaces the exhausted Cadjebut mine with no net increase in capacity. In addition, the company plans to develop its nearby Kapok zinc-lead mine for production in mid-1997, and also approved the final evaluation of the Blendvale zinc-lead deposit located in the same area. The evaluation of Blendvale would confirm reserves, currently comprising 15 Mt grading 7.5% zinc and 2.4% lead, and obtain a bulk sample for metallurgical testing. Blendvale could come on stream in 1998 producing 106 000 t/y of zinc in concentrate.

United States

Cominco discovered a new zinc-lead orebody 500 m from its existing Red Dog mine in Alaska. The flat-lying deposit, amenable to open-pit mining, contains at least 65 Mt grading 14% zinc and 3% lead, boosting existing reserves at the mine by 70%. Cominco is examining the feasibility of expanding the mining rate at Red Dog by 30%. Such an expansion would have to be approved by the local native-owned NANA Regional Corporation, which leases the Red Dog property to Cominco.

Kennecott Minerals Company, a subsidiary of RTZ Corporation PLC, has decided to restart production at its Greens Creek underground polymetallic mine in Alaska in early 1997. The mine closed in 1993 due to low 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. Upon re-opening, the mine would produce 45 000 t/y of zinc in concentrate.

South America

Approval for development of the Iscaycruz zinc-lead mine in Peru was given in April and partners Glencore International AG (75%) and Minero Peru S.A. are planning start-up for the end of March 1996. When at full production, the mine will produce 55 000 t/y of zinc in concentrate.

State-owned Centromin Péru S.A. announced that privatization of the company will begin in February 1996. Among the assets scheduled for privatization are the Casapalca, Cerro de Pasco, Morococha, San Cristobal and Yauricocha zinc-lead-silver mines with a total capacity of 225 000 t/y of zinc in concentrate.

Mineracao Morro Agudo S.A. closed its Morro Agudo mine in Brazil with a resulting loss in capacity of 40 000 t/y of zinc in concentrate. Meanwhile, Grupo Trevo plans to re-open its Toropalca lead-zinc mine in Bolivia in 1996. The mine would produce 15 000 t/y of zinc in concentrate.

Commonwealth of Independent States

The Kazakstan government received no offers in its attempt to privatize the Zyrianovsk Combinat in Kazakstan. The Combinat owns the Maleeva copper-zinc-lead mine and associated concentrating facilities. The Maleeva mine, currently in development, is close to the Ust-Kaminogorsk lead-zinc smelter, which has been experiencing concentrate supply shortages in recent months.

Glencore undertook a feasibility study on modernization and rationalization of the Dalpolymetal lead-zinc mine complex near Vladivostok in Russia in which it owns a majority interest. The mines produce an average of 60 000 t/y of zinc in concentrate.

Asia

Several zinc mine projects are under way in China. Construction has started on the Qiandongshan lead-zinc-silver mine in Shaanxi Province, owned by Asia Minerals Corporation and China National Nonferrous Metals Industry Corporation, with completion expected in 1997. The second stage of development at the state-owned Changba lead-zinc mine in Gansu province is also in progress to raise capacity by 12 000 t/y to 50 000 t/y of zinc in concentrate. Other planned developments include Asia Minerals' Ashele copper-zinc mine in Xinjiang Province and the state-owned Lanping and Lijiagou zinc-lead mines in Kunming and Gansu provinces, respectively. These projects have a total capacity of 138 000 t/y of zinc in concentrate.

Arabian Shield Development Company began construction of its Al Masane copper-zinc mine in Saudi Arabia. The mine, which would have a capacity of 30 000 t/y of zinc in concentrate, is scheduled to open in 1996. Arabian Shield is also considering the construction of a zinc smelter with a capacity of 200 000 t/y of refined zinc using Sherritt pressure leach technology.

Pasminco signed a US\$10 million agreement with Pakistani federal and state development companies to further explore and possibly develop the Duddar zinc-lead deposit in Pakistan. Duddar contains a reserve of 7 Mt grading 11.4% zinc and 2.1% lead.

SMELTING

World production of zinc metal reached 7 191 000 t in 1995, compared to 7 128 000 t in 1994. The increases occurred in several countries with the only significant decrease registered in Peru.

Europe

The Commission of the European Communities launched an investigation into allegations of dumping

of refined zinc into Western Europe from Poland, Russia, Kazakstan, Ukraine and Uzbekistan. The dumping claim is based on a comparison of Poland's domestic prices and export prices to the European Union.

Metaleurop SA restarted the refinery at its Noyelles-Godault zinc smelter in France in March and reached its full capacity of 100 000 t/y of refined zinc in June. The refining columns and control and safety systems at the plant were rebuilt after an explosion in January 1994. Metaleurop had been stockpiling most of the crude zinc produced at the plant since the accident. In November, Metaleurop announced that it planned to undertake a two-year upgrading of the smelter to reduce costs and increase efficiency, but did not indicate how this would be achieved.

Pasminco became sole owner of the Budelco zinc smelter in the Netherlands by acquiring the 50% interest of Logam BV. The future of the 205 000-t/y capacity smelter was in doubt due to environmental concerns over the continued storage of jarosite wastes. However, these concerns were eased when Pasminco obtained an agreement with CRA to secure 400 000 t/y of low-iron zinc concentrates from the latter's Century mine in Australia that is due to come on stream in 1998.

Asturiana de Zinc S.A.'s 320 000-t/y capacity zinc smelter in Spain returned to full production by mid-year after securing additional concentrate stocks. Full production should be maintained after an agreement with Anvil Range was reached to acquire concentrates from the latter's Faro mine. Asturiana de Zinc was obliged to buy zinc from the LME early in the year to meet continued strong zinc demand in Spain.

Norzink A/S undertook efficiency improvements in the cell house at its Odda zinc refinery in Norway. Improvements and maintenance necessitated a three-month shut-down. Norzink hopes to operate at a rate of 140 000 t/y in 1996.

Australia

Korea Zinc Co. Ltd. announced plans to construct a US\$333 million zinc smelter in Townsville, Queensland. The smelter would have a capacity of 170 000 t/y of refined zinc. Korea Zinc's decision followed the negotiation with the Queensland government of a competitive electricity rate. The smelter is expected to come on stream in early 1998.

Pasminco received final approval for a US\$30 million environmental upgrade and expansion at its Cockle Creek zinc smelter in New South Wales. The project, which will raise capacity by 30 000 t/y to 110 000 t/y of refined zinc, should be completed by late 1997. Meanwhile, Pasminco has been granted permission by the Australian government to continue ocean dumping of jarosite residue from its Risdon zinc smelter in Tasmania until a new co-treatment

process can be developed. The process would replace jarosite production with a paragoethite residue that would be shipped to Pasminco's Port Pirie lead smelter for further processing. The resulting inert residue would then be landfilled.

Japan

Hachinohe Smelting Co. Ltd. restarted zinc-refining operations at its 108 000-t/y Hachinohe zinc smelter in Aomori Prefecture in February after damages caused by the Kobe earthquake were repaired. Sumitomo Metal Mining Co. Ltd. restarted its 79 000-t/y Harima zinc smelter in Hyogo Prefecture in April.

A major rationalization of the zinc smelting industry in Japan took place during the year. The profitability of Japanese smelters has been affected by the high value of the yen, a lowering of tariffs on imported refined zinc, and low zinc prices. In July, Mitsubishi Materials Corp. announced that it will close its 106 000-t/y Akita smelter in Akita Prefecture by June 1996, although production of zinc alloys will continue. In October, Nikko Metal Co. Ltd. stopped primary zinc smelting at its 120 000-t/y Mikkaichi smelter in Toyama Prefecture, but continued to produce Prime Western-grade zinc from secondary materials.

Several other Japanese smelters announced that they will increase production at their facilities to offset some of the lost production, while increased imports, mainly from China, will likely make up the balance.

United States

Korea Zinc purchased the Sauget, Illinois, zinc smelter of Big River Zinc Corp. for US\$53 million. The smelter has a capacity of 82 000 t/y of refined zinc. The purchase gives Korea Zinc a production base in the United States.

Savage Resources Ltd. will spend US\$2 million to increase capacity at its Clarkesville, Tennessee, zinc smelter by 3000 t/y to 103 000 t/y of refined zinc in 1996. A feasibility study is also under way for a further US\$350 million expansion to 160 000 t/y.

The United States Defense Logistics Agency (DLA) sold 8000 t of zinc from its strategic stockpile in fiscal year 1995, ending September 30. Sales had been suspended for the first six months of the year under a Defense Appropriations moratorium. The fiscal year 1996 sales plan allows for the sale of 45 000 t from the DLA stockpile.

In April, The American Zinc Association (AZA) asked the Market Impact Committee of the U.S. Congress to examine zinc sales, arguing that the sale prices did not reflect the high premiums being obtained in the marketplace at that time. The AZA also expressed a difference of opinion over what constituted a market disruption for zinc, an event that would trigger a suspension of sales.

The debate over DLA zinc sales prompted the U.S. House Sub-Committee on Military Readiness to order, in October, the General Accounting Office to review the zinc sales program. Meanwhile, a scheduled sale of DLA zinc was suspended on October 17, as provided for in the 1995 Defense Appropriations Bill, when the LME price of zinc fell 5% below the price on the day the Bill was signed.

China

Strong domestic demand and domestic prices, which were higher than LME prices, helped diminish exports of Chinese unwrought zinc and zinc alloys to 191 500 t from the 1994 total of 278 000 t. Chinese zinc smelters also faced shortages of zinc concentrates which caused some to reduce production.

The Zhuzhou zinc smelter in China's Hunan Province, with a capacity of 130 000 t/y of refined zinc, was shut for six weeks beginning in October for extended maintenance due, in part, to lower export revenues that affected its ability to purchase zinc concentrates. Low world zinc prices, as well as damage caused by monsoon rains, caused reductions in output at the Huludao smelter in Liaoning Province which has a capacity of 300 000 t/y of refined zinc.

Expansions in China's zinc smelting industry are under way or being planned. A 20 000-t/y expansion at the state-owned Zhuzhou smelter to 150 000 t/y of refined zinc was completed at the end of 1995 with a further expansion of 100 000 t/y by 1996/97 being considered. Chifeng Non Ferrous Metals Corporation opened its 21 000-t/y Chifeng electrolytic zinc smelter in Inner Mongolia in September. Expansions at state-owned zinc smelters are also planned for completion in 1996. These include a 60 000-t/y expansion at the Shaoguan smelter in Guangdong Province to 120 000 t/y of refined zinc with the installation of a second plant, and a 20 000-t/y expansion at the Huise zinc smelter to raise its capacity to 55 000 t/y of refined zinc.

South America

In February, Cominco and partner Marubeni Corporation acquired the 102 000-t/y Cajamarquilla zinc refinery in Peru from state-owned Minero Peru for US\$108 million. Cominco, which became the operator of the smelter with an 89% interest, declared force majeure on 25% of production in February and another 25% in March due to the failure of two electrical transformers. Damage to the transformers was caused by power fluctuations due to drought and terrorist activities. Cajamarquilla returned to full capacity in July.

In Brazil, imports of refined zinc were expected to total 40 000 t in 1995, up from 11 000 t in 1994. The increase in imports was due to high domestic interest rates averaging 6%/m, which made overseas financ-

ing more attractive. High interest rates also caused Cia Paraibuna de Metais SA to delay expansion of its Juiz de Fora zinc smelter from 72 000 t/y to 150 000 t/y of refined zinc. At the same time, exports dropped as producers such as Paraibuna sold more zinc to the domestic market due to strong demand from the construction and automotive sectors.

Cia Mercantil e Industrial Inga SA completed a 20 000-t/y expansion of its Itaguaí zinc smelter in Brazil to 62 000 t/y of refined zinc. However, the company filed for creditor protection at the end of June. Brazilian producers have experienced sharp increases in production costs following the introduction of Brazil's new currency, the Real. Also completed in Brazil was a 20 000-t/y expansion of the Tres Marais zinc smelter of Cia Mineradora de Metais SA to 112 000 t/y of refined zinc.

Commonwealth of Independent States

The Chelyabinsk zinc smelter sold 15% of the government-owned shares in the enterprise in order to repay debt and to modernize its 120 000-t/y plant. The modernization is to involve the completion of a modern zinc electrolysis plant.

The Ust-Kamenogorsk lead-zinc smelting complex in Kazakhstan continued to experience production problems through a shortage of concentrates. With high debts at the plant, Western companies were reported to be reluctant during the year to ship concentrates for toll smelting for fear that they would be seized to help pay off the debt. Ust-Kamenogorsk has a nominal capacity of 240 000 t/y of refined zinc.

The European Bank for Reconstruction and Development is considering issuing a US\$30 million loan in early 1996 for environmental and process improvements at the Leninogorsk lead-zinc metallurgical complex, also in Kazakhstan. The plant is being managed under contract by Ridder-invest, a Kazak-U.S. joint venture that has raised US\$50 million to pay off debts and augment working capital at Leninogorsk.

Other

Korea Zinc announced in September that it plans to expand zinc smelting capacity at its Onsan electrolytic zinc smelter in Korea. The 80 000-t/y expansion would raise capacity to 300 000 t/y of refined zinc.

Binani Zinc Ltd. completed a 5000-t/y expansion of its zinc smelter in India to bring its capacity to 30 000 t/y of refined zinc. The company has undertaken a feasibility study on a further expansion to 60 000 t/y by 1998/99. Meanwhile, Hindustan Zinc Ltd., faced with high power costs and competition from imports due to duty reductions in India, is considering building a smelter in the Middle East to process its concentrates.

Padaeng Industry Co. Ltd. is undertaking a US\$92 million upgrading of its zinc processing and smelting facilities in Thailand. The company signed an engineering agreement with Union Minière SA to boost zinc output at its 70 000-t/y Tak smelter to 104 000 t/y of refined zinc. The increase would be achieved by 1997 by expanding the cellhouse and debottlenecking the leach and purification sections. The upgrading also includes conversion of its Rayong calcine plant to treat sulphide ores. The plant had originally been built to treat zinc silicate ores from the company's now-depleted Mae Sod mine.

Zinc Corp. of South Africa experienced a 13% decrease in production at its Springs zinc smelter in South Africa due to a three-week strike in September over wages and working conditions. The smelter has a capacity of 105 000 t/y of refined zinc. Meanwhile, Eskom, the state electrical utility, completed a pre-feasibility study on a new 200 000-t/y zinc smelter at Richards Bay, also in South Africa, but no production decision has been announced.

SECONDARY ZINC

Zinc from secondary sources has become increasingly important in recent years. Figures from the International Lead and Zinc Study Group (ILZSG) indicate that the total recovery of zinc from secondary materials in the Western World in 1994 was 1.9 Mt. Secondary zinc includes high-purity zinc refined from the treatment of Electric Arc Furnace (EAF) dusts, remelted zinc of a purity less than 98.5% zinc, and scrap zinc used in the production of zinc alloys.

With the increasing use of zinc galvanized steel in the automobile and construction industries, secondary zinc from EAF dusts has become a significant source of zinc. These dusts contain various other elements in a form that render untreated dusts inappropriate for disposal in standard landfill sites. Consequently, before May 1995, EAF dusts for disposal had to be put into landfills for hazardous wastes in the United States. The decreasing space available at such sites and the associated increases in disposal costs provided a further incentive for recycling.

However, in May, the U.S. Environmental Protection Agency (EPA) ruled that EAF dusts can be dumped in municipal landfill sites rather than hazardous waste sites if the material has been treated to stabilize it. Currently the Super Detox chemical process developed by Bethlehem Steel Corporation is the sole commercial process capable of doing this. However, Horsehead Industries Inc., the largest U.S. recycler of EAF dusts, has challenged the EPA ruling, arguing that it violates national policies and laws aimed at maximizing recycling and would result in an increased need for the production of primary zinc. As vehicles manufactured in the 1980s begin to be recycled, the recovery of zinc from flue dusts should rise.

In recent years, technologies for recycling zinc-bearing materials have been developed. The Waelz kiln is the most common method of processing EAF dusts. Waelz oxides are treated in imperial smelting furnaces for the production of refined zinc. The requirement of Waelz kilns to be near their feed source, i.e., steel mill complexes, would suggest that treatment of these dusts will be most important in the United States, Japan and Western Europe.

Canada does not currently process EAF dusts. However, Philip Environmental Inc. of Hamilton, Ontario, and the Scientific Ecology Group Inc. of Oak Ridge, Tennessee, plan to build a \$25 million plant in Hamilton to recycle 70 000 t/y of EAF residues using their proprietary zinc-iron plasma process that converts these residues into zinc, lead and iron products.

Purity Zinc Metals Co. Ltd. began phasing out secondary zinc production at its facility in Stoney Creek, Ontario, which reprocessed galvanized drosses and skimmings. The decision to concentrate on zinc dust and alloy production was made largely because of the decreasing availability of secondary materials. Purity Zinc was Canada's only secondary zinc facility after the closure of Federated Genco Limited's Burlington plant in 1993.

Korea Zinc commissioned its 120 000-t/y Ausmelt zinc residue treatment plant. The plant uses the Ausmelt process to treat goethite residues from the zinc production process at the company's Onsan lead-zinc smelter. Zinc is recovered as an oxide fume. The plant is the first of its kind in the world.

Hoogovens Groep BV of the Netherlands announced in January 1996 that it was opening a pilot dezincing plant in Valenciennes, France, with a capacity to treat 45 000 t/y of galvanized steel. The plant is the first of its kind in the world. The dezincing process involves dissolving zinc in a soda bath followed by electrolysis.

The fertilizer and chemical industries also make use of zinc-bearing wastes to create zinc sulphate and chloride compounds. The chemicals are then used in the production of fertilizer micronutrients.

CONSUMPTION AND USES

World consumption of zinc increased to 7 356 000 t in 1995, an increase of 5% from the 1994 level. Demand continued to improve in the United States, Europe and Asia, including a modest increase in Japan.

Galvanizing has been maintaining its importance as the principal use of zinc, representing 47% of zinc consumption in 1994. Zinc is used extensively in the automotive and construction industries for corrosion protection and remains the most cost-effective means of protecting steel against corrosion. The galvanization of steel is the fastest growing usage of zinc; it

has grown steadily in recent years at the expense of almost all other end uses. This trend is expected to continue in the future despite dropping by 0.6% from 1993 due to strong growth in brass and bronze applications in 1994.

Galvanized steel is used in automobile construction to protect steel from corrosion. Zinc coatings act as a physical barrier and as a sacrificial oxidant. The oxide, in turn, acts as a further barrier to corrosion. The brightest prospects for galvanized steel in the automobile industry are currently in Asia. Japanese and other Asian manufacturers are using increasing amounts of galvanized sheet in response to demands for enhanced corrosion protection. In North America, where galvanized steel is already extensively used in automobile construction, applications of dual-sided galvanized steel have become increasingly important for exposed body surfaces.

Galvanized steel is also used in construction for structural components, roofing, siding and reinforcement bars. Zinc and zinc-aluminum thermally sprayed coatings are used for the long-term corrosion protection of large steel structures such as bridges and hydro-electric transmission towers.

With the relatively high cost of lumber, fabricated hot-dipped structural steel is becoming cost-competitive for use in residential home construction. The number of steel-framed homes built yearly in the United States has risen from 500 in 1992 to 40 000 in 1994, and is estimated to reach 250 000 in 1997. Galvanized steel studs have a number of advantages over wood including less volatile prices, less weight, immunity to warping or termites, fire resistance, and recyclability. However, disadvantages include greater care in handling and a lack of training or specialized tools which lead to lengthier construction times.

A number of zinc alloy coatings have been developed over the years that have superior qualities over pure zinc in specific applications. These include Galfan (90% zinc, 5% aluminum and the remainder rare earth elements) and Galvalume (55% aluminum, 43.4% zinc and 1.6% silicon), as well as zinc-iron and zinc-nickel alloys. Galfan, for example, exhibits higher formability and paintability than other coatings, and zinc-nickel alloys reduce the reactivity of high-silicon steels.

Canada's hot-dip galvanized steel and Galvalume capacity of 1 902 000 t/y is located in Ontario at the facilities of Dofasco Inc. and Stelco Inc. in Hamilton and DNN Galvanizing Corporation in Windsor, and in Quebec at Sorevco in Coteau-du-Lac.

The manufacture of brass and bronze is the second most important use of zinc, accounting for 19% of consumption in 1994. These alloys are used in plumbing fittings, heating and air conditioning components, and other products. Consumption of brass

and bronze is highly dependent on the performance of the construction industry and the 0.8% increase over 1993 reflects the general improvement in economic activity in many countries.

The third most important use of zinc, accounting for 14.5% of consumption in 1994, is in the die-casting industry for products such as builders' hardware and automobile fittings. The goal of weight reduction in automobiles for increased fuel efficiency has led to a reduction in the use of zinc die-castings, although the increased number of cars being sold has led to overall increases in zinc consumption. The development of new alloys and manufacturing techniques, such as thin-walled die-casting, has taken place in recent years to make zinc alloy castings more competitive relative to plastics and other substitute materials. Zinc castings also have the ability to hold closer tolerances than aluminum castings.

One promising series of alloys is ACuZinc, which contains 5-11% copper and 2.8-4% aluminum, with the balance being zinc. These alloys increase the durability and performance or reduce the thickness of automotive die-castings compared to many other zinc alloys.

The balance of zinc consumption is for such items as zinc semi-manufactures, oxides, chemicals and zinc dust. Zinc oxide is an important component in the manufacture of tires and rubber products. Rolled zinc has been a popular roofing material in parts of Europe for many years.

Increased research has been conducted in recent years into the use of zinc in batteries. A long run-time rechargeable zinc-air battery for use in portable personal computers is currently being developed that is designed to provide power up to 10 times longer than conventional batteries and provides more energy density by weight than nickel-cadmium or nickel-metal hydride batteries.

Zinc-air batteries are also being tested for use in electric vehicle fleets in Germany and Sweden. Electric Fuels Corp., which is pioneering zinc-air technology, has completed a pilot zinc regeneration plant in Israel to recycle the depleted fuel cassettes that are used in the zinc-air battery. Meanwhile, Zinc Air Power Corp. of Ohio received a licence to create an applications laboratory and pilot plant for the development and production of rechargeable zinc-air batteries for use in electric vehicles.

INTERNATIONAL LEAD AND ZINC STUDY GROUP

The International Lead and Zinc Study Group was formed in 1959 to improve market information and to provide opportunities for regular inter-governmental 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. While it has an extensive information-gathering and dissemination role, the Group has no market intervention powers. It holds a general session each year in the fall. Member countries' delegations include industry representatives as advisors. Canada has been an active member since its inception.

The 40th Session of the Study Group was held in Geneva, Switzerland, in October 1995 and was attended by representatives of 28 member countries as well as observers from several nations and organizations. The 1995 session examined statistical trends, current new mine and smelter projects, trade patterns, and changes to the U.S. Strategic Stockpile, as well as certain environmental issues. The recent Basel Decision to ban exports of hazardous wastes destined for recycling from OECD to non-OECD countries and the OECD Risk Reduction Strategy for Lead were major topics of discussion.

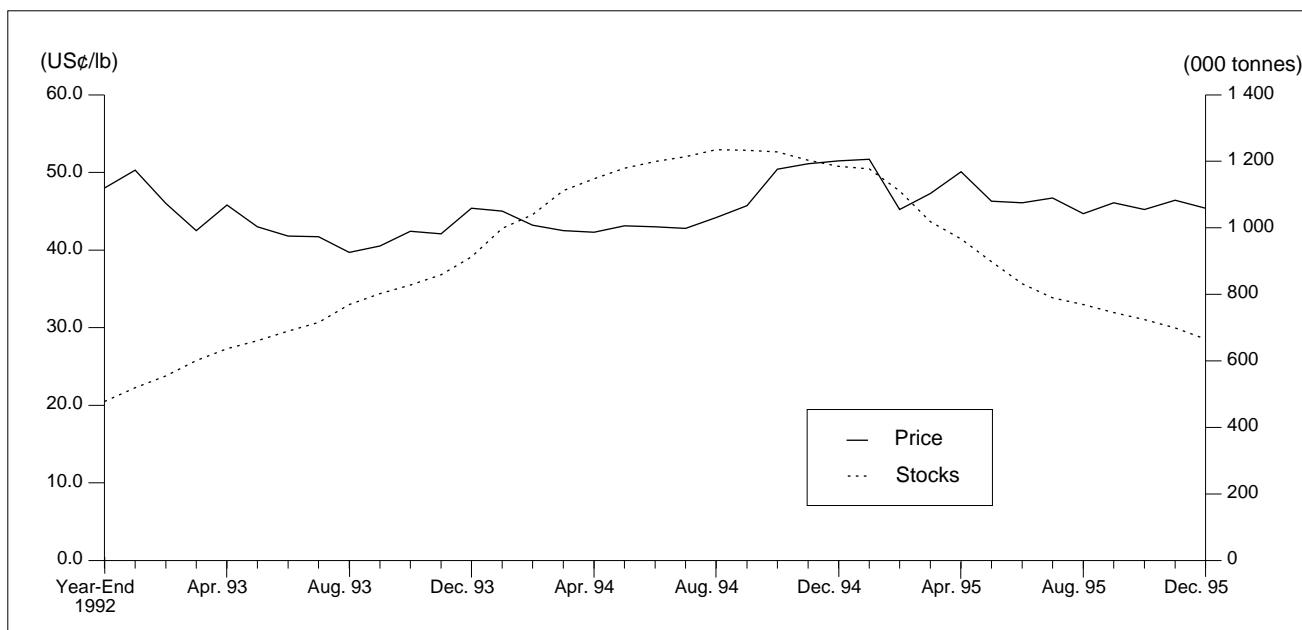
PRICES AND STOCKS

Zinc prices remained low in 1995 and traded in a narrow range as metal stocks, although dropping throughout the year, remained high and as zinc followed the downward trend of other metals under speculative activity. The average price of zinc on the LME for 1995 was US46.8¢/lb.

Zinc began 1995 at US52¢/lb and reached the year's high of 55¢/lb on January 19 due to continued strong demand and investment interest over the extent of earthquake damage to Japanese smelters. However, the rally was short-lived as investment funds liquidated their positions in base metals over fears of a slowdown in the U.S. economy. Prices reached a low of just over 43¢/lb in mid-February; they then ranged from 45¢-50¢/lb until the end of August when they again dropped below 45¢/lb as further speculative selling reflected the slump in copper prices. Zinc prices reached their low for the year of 43¢/lb on October 11 and closed the year at 45¢/lb.

Zinc stocks stood at 1 619 000 t at the end of 1994, including 1 185 000 t on the LME. From a high of 1 239 000 t in October 1994, LME zinc stocks

Figure 3
LME Zinc Stocks vs. LME Settlement Price, 1993-95



Sources: Reuters; World Nonferrous Metal Statistics.

Note: End-of-month data.

declined steadily due to continued strong world demand. At the end of 1995, total stocks stood at 1 114 000 t representing 9.5 weeks of consumption. Of this total, 665 000 t were stocks held on the LME.

OUTLOOK

A 2.5% increase in world zinc consumption in 1996 to 7.5 Mt is predicted, following an increase of 5% in 1995. Demand in 1996 is expected to strengthen in Western Europe and to continue to show strong growth in China and Southeast Asia, with the exception of Japan. Japanese growth is expected to be limited as more manufacturers look to relocate outside of Japan due to the high value of the yen.

World mine production of zinc is expected to increase by 6.5% in 1996 to 7 442 000 t after a 2% increase in 1995 as several projects, particularly in Australia and Canada, come on stream or are in full production for the entire year after start-up in 1995. Mine production will likely remain stagnant in C.I.S. countries due to a lack of capital investment and rising operating costs, while Chinese mine production will continue to lag behind smelting capacity.

World metal production is forecast to increase by 3% to 7 393 000 t in 1996 after a 1% rise in 1995 in order to meet continued strong world demand. This would be a much slower growth rate than that of mine production. Rises in several countries will be partially offset by a decline in Japan as rationalization in the zinc smelting industry takes full effect.

With an increased zinc concentrate supply forecast in 1996, treatment charges imposed by smelters will likely increase. Although there is limited additional smelter capacity in Western countries to treat this concentrate, toll smelting and exports to the West may increase in China, which has under-utilized smelting capacity. The increased supply of metal will likely be more than balanced on a world basis by continued strong demand for zinc. Stocks are therefore likely to continue their decline throughout 1996. However, prices are not expected to improve significantly until late in the year when stocks begin to reach more normal levels. The average zinc price for 1996 is forecast to be US52¢/lb.

Beyond 1996, world zinc consumption is forecast to increase by a yearly average of 2.5% to 2005, despite an economic downturn late in the forecast period. Overall strong demand in China and Southeast Asia is expected to be partially offset by slower growth in North America and Japan.

Steady reductions in LME stocks are expected as demand for zinc remains strong and as Japan imports more zinc metal in response to reduced domestic smelter capacity. This should result in a gradual increase in prices from a range, in constant

1995 cents, of US50¢-55¢/lb in 1997 to US60¢-65¢/lb by 2001. A decline for the remainder of the forecast period to US42¢-47¢/lb by 2005 is then predicted, given the cyclical nature of zinc markets.

Canadian mine production of zinc is forecast to increase to 1 350 000 t in 1996 with a full year of production at Faro and the opening of the Grevet mine in Quebec. Further increases to 1 500 000 t/y by 1998 are expected, but production could fall to 1 000 000 t/y by 2001 as older mines become exhausted. This level will likely be maintained through 2005 by the development of new discoveries in the late 1990s.

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, 1996.

TARIFFS

Item No.	Description	Canada			United States	EU	Japan ¹
		MFN	GPT	USA	Canada	MFN	GATT
2603.00 2603.00.00.30	Copper ores and concentrates Zinc content	Free	Free	Free	Free	Free	Free
2607.00 2607.00.00.30	Lead ores and concentrates Zinc content	Free	Free	Free	0.3¢/kg on lead content	Free	Free
2608.00 2608.00.00.30	Zinc ores and concentrates Zinc content	Free	Free	Free	0.3¢/kg on lead content	Free	Free
2616.10 2616.10.00.30	Silver ores and concentrates Zinc content	Free	Free	Free	Free	Free	Free
2620	Ash and residues (other than from the manufacture of iron or steel), containing metals or metallic compounds, containing mainly zinc						
2620.11	Hard zinc spelter	Free	Free	Free	0.3%	Free	Free
2817.00	Zinc oxide; zinc peroxide	9.5%	Free	2%	Free	10.5%	5%
2833	Sulphates; alums; peroxosulphates (persulphates)						
2833.26	Of zinc	Free	Free	Free	Free	8.3%	4.5%
7901	Unwrought zinc Zinc, not alloyed:						
7901.11	Containing by weight 99.99% or more of zinc	Free	Free	Free	0.3%	3%	7.26 yen/kg
7901.12	Containing by weight less than 99.99% of zinc	Free	Free	Free	0.3-3.8%	3%	7.26 yen/kg
7901.20	Zinc alloys:						
7901.20.10	Containing by weight 90% or more but less than 97.5% of zinc	Free	Free	Free	3.8%	3%	6.60-7.10 yen/kg
7901.20.20	Containing by weight less than 90% of zinc	11.7%	7%	3.4%	3.8%	3%	Free-6.6 yen/kg
7902.00	Zinc waste and scrap	Free	Free	Free	Free	Free	1.5%
7903	Zinc dust, powders and flakes						
7903.10	Zinc dust	Free	Free	Free	0.1¢/kg	4%	5.2%
7903.90	Other:						
7903.90.10	Powders, not alloyed	Free	Free	0.8%	0.1¢/kg	4%	5.2%
7903.90.20	Alloyed powders; flakes	Free	Free	2%	1.9%	4%	5.2%
7904.00	Zinc bars, rods, profiles and wires						
7904.00.10	Bars, rods or profiles, containing by weight 90% or more of zinc	Free	Free	Free	0.8%	7.4%	4.4%
7904.00.21	Bars, rods or profiles; wire, coated or covered	4%	2%	2%	0.8%	7.4%	4.4%
7904.00.22	Wire, not coated or covered	4%	2%	1.6%	0.8%	7.4%	4.4%
7905.00	Zinc plates, sheets, strip and foil containing by weight 90% or more of zinc						
7905.00.11	Of a thickness exceeding 0.15 mm but less than 4.75 mm, for making offset printing plates; of a thickness exceeding 0.15 mm but less than 4.75 mm, not polished, coated on one side with acid- resisting material, imported for use by grinders and polishers, to be prepared for use in photo-engraving	Free	Free	Free	0.8%	7.4%	6.4%
7905.00.19	Other:	3.4%	2%	1%	0.8%	7.4%	6.4%
7905.00.20	Containing by weight less than 90% of zinc	3.4%	2%	2%	0.8%	7.4%	6.4%
7906.00	Zinc tubes, pipes, and tube or pipe fittings (for example, couplings, elbows, sleeves)	3.3%	2%	2%	0.7%	7.4%	4.4%
7907.00	Other articles of zinc						
7907.00.10	Gutters, roof capping, skylight frames and other fabricated building components	7.3%	4%	2%	0.6-1.1%	6.6%	4.5%
7907.00.20	Anodes for electroplating	Free	Free	Free	0.6-1.1%	6.6%	5.2%
7907.00.30	Discs or slugs, containing by weight 90% or more of zinc	5%	3.5%	1.6%	0.6-1.1%	6.6%	5.2%
7907.00.90	Other	7.3%	Free	2%	0.6-1.1%	6.6%	5.2%

Sources: Customs Tariff, effective January 1996, Revenue Canada; Harmonized Tariff Schedule of the United States, 1996; The "Bulletin International des Douanes," Journal Number 14 (17th Edition), European Union, 1994-1995, "Conventional" column; Custom Tariff Schedules of Japan, 1995.

¹ GATT rate is shown; lower tariff rates may apply circumstantially.

Note: Where there is a tariff "range," a complete match of the HS code was not available; therefore, the high and low for the product in question is shown.

TABLE 1. CANADA, ZINC PRODUCTION AND TRADE, 1994 AND 1995, AND CONSUMPTION, 1992-94

Item No.	1994		1995P		
	(tonnes)	(\$000)	(tonnes)	(\$000)	
PRODUCTION					
All forms ¹					
New Brunswick	291 796	397 718	334 853	476 496	
Quebec	139 898	190 681	163 000	231 949	
Ontario	163 658	223 066	157 118	223 579	
British Columbia	115 510	157 440	138 924	197 690	
Manitoba	93 607	127 586	79 680	113 385	
Yukon	—	—	41 000	58 343	
Northwest Territories	171 840	234 219	178 965	254 667	
Total	976 309	1 330 709	1 093 541	1 556 108	
Mine output ²	1 010 712	..	1 124 548	..	
Refined ³	690 965	..	724 129	..	
EXPORTS					
2608.00.30	Zinc content in zinc ores and concentrates				
	Germany	95 641 ^r	75 529 ^r	108 531	94 014
	Belgium	115 970 ^r	69 826 ^r	140 920	86 681
	Spain	60 478 ^r	37 923 ^r	76 191	61 218
	Finland	22 417	19 629	48 288	43 587
	Italy	36 047	25 924	42 777	28 542
	Netherlands	28 330 ^r	17 379 ^r	30 310	23 107
	France	37 643	26 396 ^r	25 797	19 213
	South Korea	—	—	40 547	17 958
	United Kingdom	18 983 ^r	11 899 ^r	21 112	17 069
	Sweden	—	—	12 609	16 477
	Norway	25 560 ^r	16 425 ^r	19 148	15 692
	Other countries	9 241	8 101	38 177	24 190
	Total	450 311 ^r	309 037 ^r	604 408	447 755
2600.00	Zinc content in other ores and concentrates ⁴	9	6	5 167	1 547
2603.00.30	Zinc content in copper	—	—	—	—
2607.00.30	Zinc content in lead	9	6	5 167	1 547
2616.00.30	Zinc content in silver	—	—	—	—
2620.11	Ash and residues containing hard zinc spelter				
	India	80	67	202	149
	United States	—	—	5	2
	Total	80	67	207	151
2620.19	Ash and residues containing mainly zinc, n.e.s.				
	United States	9 422	7 727	8 848	8 005
	India	1 019 ^r	665 ^r	1 238	957
	South Korea	126	102	86	139
	Taiwan	21	8	81	103
	United Kingdom	110	90	—	—
	Colombia	17	11	—	—
	Nepal	20	8	—	—
	Total	10 737 ^r	8 615 ^r	10 253	9 205
2817.00	Zinc oxide; zinc peroxide				
	United States	25 496	37 796	24 788	39 553
	Brazil	—	—	405	680
	Netherlands	—	—	54	91
	Hong Kong	—	—	36	73
	Other countries	75	62	53	88
	Total	25 571	37 859	25 336	40 488
2833.26	Zinc sulphate	217	103	35	90
7901.11	Zinc, not alloyed, unwrought, containing by weight 99.99% or more of zinc				
	United States	286 144 ^r	391 175 ^r	281 132	424 725
	Taiwan	6 232	9 179	11 577	16 221
	Indonesia	—	—	2 058	5 380
	Japan	1 808	2 445	3 645	5 326
	Philippines	396	582	3 389	5 083
	Singapore	—	—	2 595	3 819
	Thailand	—	—	1 817	2 698
	Hong Kong	1 051	1 502	1 684	2 480
	Other countries	2 573	3 549	3 725	5 729
	Total	298 204 ^r	408 437 ^r	311 621	471 469

TABLE 1 (cont'd)

Item No.		1994		1995P	
		(tonnes)	(\$000)	(tonnes)	(\$000)
EXPORTS (cont'd)					
7901.12	Zinc, not alloyed, unwrought, containing by weight less than 99.99% of zinc				
	United States	205 913	290 564 ^r	186 499	287 128
	Taiwan	13 485	16 404	11 636	15 638
	Indonesia	8 794	9 619	8 547	8 965
	Philippines	9 978	11 373	4 346	6 000
	Hong Kong	1 517	1 697	2 079	3 432
	Japan	3 731	4 529	2 059	3 101
	New Zealand	992	1 313	1 917	2 637
	Thailand	1 990	2 268	1 543	2 088
	Malaysia	2 441	2 790	1 118	1 469
	Sri Lanka	640	697	1 524	1 380
	Other countries	3 483	4 736	270	414
	Total	252 964	345 997^r	221 538	332 259
7901.20	Zinc alloys, unwrought				
	Hong Kong	4 748	4 605	1 311	1 488
	Taiwan	549	516	338	353
	Japan	715	722	280	330
	Thailand	308	291	249	285
	Philippines	280	277	149	163
	Malaysia	238	224	124	138
	Indonesia	—	—	125	137
	Singapore	120	124	83	99
	Other countries	546	643	106	97
	Total	7 504	7 405	2 763	3 095
7902.00	Zinc waste and scrap				
	United States	49 251	27 261	38 946	25 795
	Taiwan	3 741 ^r	3 559 ^r	1 996	2 069
	India	146	105	321	250
	Other countries	2 316	664	—	—
	Total	55 454^r	31 591^r	41 263	28 114
7903.10	Zinc dust				
	United States	5 424	11 518	4 878	11 316
	Other countries	1	4	45	48
	Total	5 425	11 522	4 922	11 364
7903.90	Zinc powders and flakes				
	United States	2 333	3 857	2 414	3 905
	Other countries	47	76	20	51
	Total	2 380	3 935	2 434	3 957
7904.00	Zinc bars, rods, profiles and wire				
	United States	43	245	46	229
	Other countries	1	3	—	—
	Total	44	248	46	229
7905.00	Zinc plates, sheets, strip and foil				
	United States	108	253	64	253
	Total	108	253	64	253
7906.00	Zinc pipes or tubes and fittings				
	United States	210	2 915	475	6 955
	Germany	1	11	—	—
	Total	211	2 926	475	6 955
7907.90	Articles of zinc, n.e.s.				
	United States	1 506	8 131	1 717	10 437
	Other countries	28 ^r	201 ^r	59	203
	Total	1 533^r	8 336^r	1 776	10 645
IMPORTS					
2608.00.00.30	Zinc content in zinc ores and concentrates	151 888 ^r	91 942 ^r	176 628	115 330
2603.00.00.30	Zinc content in copper ores and concentrates	280	382	100	135
2607.00.00.30	Zinc content in lead ores and concentrates	810	900	—	—
2616.10.00.30	Zinc content in silver ores and concentrates	2 079	2 228	7 204	5 109
2620.11	Ash and residues containing hard zinc spelter	—	—	—	—
2620.19	Ash and residues containing mainly zinc, n.e.s.	1 350	674	340	250
2817.00	Zinc oxide; zinc peroxide	4 935	5 669	5 956	7 962
2833.26	Zinc sulphate	4 045	2 570	3 238	2 278

TABLE 1 (cont'd)

Item No.	1994		1995 ^P		
	(tonnes)	(\$000)	(tonnes)	(\$000)	
IMPORTS (cont'd)					
7901.11	Zinc, not alloyed, unwrought, containing by weight 99.99% or more of zinc	2 266	3 117	3 442	5 490
7901.12	Zinc, not alloyed, unwrought, containing by weight less than 99.99% of zinc	2 754	3 763	510	800
7901.20	Zinc alloys, unwrought	7 470	12 207	7 814	13 860
7902.00	Zinc waste and scrap	1 049	899	2 128	1 794
7903.10	Zinc dust	1 005	1 138	491	867
7903.90	Zinc powders and flakes	436	895	667	1 322
7904.00	Zinc bars, rods, profiles and wire	370	986	514	1 501
7905.00	Zinc plates, sheets, strip and foil	553	1 657	647	2 014
7906.00	Zinc pipes or tubes and fittings	1 362	5 028	1 353	6 221
7907.90	Articles of zinc, n.e.s.	3 498 ^r	11 764 ^r	3 883	13 370
Total Imports		186 150 ^r	145 819 ^r	214 914	178 303

	1992			1993 ^a			1994 ^P		
	Primary	Secondary	Total	Primary	Secondary	Total	Primary	Secondary	Total
(tonnes)									
CONSUMPTION^{5,6}									
Zinc used for or in the production of:									
Copper alloys (brass, bronze, etc.)	x	x	3 154	x	x	2 850	x	x	3 536
Galvanizing: electro	x	x	2 075	x	x	2 205	x	x	1 746
hot dip	x	x	63 946	x	x	62 750	x	x	67 179
Zinc die-cast alloys	x	x	21 132	x	x	20 557 ^r	x	x	25 936
Other products (including rolled and ribbon zinc, zinc oxides)	x	x	24 418	x	x	24 071	x	x	26 494
Total	109 093	5 632	114 725	108 687	3 745 ^r	112 432 ^r	122 502	2 388	124 890
Consumer stocks, year-end	10 272	726	10 998	9 084	610 ^r	9 694 ^r	8 093	414	8 507

Sources: Natural Resources Canada; Statistics Canada.

– Nil; . . Not available; n.e.s. Not elsewhere specified; ^P Preliminary; ^r Revised; x Confidential.^a Increase in number of companies being surveyed.

¹ New refined zinc produced from domestic primary materials (concentrates, slags, residues, etc.) plus estimated recoverable zinc in ores and concentrates shipped for export. ² Zinc content of ores and concentrates produced. ³ Refined zinc produced from domestic and imported ores. ⁴ Includes HS classes 2603.00.30, 2607.00.30 and 2616.00.30. ⁵ Consumer survey does not represent 100% of Canadian consumption and is therefore consistently less than apparent consumption. ⁶ Due to sensitivity in some end-use categories, a breakdown of primary and secondary sources is not provided in order to be consistent.

Note: Numbers may not add to totals due to rounding.

TABLE 2. CANADA, ZINC PRODUCTION, EXPORTS¹ AND DOMESTIC SHIPMENTS, 1975, 1980 AND 1985-95

	Production		Exports		
	All Forms ²	Refined ³	In Ores and Concentrates	Refined	Total
	(tonnes)				
1975	1 055 151	426 902	705 088	247 474	952 562
1980	883 697	591 565	434 178	471 949	906 127
1985	1 049 275	692 406	396 103	555 621	951 724
1986	988 173	570 981	450 249	427 176	877 425
1987	1 157 936	609 909	613 185	441 227	1 054 412
1988	816 885	703 206	816 885 ^r	551 521	1 368 407 ^r
1989	614 223	669 677	614 223	495 060	1 109 284
1990	716 185	591 786	716 185	452 251	1 168 436
1991	566 815	660 552	566 815	520 508	1 087 323
1992	678 172	671 702	678 172	509 744	1 187 916
1993	455 953	659 881	455 953	493 265	949 218
1994	976 309	690 965	450 320 ^r	551 168 ^r	1 001 488 ^r
1995 ^p	1 093 541	724 129	609 575	533 159	1 142 734

Sources: Natural Resources Canada; Statistics Canada.

^p Preliminary; ^r Revised.

¹ Beginning in 1988, exports 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 2608.00.30, 2603.00.30 and 2607.00.30. Refined includes HS classes 7901.11 and 7901.12. ² New refined zinc produced from domestic primary materials (concentrates, slags, residues, etc.) plus estimated recoverable zinc in ores and concentrates shipped for export.

³ Refined zinc produced from domestic and imported ores.

TABLE 3. WESTERN WORLD, PRIMARY ZINC STATISTICS, 1991-95

	1991	1992	1993	1994	1995 ^p
	(000 tonnes)				
Mine production (zinc content)	5 601	5 704	5 244	5 162	5 352
Metal production	5 385	5 441	5 457	5 376	5 425
Metal consumption	5 366	5 396	5 557	5 868	6 228

Source: International Lead and Zinc Study Group.

^p Preliminary.

TABLE 4. WORLD MINE PRODUCTION OF ZINC, 1991-95

	1991	1992	1993	1994	1995p
	(000 tonnes)				
EUROPE					
Finland	56	31	22	17	16
Ireland	187	194	194	194	184
Poland	145	152	151	151	152
Russia	190	158	158	147	143
Spain	265	208	171	150	174
Sweden	157	171	167	160	168
Others	337	251	191	152	138
Subtotal	1 337	1 165	1 050	971	975
AFRICA					
Morocco	27	23	66	79	79
Namibia	36	36	28	33	30
South Africa	64	72	78	76	72
Others	77	70	31	17	43
Subtotal	204	201	203	205	224
OCEANIA					
Australia	1 048	1 014	1 007	928	890
AMERICAS					
Bolivia	130	144	123	101	135
Brazil	103	119	138	140	135
Canada	1 157	1 325	1 004	1 008	1 148
Mexico	317	352	359	382	378
Peru	638	626	668	682	686
United States	547	551	513	601	629
Others	108	104	86	81	86
Subtotal	3 000	3 221	2 891	2 995	3 197
ASIA					
China	710	706	775	991	930
India	102	153	156	147	157
Iran	31	66	77	75	80
Japan	133	134	119	101	95
Kazakstan	284	258	207	170	178
Korea, D.P.R.	120	120	110	90	90
Thailand	87	69	69	59	14
Others	109	106	94	87	118
Subtotal	1 576	1 612	1 607	1 720	1 662
Total, World	7 165	7 213	6 758	6 819	6 948
Total, Western World	5 601	5 704	5 244	5 162	5 352

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

TABLE 5. WORLD ZINC METAL PRODUCTION, 1991-95

	1991	1992	1993	1994	1995p
	(000 tonnes)				
EUROPE					
Belgium	298	217	210	211	211
Finland	170	170	170	173	177
France	299	304	310	309	314
Germany	346	383	381	360	322
Italy	256	153	254	256	261
Netherlands	201	218	214	212	204
Poland	126	135	149	154	161
Russia	165	186	203	138	155
Spain	274	368	342	296	360
United Kingdom	101	97	105	101	106
Others	314	276	301	297	285
Subtotal	2 550	2 607	2 639	2 507	2 556
AFRICA					
Algeria	29	25	29	24	24
South Africa	92	83	96	94	100
Zaire	28	19	6	1	–
Zambia	7	7	5	–	–
Subtotal	156	134	136	119	124
AMERICAS					
Argentina	36	35	31	35	35
Brazil	157	180	183	198	190
Canada	660	672	662	693	723
Mexico	189	151	209	212	221
Peru	154	124	156	158	123
United States	376	400	382	356	363
Subtotal	1 572	1 562	1 623	1 652	1 655
ASIA					
China	577	648	857	1 017	1 000
India	92	137	150	157	155
Japan	731	729	696	666	664
Kazakstan	292	261	224	172	170
Korea, D.R.P.	130	120	115	100	100
Korea, Republic of	242	253	270	271	283
Others	186	169	157	149	152
Subtotal	2 250	2 317	2 469	2 532	2 524
OCEANIA					
Australia	326	333	317	318	332
Total, World	6 854	6 953	7 184	7 128	7 191
Total, Western World	5 385	5 441	5 457	5 376	5 425

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

TABLE 6. WORLD ZINC CONSUMPTION, 1991-95

	1991	1992	1993	1994	1995P
	(000 tonnes)				
EUROPE					
Belgium	200	189	210	225	250
France	289	258	219	241	250
Germany	540	532	495	519	530
Italy	283	300	300	320	332
Russia	380	260	164	114	105
Spain	129	112	119	139	151
United Kingdom	184	190	196	197	200
Others	580	570	567	552	575
Subtotal	2 585	2 411	2 270	2 307	2 393
AFRICA					
South Africa	91	85	87	92	100
Others	59	54	64	57	60
Subtotal	150	139	151	149	160
OCEANIA					
Australia	113	119	143	173	180
New Zealand	17	19	21	24	24
Subtotal	130	138	164	197	204
AMERICAS					
Brazil	118	112	126	147	160
Canada	121	126	134	148	150
Mexico	110	107	111	118	124
United States	931	1 048	1 125	1 185	1 248
Others	126	135	143	147	155
Subtotal	1 406	1 528	1 639	1 745	1 837
ASIA					
China	530	551	530	655	670
India	130	140	155	192	200
Japan	846	784	719	721	746
Korea, Republic of	271	272	301	318	359
Taiwan	126	128	171	170	214
Others	453	466	509	525	573
Subtotal	2 356	2 341	2 385	2 581	2 762
Total, World	6 627	6 557	6 609	6 979	7 356
Total, Western World	5 366	5 396	5 557	5 868	6 228

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

TABLE 7. CANADA, ZINC METAL CAPACITY, 1995

Company and Location	Annual Rated Capacity (000 tonnes of slab zinc)
PRIMARY	
Canadian Electrolytic Zinc Limited (CEZ) Valleyfield, Quebec	230
Falconbridge Limited Timmins, Ontario	133
Hudson Bay Mining and Smelting Co., Limited (HBMS) Flin Flon, Manitoba	95
Cominco Ltd. Trail, British Columbia	272
Total primary, Canada	730
SECONDARY	
Federated Genco Ltd. Burlington, Ontario	Closed
Purity Zinc Metals Co. Ltd. Stoney Creek, Ontario	Phasing out secondary refining
Total secondary, Canada	17

Source: Natural Resources Canada.

TABLE 8. MONTHLY AVERAGE ZINC PRICES, 1994 AND 1995

	North American Special High Grade	LME Special High Grade Settlement
(US¢/lb)		
1994		
January	47.8	45.2
February	47.0	44.0
March	44.8	42.5
April	44.5	41.9
May	46.1	43.4
June	47.1	43.8
July	47.7	43.7
August	46.9	42.9
September	49.8	45.0
October	53.6	48.0
November	58.5	52.3
December	57.3	50.6
Year average	49.3	45.3
1995		
January	60.9	52.5
February	55.8	46.8
March	54.5	46.4
April	55.3	48.1
May	54.0	47.0
June	52.0	45.8
July	52.4	46.6
August	51.2	46.0
September	50.0	44.7
October	49.7	44.4
November	52.0	46.8
December	50.1	46.2
Year average	53.2	46.8

Sources: *Metals Week*; Reuters.