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Canadian Minerals Yearbook (CMY) - 2009

Doug Panagapko

The author is with the Minerals and Metals Sector,
Natural Resources Canada.

Telephone: 613-992-2667

E-mail: doug.panagapko@nrcan-rncan.gc.ca

HIGHLIGHTS

- Canada is an important producer and supplier of refined lead, ranking sixth in the world in 2009.
- Canadian mine output of lead decreased by 31%, whereas world mine output increased by 3.4% during 2009.
- World consumption of refined lead was stable compared to 2008 as lead was somewhat sheltered from declines in global economic output compared to other metals. Demand for lead in automotive and industrial batteries continued to be strong in China and Asia, offsetting major declines in demand in Europe and North America.
- In Canada, primary lead is produced mainly as a co-product of zinc mining. The recycling of lead, mainly from depleted car batteries, is an important source of refined lead, representing about 61% of Canada's total refined lead production in 2009.

World Lead Data	2007	2008	2009	2009/08
	(000 t)			(% change)
Mine production	3 610	3 896	4 031	3.4
Refined production	8 114	8 653	8 815	1.9
Usage (consumption)	8 182	8 648	8 771	1.4
Refined balance	-68	5	44	n.a.
Refined stocks at year-end	264	306	386	n.a.

Source: International Lead and Zinc Study Group.

n.a. Not applicable.

LME Lead Prices	2007	2008	2009
Cash US\$/lb	117.95	94.28	78.31

Cash US\$/t	2 600.38	2 078.83	1 726.35
3 months US\$/t	2 571.26	2 080.91	1 740.94
15 months US\$/t	2 314.61	1 941.97	1 742.69

Source: International Lead and Zinc Study Group.
LME: London Metal Exchange.

Canadian Lead Data	2007	2008	2009	2009/08
	(tonnes)			(% change)
Mine output (1)	75 135	99 810	68 624	-31.2
Lead primary refined production	95 577	105 526	101 484	-3.8
Lead recycled refined production	141 111	153 549	157 456	2.5
Lead domestic shipments	25 036	31 496	27 224	-13.6
Lead refined imports	5 679	7 515	6 395	-14.9
Apparent lead usage (2)	30 715	39 011	33 619	-13.8

Source: Natural Resources Canada.

(1) Lead content of ores and concentrates produced. (2) Domestic shipments plus imports.

INTRODUCTION

Lead has been known since ancient times and is one of several metals that were discovered during the earliest periods of human history. Some experts believe that lead was used as early as 5000 B.C. The oldest archaeological evidence of lead use by humans is a figurine found in the Dardanelles area of Asia Minor dating from 3800 B.C.

Lead was used in coinage in China about 2000 B.C. and was mined by the Greeks from about 1200 B.C. to make coins, ornaments, weights, and many other articles. One of lead's most enduring uses has been as pipe for the transportation of water. Romans manufactured lead pipes in one standard length and in several diameters and used it extensively in municipal water systems. The Latin word for lead is *plumbum*, which forms the root of modern English words such as "plumber" and "plumbing," as well as the chemical symbol for lead, Pb.

Almost all lead is obtained from sulphide ores in which the most common lead mineral is galena (PbS). It is usually found in combination with other sulphide ores, most frequently zinc, and also copper. Other lead-containing minerals include cerussite (PbCO₃) and anglesite (PbSO₄).

HISTORY OF LEAD MINING IN CANADA

Lead-zinc ores were originally discovered in the Kootenay region of British Columbia in the 1820s. Active prospecting in the area dates from 1865 and mining commenced shortly thereafter. In the early years, the ores from British Columbia were sent to the United States for smelting and refining.

The now-famous Sullivan mine started operating near Kimberley, British Columbia, in the early 1900s and continued to produce lead until its closure in December 2001. By 1914, the Sullivan mine was the largest lead producer in Canada – a position it held for 50 years until the Pine Point mine in the Northwest Territories completed its first year of operation in 1966. Pine Point closed in 1988. The Kingdon mine at Galetta, on the Ottawa River near Amprior, Ontario, was discovered in 1884, operated briefly in the 1880s, and was reactivated in 1914, producing lead and zinc ore until the early 1930s. The discovery, by the Geological Survey of Canada, of lead and zinc ores on Baffin Island in the mid-1950s led to the development of the Nanisivik mine in the mid-1970s. It closed in 2002. The discovery of lead-zinc on Little Cornwallis Island in 1971 led to the development of the Polaris mine. Operated by Teck Cominco, the mine had the distinction of being the most northerly base-metal mine in the world until its closure in 2002 after 20 years of operation.

CANADIAN PRODUCTION FACILITIES

Lead in concentrate was produced at two mines during 2009. Primary refined lead metal is produced from domestic and foreign concentrates at two smelters: one located in New Brunswick and the other in British Columbia. Secondary lead metal is produced from recycled lead (primarily car batteries) at four sites in Quebec, Ontario, and B.C. (Figure 1).

In 2009, Canadian mines produced 68 624 t of lead in concentrate, compared to 99 810 t in 2008, a 31% decrease in production (Table 1, Figure 2). This sharp drop in mine production was due to the closure of several mines that only recently re-opened due to high metal prices in 2006 and 2007. Refined metal production for 2009 was 258 940 t, virtually unchanged from the previous year (Table 1, Figure 3). Primary lead metal production was 101 484 t in 2009, compared to 105 526 t in 2008. Secondary metal production was 157 456 t, compared to 153 549 t the

previous year. [Table 4](#) shows lead production, trade, and use for the period 1988-2009. Statistics on exports and imports of lead concentrates, metal, and semi-fabricated products are given in [Table 2](#).

The following is a summary of Canadian lead mines and metal production facilities in operation during 2009.

New Brunswick

Xstrata Zinc Canada owns the **Brunswick** zinc and lead mine. Located 21 km southwest of Bathurst, it is Canada's largest producer of primary lead. In 2009, the mine produced 3.32 Mt of ore grading 8.6% zinc and 3.3% lead, resulting in the production of 66 462 t of lead in concentrate, down from 70 406 t in 2008 (Production Report, December 2009). The mine is expected to close within the next couple of years due to the depletion of ore reserves.

Xstrata also owns and operates the **Belledune** lead smelter and refinery located 35 km north of Bathurst. In 2009, the smelter produced 83 620 t of lead, compared to 81 329 t in 2008, a 2.8% increase. Xstrata also operates a lead-acid battery recycling plant that produces secondary lead feeds for the smelter.

Quebec

Newalta Corporation of Calgary, Alberta, owns and operates a lead recycling facility in Ville Ste-Catherine, Quebec, just south of Montréal. The facility operates two long rotary kilns, the second kiln having been commissioned during the year. The facility is capable of recycling 3.7 million lead acid batteries per year and has the capacity to produce up to 100 000 t of lead and lead alloys, primarily for the automotive and industrial battery manufacturing industry. In 2009, the company reported production of 62 600 t of lead, compared to 46 300 t in 2008 (2009 Annual Report).

Ontario

Tonolli Canada Ltd. of Mississauga operates a secondary lead smelter and refinery that processes about 60 000 t of lead-acid batteries annually to produce about 35 000 t of lead and lead alloys.

British Columbia

The integrated zinc and lead smelting and refining complex at **Trail**, owned by **Teck Resources Limited**, has a capacity of 100 000 t/y of refined lead. The complex produces refined zinc and lead, as well as gold, silver, cadmium, germanium, indium, sulphuric acid, and fertilizers. In 2009, production at Trail was 72 600 t of lead, down from 85 000 t in 2008 (2009 Annual Report). The company reported that this production loss was due to a maintenance shut-down in the dressing plant.

A small amount of lead is contained in concentrates produced at the **Myra Falls** mine of **Breakwater Resources Ltd.**, located about 65 km west of Campbell River.

Metalex Products Ltd. of **Richmond** is a secondary lead smelting and refining operation that processes lead-acid batteries and other forms of scrap lead to produce lead and lead alloys for various manufacturing customers. The plant has the capacity to process 300 000 automotive batteries per year.

RECENT DEVELOPMENTS

The **Wolverine** mine project, located 175 km northwest of Watson Lake, Yukon, owned by **Yukon Zinc Corp.**, continues to proceed through the Yukon government regulatory approvals process. All major permits have been awarded. The deposit contains proven and probable reserves of 5.15 Mt grading 9.71% zinc, 0.93% copper, 1.26% lead, 284.2 g/t silver, and 1.36 g/t gold. Once in production at a daily rate of 1700 t, the mine is expected to produce 53 400 t of zinc in concentrate and 5860 t of lead in concentrate annually over a 10-year mine life. A tailings infrastructure construction plan was recently approved and construction activities at the site are continuing. Yukon Zinc Corp. is owned privately by **Jinduicheng Molybdenum Group Ltd.** and **Northwest Nonferrous International Investment Company Ltd.**

Selwyn Resources Ltd. is continuing towards a production decision and the development of an underground mine at its **Howard's Pass** zinc-lead project in east-central Yukon. This would be followed by a later expansion to open-pit mining. Initial mining would be at a rate of 8000 t/d. Annual metal output would be approximately 255 000 t of zinc and 65 000 t of lead. The company is proceeding with environmental assessment work and First Nations consultations, as well as with work permit applications for underground development activities. A high-grade mineral resource estimate for four separate deposits is 16.1 Mt grading 10.25% zinc and 4.23% lead. In December, the company announced that it had reached a joint-venture agreement with **Yunnan Chihong Zinc & Germanium Co. Ltd.** whereby Yunnan could earn a 50% interest in the project by investing \$100 million and taking the project to the feasibility stage.

Canadian Zinc Corporation continued permitting activities to advance its **Prairie Creek** zinc-lead-silver project located in the western Northwest Territories. The project is environmentally sensitive as it lies within the Nahanni River watershed and is surrounded by the recently expanded Nahanni National Park. Activities included filing reports with the Mackenzie Valley Land and Water Board and submitting applications for an environmental assessment. The property consists of a partially developed mine with a 1000-t/d mill and related infrastructure. Published resources include measured and indicated resources of 5.84 Mt grading 10.7% zinc, 9.9% lead, and 161 g/t silver. Some rehabilitation work on the winter road was completed during 2009.

WORLD PRODUCTION

According to the International Lead and Zinc Study Group (ILZSG), world lead mine production for 2009 was 4.03 Mt, up 3.5% from the previous year ([Table 6](#)). World refined lead metal production was 8.82 Mt, up 1.9% from 2008 ([Table 7](#)). In terms of mine production, Canada ranked eighth behind China, Australia, the United States, Peru, Mexico, India, and Russia. Canada ranked sixth in the world in terms of refined lead production. The top five lead metal-producing countries are China, the United States, Germany, the United Kingdom, and South Korea.

The top five mining companies producing lead are: Xstrata (241 000 t), BHP Billiton (230 000 t), Doe Run Company (135 000 t), Volcan Compania Minera (119 000 t), and Teck Resources (73 000 t), which together account for about 20% of world mine production. [Figure 4](#) shows world lead mine production for the period 2007-09, while [Figure 5](#) shows refined metal production for the same period.

Output from Chinese smelters increased 15% in 2009 following a similar increase in 2008. The general weakness in Western World economies is shown in the 8.3% decline in lead production in Europe and a similar 7% decline in North America. [Figure 6](#) shows lead use in different areas of the world. [Table 9](#) shows Western World secondary lead production for the period 2005-09.

USES

The largest single use of lead today is in the manufacture of the lead-acid storage battery, which is a vital part of every automobile. The average car battery contains about 10 kg of lead. Lead-acid batteries for automotive, industrial, and consumer purposes account for about 75% of world lead usage. In the communications industry, lead is still used extensively as protective sheathing for underground and underwater cables, including transoceanic cable systems. Lead-acid storage batteries are also used for backup power in the telecommunications sector in cell phone towers. With the expected advancement in mobile phone technology, demand for large battery systems will continue to be strong. Certain lead compounds are used as paint pigments. Red lead (lead oxide) is the basic paint primer for iron and steel. Lead compounds are used as stabilizers in plastic (PVC) piping and in decorative glass. Lead's corrosion-resistant nature also makes it suitable for applications in sheeting for roofing purposes, while its high density imparts radiation attenuation properties that prevent the emission of harmful radiation from television, video, and computer screens. Lead alloys such as lead-antimony are used in batteries and in the chemicals industry for pumps and valves. Lead-tin solders are used for welding metal parts together. In the area of hybrid vehicles, lead starter batteries will still be standard equipment in cars, no matter what hybrid battery system is chosen.

[Table 3](#) shows lead use data for the period 2006-08. Total use in 2008 decreased 15% over the previous year, mostly for recycled lead. [Figure 7](#) shows the breakdown of lead uses in the United States for 2008 (the most recent year for which data are available) and gives a general comparison showing relative percentages of lead used in various applications.

INTERNATIONAL LEAD AND ZINC STUDY GROUP

The International Lead and Zinc Study Group (ILZSG) is an intergovernmental organization that regularly brings together 30 member countries in an international forum to exchange information on lead and zinc. Particular attention is given to providing regular and frequent information on supply, demand, and the outlook for lead and zinc prices and markets. The twice-yearly supply-demand and metal balance reports compiled by ILZSG with member government support are widely used in industry as a basis for determining potential price directions.

The Study Group, headquartered in Lisbon, Portugal, represents most of the world's major lead- and zinc-producing and using nations. The Group has an extensive information-gathering and dissemination role and acts as an effective mechanism for increasing market transparency related to the production, use, and trade of lead and zinc. The Group is also an important forum for communication among governments, among industry, and between governments and industry. It holds a general session each year in October.

More information on the Group's activities can be obtained from its web site at www.ilzsg.org/static/home.aspx.

PRICES AND STOCKS

The average annual London Metal Exchange (LME) settlement price for lead in 2009 was US\$1726/t, a 17% decrease over the 2008 average. The trend in daily LME cash settlement prices for 2009 is shown in [Figure 8](#). Prices started the year at US\$1041/t and rose to almost US\$2400/t by year-end. The highest price reached in 2009 was US\$2440/t on September 9. Average annual cash settlement prices for the period 1985-2009 are shown in [Figure 9](#). The trend in lead prices for the period 2005-09, along with stocks, is shown in [Figure 10](#). Lead inventories held in LME warehouses increased from 53 000 t in January to end the year at 147 000 t. Total reported stocks were 385 000 t, an increase of 88 000 t from the previous year. This trend is unusual, as in the past cycle, because prices increased while stocks were decreasing whereas, in 2009, a continued increase in stocks did not have a negative effect on prices.

According to figures from ILZSG, world refined lead usage was 8.77 Mt in 2009, up slightly from 8.64 Mt in 2008 ([Table 8](#)). In 2009, the world lead metal balance was in a surplus position of 44 000 t, compared to a surplus of only 5 000 t in 2008.

OUTLOOK

ILZSG predicts that global lead mine production for 2010 will increase by 5.1% to 4.2 Mt, an increase of 202 000 t from 2009 levels, due predominantly to production increases in Australia and Mexico. Refined metal production should increase to 9.4 Mt, representing 660 000 t of added production. This is due to expected added capacity in India and Brazil. It is expected that global refined lead usage will be 9.3 Mt in 2010.

It is also expected that global metal supply will exceed demand by about 96 000 t in 2010. Continued strong demand for automotive batteries in China and other Asian countries will not offset the much slower economic growth predicted for Europe and North America.

Lead prices are expected to vary within the US\$1800-\$2000/t (US\$0.81-\$0.91/lb) range during 2010.

OTHER SOURCES OF INFORMATION ON LEAD

Battery Council International

www.batterycouncil.org

Eurometaux (European Association of Metals)

www.eurometaux.org

International Lead Association

www.ila-lead.org

International Lead Management Center

www.ilmc.org

Lead Sheet Association

www.leadsheetassociation.org.uk

London Metal Exchange

www.lme.com

U.S. Geological Survey

<http://minerals.usgs.gov/minerals/pubs/commodity/lead/>

World Bureau of Metal Statistics

www.worldbureau.com

Notes: (1) For definitions and valuation of mineral production, shipments and trade, please refer to the chapter entitled "Definitions and Valuation: Mineral Production, Shipments, and Trade." (2) Information in this review was current as of May 15, 2010. (3) This and other reviews, including previous editions, are available on the Internet at www.nrcan.gc.ca/minerals-metals/business-market/canadian-minerals-yearbook/4070.

Note To Readers

The intent of this document is to provide general information and to elicit discussion. It is not intended as a reference, guide or suggestion to be used in trading, investment, or other commercial activities. The author and Natural Resources Canada make no warranty of any kind with respect to the content and accept no liability, either incidental, consequential, financial or otherwise, arising from the use of this document.

Figure 1

Lead Producers in Canada, 2009



Numbers refer to locations on map above.

Lead-Producing Mines

1. Brunswick, Xstrata Zinc Canada

www.xstrata.com

6. Myra Falls, Breakwater Resources Ltd.

www.breakwater.ca

Lead Metallurgical Plants

1. Belledune, Xstrata Zinc Canada

www.xstrata.com

2. Newalta Corporation

www.newalta.com

3. Tonolli, Tonolli Canada Ltd.

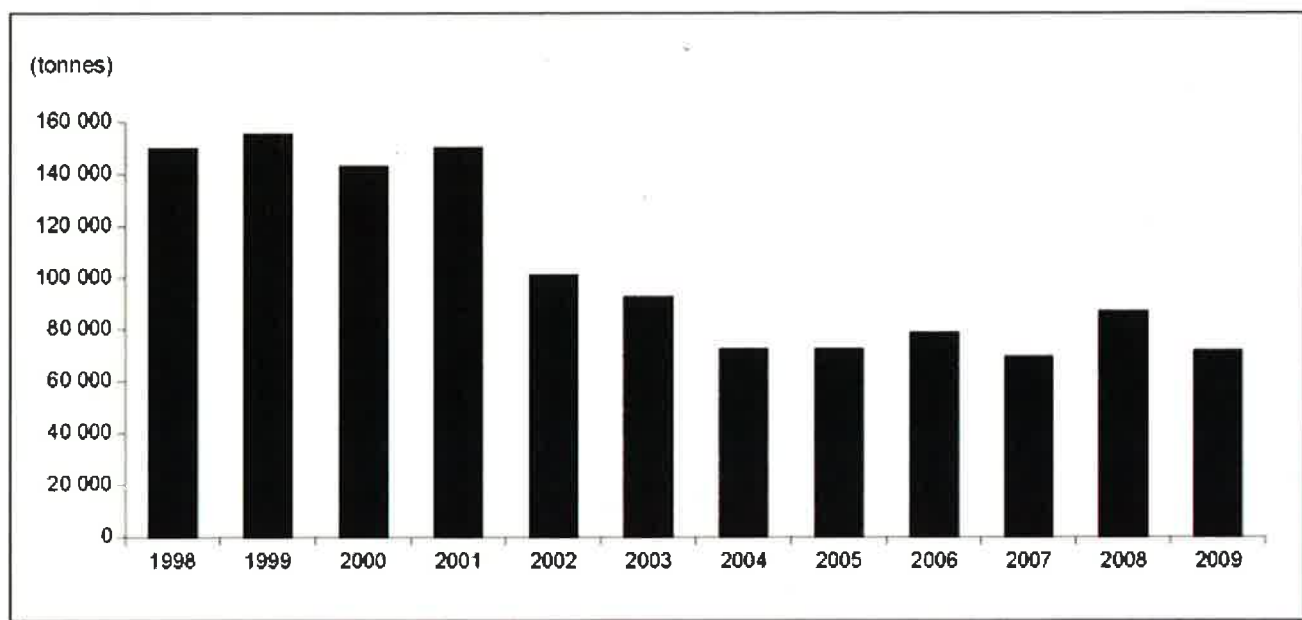
4. Trail, Teck Resources Limited

www.teck.com

5. Metalex Products Ltd.

www.metalexleadrecycling.com

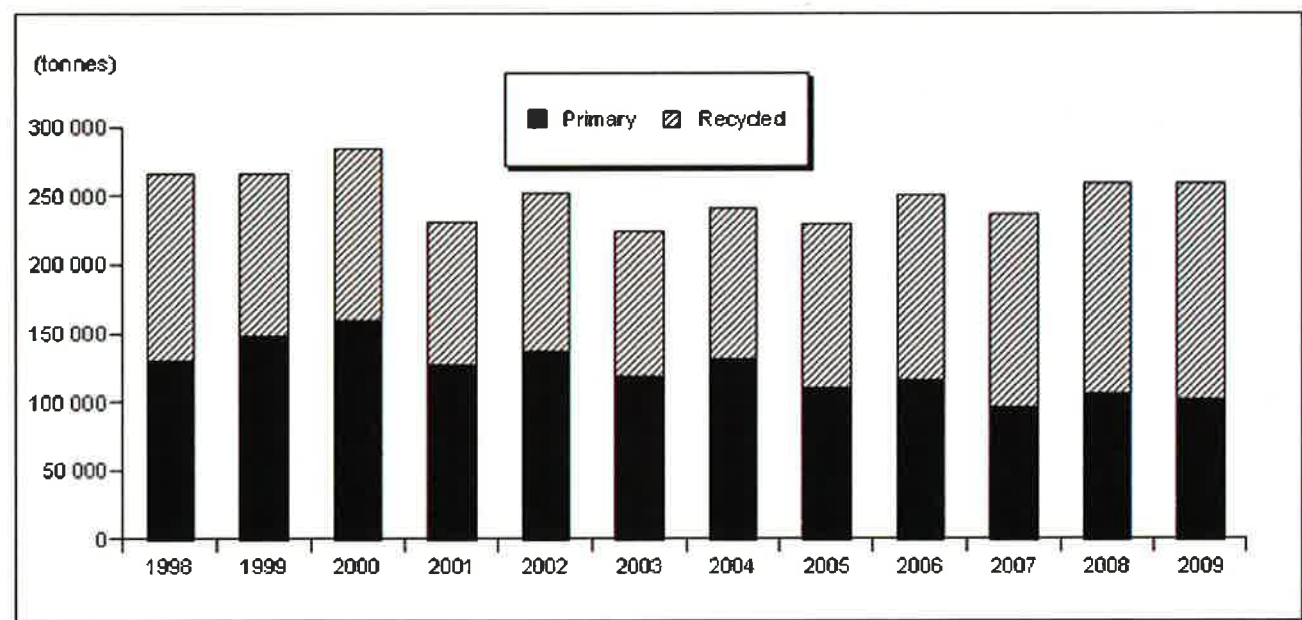
Figure 2
Canadian Mine Production of Lead, (1) 1998-2009



Source: Natural Resources Canada.

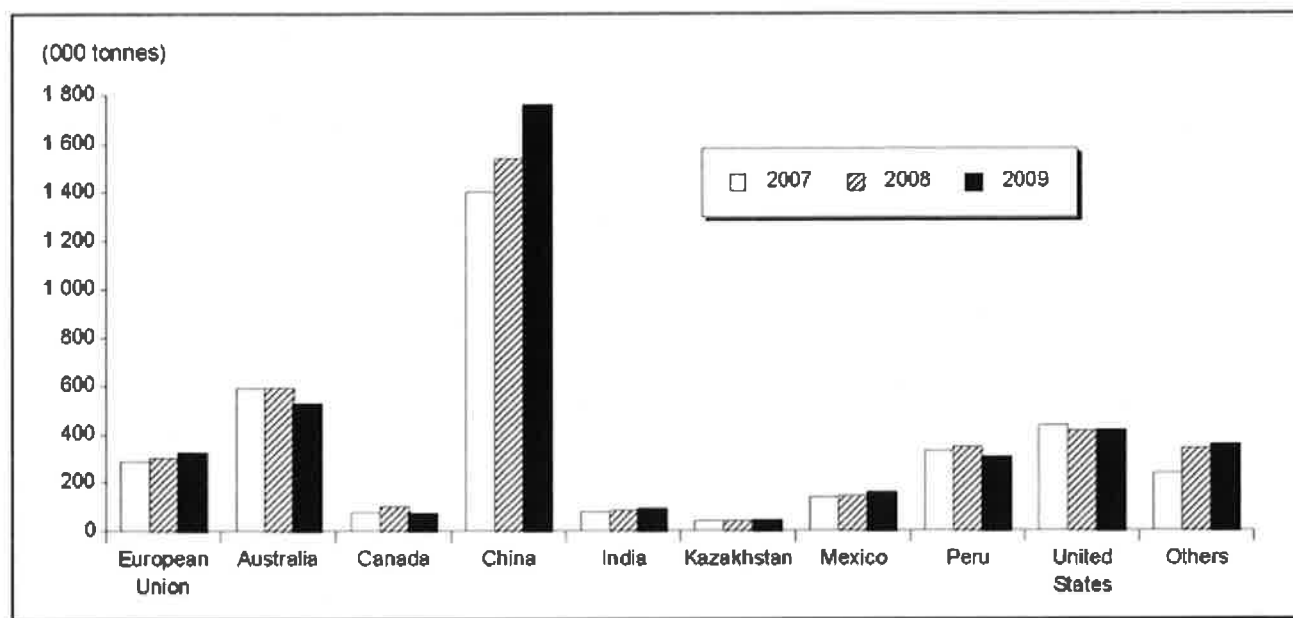
(1) Recoverable lead in ores and concentrates shipped.

Figure 3
Canadian Refined Lead Metal Production, 1998-2009



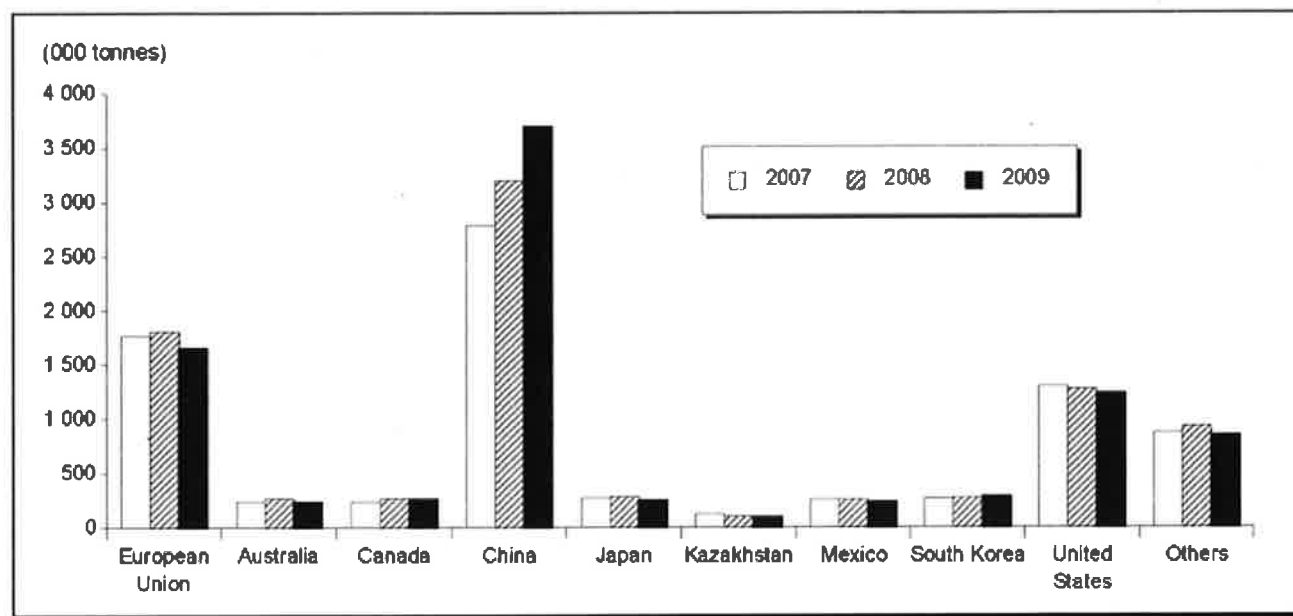
Source: Natural Resources Canada.

Figure 4
World Lead Mine Production, 2007-09



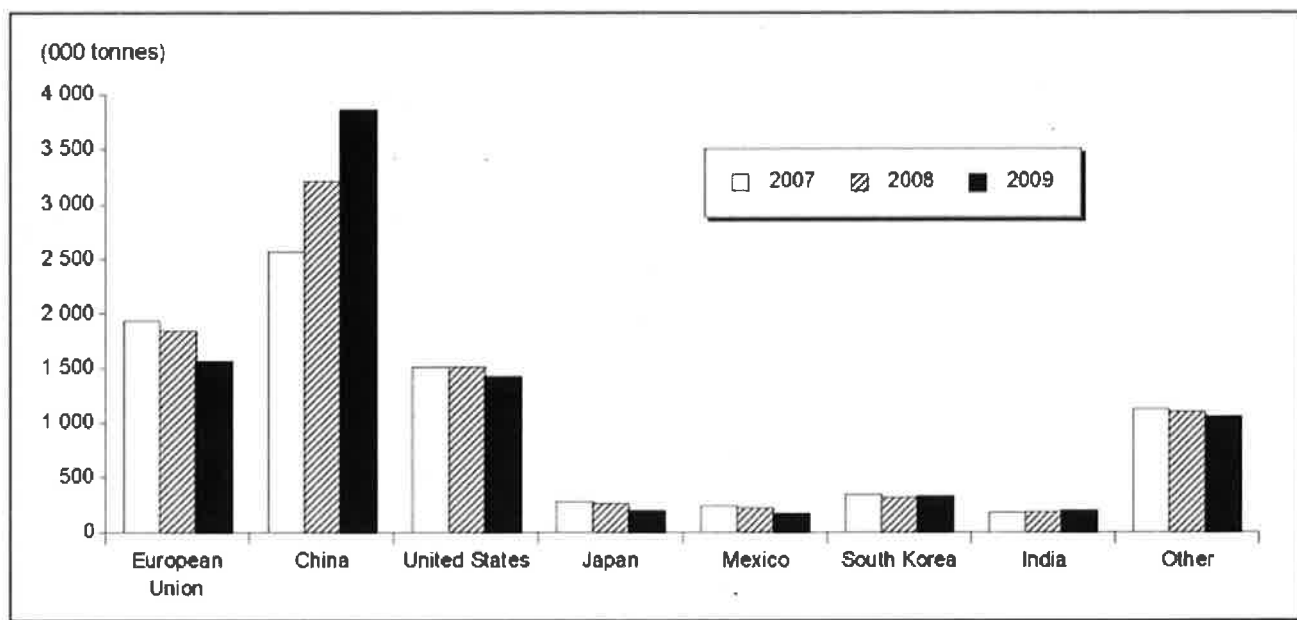
Source: International Lead and Zinc Study Group.

Figure 5
World Lead Metal Production, 2007-09



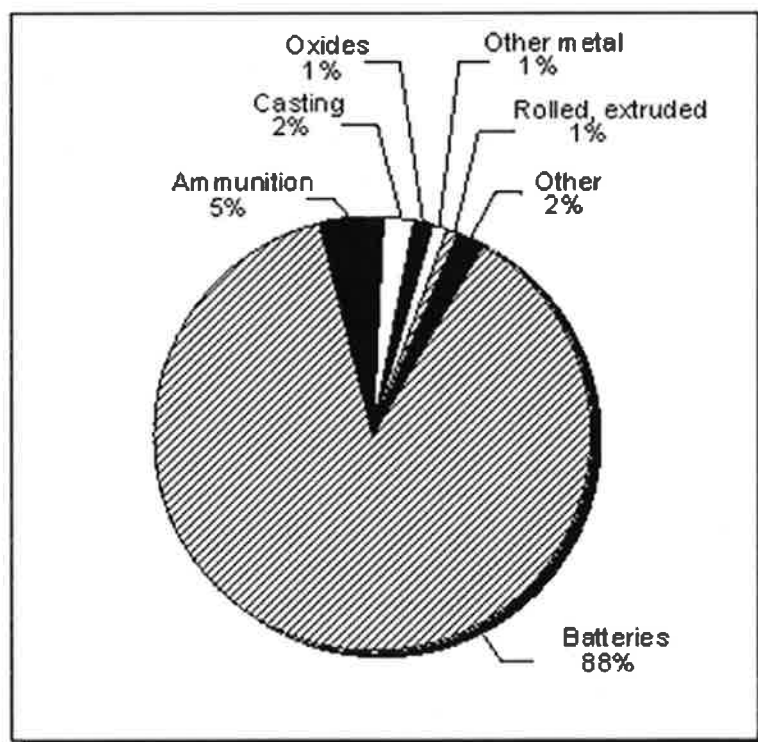
Source: International Lead and Zinc Study Group.

Figure 6
World Refined Lead Use, 2007-09



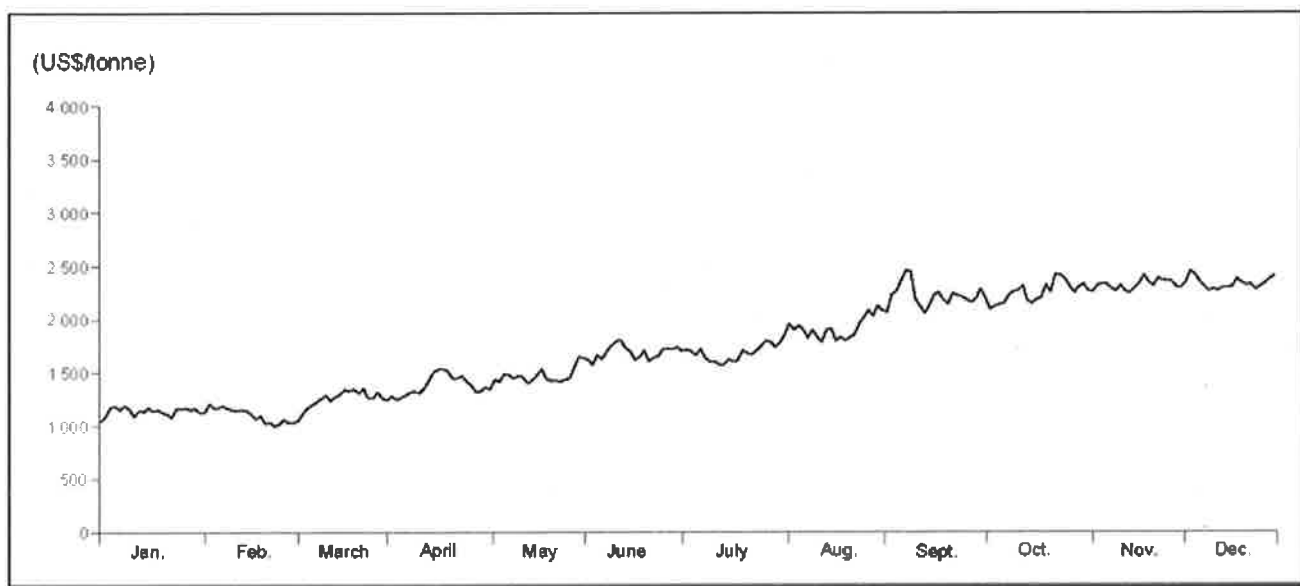
Source: International Lead and Zinc Study Group.

Figure 7
Lead Use in the United States, 2008



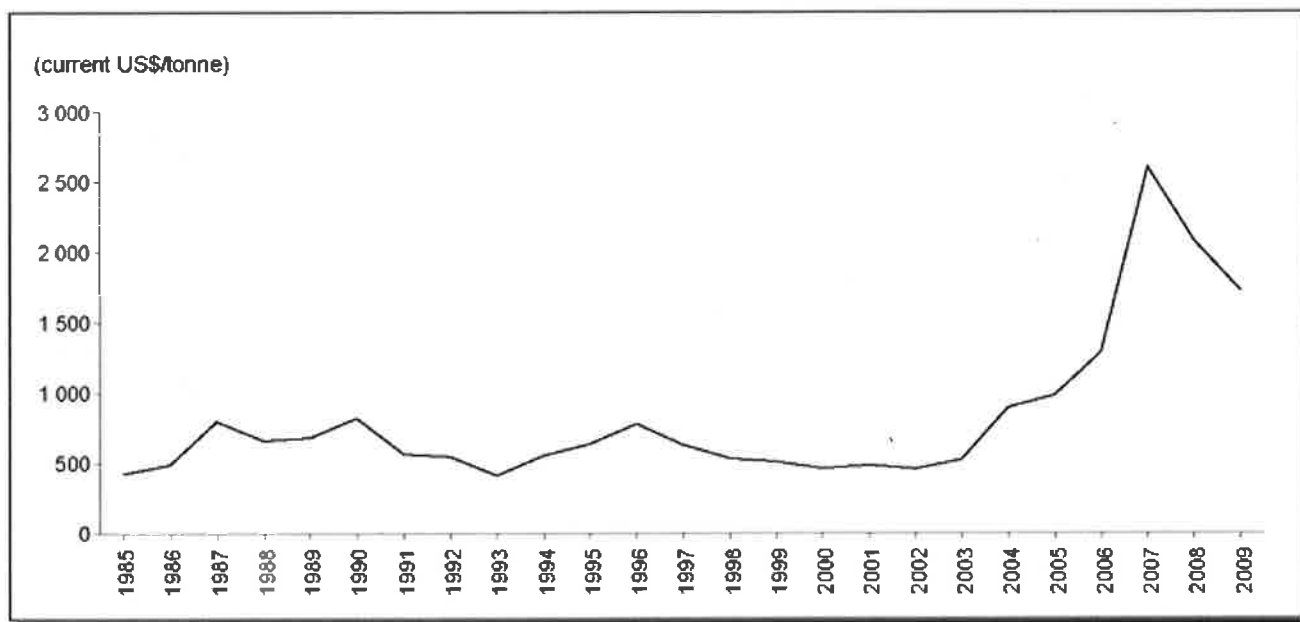
Source: U.S. Geological Survey.

Figure 8
Lead, London Metal Exchange Cash Settlement Prices, 2009



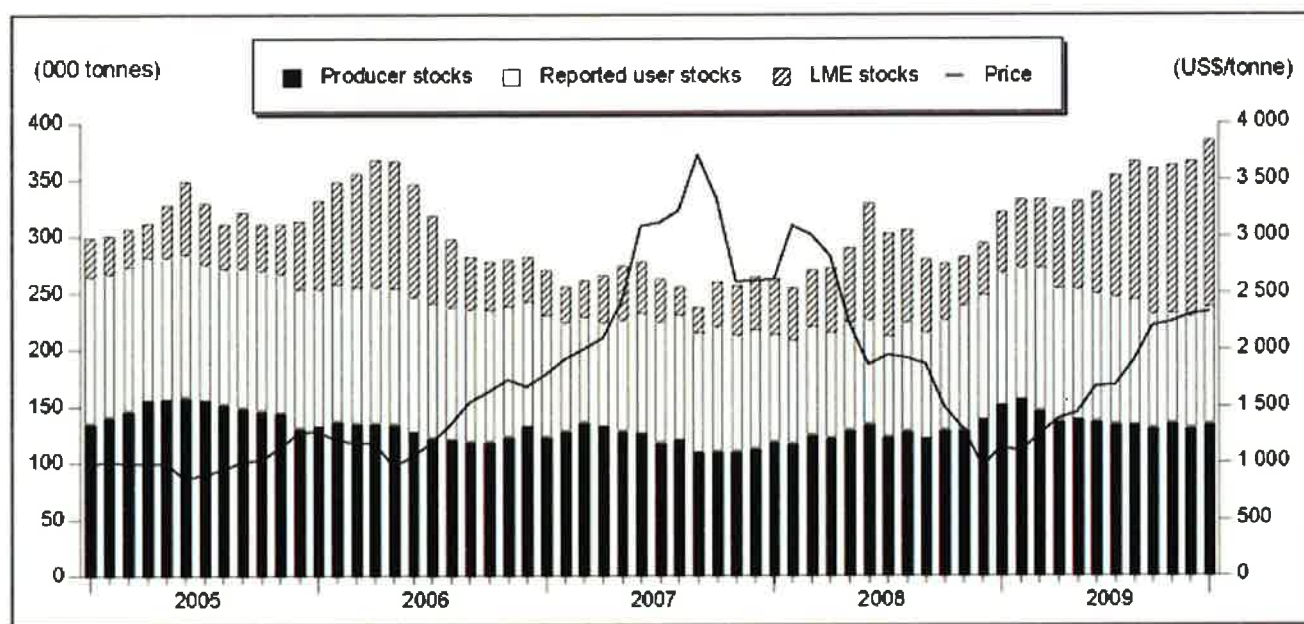
Source: metalprices.com.

Figure 9
Lead, Average Cash Settlement Prices, 1985-2009



Source: International Lead and Zinc Study Group.

Figure 10
Lead Prices and Stocks, (1) 2005-09



Source: International Lead and Zinc Study Group.

(1) LME monthly average settlement prices and reported total stocks.

TARIFFS

Item No.	Description	Canada			United States	EU	Japan
		MFN	GPT	USA	Canada (1)	Conventional Rate (1)	WTO (2)
2603.00.20	Copper ores and concentrates: lead content	Free	Free	Free	Free	Free	Free
26.07	Lead ores and concentrates	Free	Free	Free	Free	Free	Free
2608.00.20	Zinc ores and concentrates: lead content	Free	Free	Free	Free	Free	Free
2616.10.00.20	Precious metal ores and concentrates: silver ores and concentrates: lead content	Free	Free	Free	Free	Free	Free
2617.90	Other ores and concentrates: other	Free	Free	Free	Free	Free	Free
2620.29	Slag, ash and residues (other than from the manufacture of iron or steel) containing metals, arsenic or their compounds: containing mainly lead: other	Free	Free	Free	Free	Free	Free
2824.90.10	Lead oxides; red lead and orange lead: other: red lead and orange lead	3%	Free	Free	Free	5.5%	4.7%
78.01	Unwrought lead						
7801.10	Refined lead	Free-2.5%	Free	Free	Free	2.5%	Free-2.7yen/kg
7801.91	Other: containing by weight antimony as the principal other element	Free	Free	Free	Free	2.5% (3)	Free-3%
7801.99	Other: other	2.5%	Free	Free	Free	Free-2.5%	Free-3%
78.02	Lead waste and scrap	Free	Free	Free	Free	Free	2.1%
78.04	Lead plates, sheets, strip and foil; lead powders and flakes						

7804.11	Plates, sheets, strip and foil: sheets, strip and foil of a thickness (excluding any backing) not exceeding 0.2 mm	Free-3%	Free	Free	Free	5%	3%
7804.19	Plates, sheets, strip and foil: other	2.5%	Free	Free	Free	5%	3%
7804.20	Powders and flakes	2.5%	Free	Free	Free	Free	3%
78.06	Other articles of lead	2.5%-3%	Free	Free	Free	Free-5%	3%
8001.20	Unwrought tin: tin alloys	Free	Free	Free	Free	Free	2.1%
8507.10	Electric accumulators, including separators, whether or not rectangular (including square): lead-acid, of a kind used for starting piston engines	7%	7%	Free	Free	3.7%	Free
8548.10	Waste and scrap of primary cells, primary batteries and electric accumulators; spent primary cells, spent primary batteries and spent electric accumulators	Free	Free	Free	Free	Free-4.7%	Free

Sources: Canadian *Customs Tariff*, effective January 2010, Canada Border Services Agency; *Harmonized Tariff Schedule of the United States*, 2010; *Official Journal of the European Union* (Tariff Information), October 31, 2009 edition; *Customs Tariff Schedules of Japan*, 2010.

GPT General Preferential Tariff; MNF Most Favoured Nation; WTO World Trade Organization.

(1) The customs duties applicable to imported goods originating in countries that are Contracting Parties to the General Agreement on Tariffs and Trade or with which the European Community has concluded agreements containing the most-favoured-nation tariff clause shall be the conventional duties shown in column 3 of the Schedule of Duties. (2) WTO rate is shown; lower tariff rates may apply circumstantially. (3) This information comes from the footnote in the Official Journal of the European Union: "Customs duty autonomously suspended, for an indefinite period, for lead for refining, containing 0,02% or more by weight of silver (bullion lead) (TARIC code 7801 91 00 10). Entry under this subheading is subject to the conditions laid down in the relevant Community provisions (see Articles 291 to 300 of Commission Regulation (EEC) No 2454/93 (OJ 253, 11.10.1993, p.1)."

TABLE 1. CANADA, LEAD PRODUCTION, (1) BY PROVINCE, 2007-09

		2007		2008		2009 (p)	
		(tonnes)	(\$000)	(tonnes)	(\$000)	(tonnes)	(\$000)
SHIPMENTS (1)	Nova Scotia	1 194	3 309	5 742	15 560	—	—
	New Brunswick	66 173	183 431	78 266	212 101	69 879	135 985
	Quebec	—	—	442	1 199	80	157
	British Columbia	2 484	6 886	2 677	7 256	2 114	4 115
	Total	69 851	193 626	87 127	236 115	72 074	140 256
	Mine output (2)	75 135	..	99 810	..	68 624	..
	Refined production						
	Primary	95 577	..	105 526	..	101 484	..
	Recycled	141 111	..	153 549	..	157 456	..
	Total	236 688	..	259 074	..	258 940	..

Sources: Natural Resources Canada; Statistics Canada.

— Nil; .. Not available; (p) Preliminary.

(1) Production includes recoverable lead in ores and concentrates shipped valued at the Montréal Exchange average price for the year. (2) Lead content of domestic ores and concentrates exported.

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

TABLE 2. CANADA, LEAD TRADE, 2007-09

		2007		2008		2009	
		(tonnes)	(\$000)	(tonnes)	(\$000)	(tonnes)	(\$000)
EXPORTS							
2607.00	Lead ores and concentrates						
	China	9 341	29 374	12 512	32 262	344	896
	United States	31	12	...	2	1 205	585
	Hong Kong	—	—	—	—	106	141
	Other countries	8 101	7 383	2 998	4 002	—	—
	Total	17 473	36 769	15 510	36 266	1 655	1 622
2608.00.20	Lead content of zinc ores and concentrates						
	China	4 326	9 620	—	—	40 904	15 597
	Belgium	—	—	—	—	275	224
	Other countries	14 043	29 319	14 682	30 893	3	5
	Total	18 369	38 939	14 682	30 893	41 182	15 826
2616.10.20	Lead content of silver ores and concentrates						
	Germany	326	685	227	510	281	322
	Belgium	658	1 450	199	477	—	—
	Total	984	2 135	426	987	281	322
2617.90	Other ores and concentrates: other						
	China	39	15	764	1 211	255	148
	Other countries	56	66	18	11	1	1
	Total	95	81	782	1 222	256	149
2620.29	Slag, ash and residues (other than from the manufacture of iron or steel) containing metals, arsenic or their compounds: containing mainly lead: other						
	Belgium	—	—	—	—	8	8
	Australia	—	—	54	544	—	—
	Total	—	—	54	544	8	8
7801.10	Refined lead, unwrought						
	United States	142 905	305 024	82 312	185 426	100 034	187 981
	Brazil	—	—	—	—	1 179	2 554
	South Korea	—	—	—	—	587	1 066
	Japan	1 256	3 192	3 051	7 167	388	700
	Other countries	1	3	517	1 086	127	212
	Total	144 162	308 219	85 880	193 679	102 315	192 513
7801.91	Lead, unwrought, containing by weight antimony as the principal other element						
	United States	22 040	50 421	26 621	55 445	25 974	40 346
	China	1 361	2 460	313	552	1 403	2 273
	Other countries	573	1 218	36	85	—	—
	Total	23 974	54 099	26 970	56 082	27 377	42 619

7801.99	Lead, unwrought, other						
	United States	46 952	128 919	112 587	277 794	80 422	171 596
	Thailand	—	—	4 513	10 181	8 384	17 706
	Taiwan	—	—	—	—	6 860	12 365
	China	—	—	—	—	7 180	11 533
	Japan	—	—	1 020	2 098	4 531	8 938
	South Korea	—	—	—	—	2 637	4 941
	Vietnam	—	—	719	1 454	2 442	4 260
	Indonesia	19	43	244	598	1 549	3 545
	India	2	2	3	5	1 485	1 905
	Belgium	1 051	4 502	814	2 410	862	1 726
	Pakistan	2	2	—	—	834	1 401
	Other countries	9 358	19 067	1 561	3 658	683	1 543
	Total	57 384	152 535	121 461	298 198	117 869	241 459
7802.00	Lead waste and scrap						
	United States	1 224	1 681	1 036	1 628	854	2 186
	India	185	279	174	195	327	291
	Other countries	355	404	127	187	45	31
	Total	1 764	2 364	1 337	2 010	1 226	2 508
7804.11	Lead sheets, strip and foil of a thickness (excluding any backing) less than 0.2 mm						
	United States	1	18	—	—	—	—
7804.19	Lead plates, sheet, strip and foil, n.e.s.						
	United States	601	2 046	291	1 116	164	561
	Other countries	72	206	33	126	6	14
	Total	673	2 252	324	1 242	170	575
7804.20	Lead powders and flakes						
	United States	1	20	...	2	...	3
	South Korea	—	—	—	—	1	2
	Other countries	10	25	—	—	—	—
	Total	11	45	...	2	1	5
		(n.a.)	(\$000)	(n.a.)	(\$000)	(n.a.)	(\$000)
7806.00	Other articles of lead						
	United States	..	15 029	..	21 269	..	8 399
	South Africa	..	411	..	528	..	367
	United Arab Emirates	—	—	..	132	..	200
	Other countries	..	844	..	667	..	292
	Total	..	16 284	..	22 596	..	9 258
8001.20	Unwrought tin, tin alloys						
	United States	..	6 993	..	8 707	..	5 910

	Japan	..	405	..	771	..	343
	Other countries	..	80	..	124	..	17
	Total	..	7 478	..	9 602	..	6 270
		(number)	(\$000)	(number)	(\$000)	(number)	(\$000)
8507.10	Electric accumulators, lead-acid of a kind used for starting piston engines						
	United States	7 363	2 118	11 627	3 082	14 161	2 129
	Cuba	352	128	20	2	496	67
	Ukraine	1	...	—	—	697	52
	Bahamas	—	—	—	—	350	16
	Grenada	—	—	—	—	361	13
	Australia	3	...	—	—	23	12
	Saint Lucia	—	—	—	—	250	11
	Other countries	3 849	328	88 643	1 003	563	49
	Total	11 568	2 574	100 290	4 087	16 901	2 349
		(n.a.)	(\$000)	(n.a.)	(\$000)	(n.a.)	(\$000)
8548.10	Waste and scrap of primary cells, primary batteries and electric accumulators; spent primary cells, spent primary batteries and spent electric accumulators						
	United States	..	7 384	..	11 243	..	11 297
	Other countries	..	254	..	171	..	42
	Total	..	7 638	..	11 414	..	11 339
Total exports		..	631 430	..	668 824	..	526 822
		(tonnes)	(\$000)	(tonnes)	(\$000)	(tonnes)	(\$000)
IMPORTS (1)							
2603.00.00.20	Copper ores and concentrates, lead content						
	United States	1	1	—	—	—	—
2607.00	Lead ores and concentrates						
	United States	39 233	188 799	47 709	211 647	45 007	172 871
	Peru	1 123	24 920	1 760	10 048	85	44 966
	Australia	1 865	14 385	6 692	23 442	6 627	25 303
	Spain	4 876	24 769	45	22 984	17	10 864
	Colombia	—	—	—	—	6	10 208
	Mexico	—	—	...	...	1 029	7 633
	Netherlands	1 719	3 507	9 090	3 245	1 674	6 642
	United Kingdom	—	—	4	2 136	9	5 216
	Other countries	1 762	32 233	271	8 713	...	...
	Total	50 578	288 613	65 571	282 215	54 454	283 703
2608.00.00.20	Lead content of zinc ores and concentrates						
	United States	1 666	2 985	173	246	—	—
2616.10.00.20	Lead content of silver ores and concentrates						
	Bolivia	30	30	218	219	271	292

	Peru	—	—	—	—	121	126
	Panama	—	—	43	43	—	—
	Total	30	30	261	262	392	418
2617.90.00.90	Other ores and concentrates: other: other						
	Belgium	—	—	1 116	360	5	564
	United States	865	245	3 429	419	2 031	431
	Turkey	519	318	232	120	176	119
	Germany	8	2	3	15	176	53
	China	2	9	19	7	45	17
	Chile	1	...	18	2	29	12
	Panama	...	...	62	9	26	11
	Senegal	24	3	54	10	40	10
	Other countries	353	322	322	112	87	23
	Total	1 772	899	5 255	1 054	2 615	1 240
2620.29.00	Slag, ash and residues (other than from the manufacture of iron or steel) containing metals, arsenic or their compounds: containing mainly lead: other						
	United States	1 502	775	1 619	851	604	330
	Belgium	—	—	—	—	80	42
	Other countries	11	2 275	—	—	1	...
	Total	1 513	3 050	1 619	851	685	372
2824.90.10	Other: red lead and orange lead						
	United States	438	482	...	...	101	111
	Taiwan	—	—	—	—	...	...
	Total	438	482	...	...	101	111
7801.10.10	Refined lead, unwrought, pig and block						
	United States	4 415	6 180	4 516	8 288	4 062	7 162
	Other countries	111	209	42	88	—	—
	Total	4 526	6 389	4 558	8 376	4 062	7 162
7801.10.90	Refined lead, unwrought, other						
	United States	486	859	1 699	3 135	1 285	2 417
	Other countries	1	3	6	12	8	14
	Total	487	862	1 705	3 147	1 293	2 431
7801.91	Lead, unwrought, containing by weight antimony as the principal other element						
	Cuba	236	388	269	524	296	354
	United States	261	380	1 044	1 699	204	334
	Other countries	4	5	178	290	25	50
	Total	501	773	1 491	2 513	525	738
7801.99	Lead, unwrought, other						
	United States	164	266	35	59	500	829
	Belgium	—	—	—	—	11	17

	Other countries	1	2	...	...	4	9
	Total	165	268	35	59	515	855
7802.00	Lead waste and scrap						
	United States	64 394	34 254	93 142	59 762	78 813	39 008
	Norway	—	—	—	—	5	2
	Other countries	407	657	187	69	18	4
	Total	64 801	34 911	93 329	59 831	78 836	39 014
7804.11	Lead sheets, strip and foil of a thickness (excluding any backing) less than 0.2 mm						
	United States	1 104	3 188	330	1 806	518	2 374
	New Zealand	7	116	11	160	4	123
	Germany	4	33	6	61	6	65
	United Kingdom	5	30	4	42	5	38
	Other countries	...	5	3	29	...	1
	Total	1 120	3 372	354	2 098	533	2 601
7804.19	Lead plates, sheet, strip and foil, n.e.s.						
	United States	219	448	201	598	147	411
	United Kingdom	20	39	18	53	24	70
	Germany	4	9	2	6	2	7
	Other countries	3	3	7	9	2	5
	Total	246	499	228	666	175	493
7804.20	Lead powders and flakes						
	United States	316	669	201	772	195	641
	Other countries	...	...	...	1	—	—
	Total	316	669	201	773	195	641
7806.00	Other articles of lead						
	United States	1 814	6 806	1 247	7 239	788	6 632
	China	42	163	25	158	86	323
	Germany	104	189	24	201	20	199
	Japan	40	765	14	238	10	183
	Other countries	61	191	23	247	9	89
	Total	2 061	8 114	1 333	8 083	913	7 426
8001.20.00.20	Unwrought tin: tin-antimony alloys						
	United States	..	74	..	65	..	55
	Mexico	..	56	..	6	..	8
	China	..	...	—	—	—	—
	Total	..	130	..	71	..	63
		(number)	(\$000)	(number)	(\$000)	(number)	(\$000)
8507.10.00.90	Electric accumulators. Lead-acid of a kind used for starting piston engines: other						
	United States	1 777 289	91 573	1 719 298	92 133	645 333	25 221

South Korea	259 038	8 918	304 503	13 843	251 095	7 920
China	37 454	652	77 850	1 595	89 758	1 862
Switzerland	15 190	1 970	19 263	2 585	8 622	1 348
Mexico	51 923	4 522	97 277	8 505	16 675	1 235
Taiwan	55 827	1 395	46 458	1 142	37 529	934
Other countries	29 206	957	31 071	1 055	27 238	686
Total	2 225 927	109 987	2 295 720	120 858	1 076 250	39 206
	(n.a.)	(\$000)	(n.a.)	(\$000)	(n.a.)	(\$000)
8548.10	Waste and scrap of primary cells, primary batteries and electric accumulators; spent primary cells, spent primary batteries and spent electric accumulators					
United States	..	11 126	..	12 583	..	18 214
Singapore	—	—	—	—	..	109
China	..	25	..	99	..	78
United Kingdom	..	5	..	348	..	17
Other countries	..	321	..	199	..	8
Total	..	11 477	..	13 229	..	18 426
Total imports	..	473 511	..	504 332	..	404 900

Sources: Natural Resources Canada; Statistics Canada.

— Nil; .. Not available; ... Amount too small to be expressed; n.a. Not applicable; (p) Preliminary.

(1) Imports from "other countries" may include re-imports from Canada.

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

TABLE 3. CANADA, (1) LEAD USE, 2005-07

	2005			2006			2007		
	Primary	Recycled (2)	Total	Primary	Recycled (2)	Total	Primary	Recycled (2)	Total
(tonnes)									
Lead used for or in the production of:									
Antimonial lead	x	x	34 241	x	x	30 532	x	x	33 565
Batteries and battery oxides	x	x	x	1 366	x	x	x	x	x
Chemical uses; white lead, red lead, litharge, tetraethyl lead, etc.	x	—	x	3 868	—	x	x	—	x
Copper alloys; brass, bronze, etc.	x	x	12	6	x	9	—	x	x
Lead alloys:									
Solders	x	x	x	180	x	x	x	x	x
Others (including babbitt, type metals, etc.)	x	x	x	268	x	x	x	x	x
Semi-finished products:									
Pipe, sheet, traps, bends, blocks for caulking, ammunition, etc.	x	x	x	2 999	x	x	x	x	x

Other lead products	2 496	2 119	4 615	2 154	2 704	4 858	1 491	2 512	4 003
Total, all categories	28 633	39 433	68 066	18 577	29 851	48 428	19 921	36 591	56 512

Source: Natural Resources Canada.

– Nil; x Confidential.

(1) Available data, as reported by users. (2) Includes all remelt scrap lead used to make antimonial lead.

Note: This survey is currently suspended by Natural Resources Canada. Numbers may not add to totals due to rounding.

TABLE 4. CANADA, LEAD PRODUCTION, TRADE AND USE, HISTORICAL, 1988-09

	Production				Domestic Exports (1)			Imports	Quantity Used (3)
	All Forms (2)	Refined			In Ores and Concentrates	Refined	Total	Refined	
		Primary	Secondary	Total					
(tonnes)									
1988	351 148	179 461	88 615	268 076	200 822	179 946	380 769	15 133	88 728
1989	268 887	157 330	85 515	242 845	170 582	121 444	292 027	11 734	88 408
1990	233 372	87 180	96 465	183 645	221 566	84 007	305 573	11 781	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	221 039	11 611	91 915
1994	167 584	153 035	98 605	251 640	55 923	133 203	189 127	5 119	95 764
1995	204 227	178 019	103 372	281 390	90 254	140 478	230 732	3 969	91 171
1996	241 751	192 877	117 914	310 791	154 696	159 859	314 555	4 180	93 373
1997	170 847	139 736	131 659	271 395	112 694	155 639	268 333	5 841	92 997
1998	150 019	129 750	135 737	265 487	52 249	145 358	197 607	6 460	87 466
1999	155 369	148 526	117 889	266 414	58 831	139 622	198 453	7 662	92 557
2000	143 303	159 192	125 141	284 333	50 524	148 427	198 952	7 029	81 365
2001	150 389	127 007	103 921	230 928	69 093	126 651	195 743	5 111	56 905
2002	101 330	136 896	114 664	251 560	53 183	144 178	197 360	3 619	66 575
2003	92 934	118 506	104 927	223 434	22 068	129 737	151 805	4 038	68 359
2004	72 773	131 717	109 453	241 169	11 179	130 491	141 671	5 822	71 738
2005	72 828	109 996	120 241	230 237	14 524	141 088	155 612	3 477	68 066
2006	79 171	115 989	134 475	250 464	17 063	165 186	182 249	5 869	48 428
2007	69 851	95 577	141 111	236 688	36 781	144 848	181 629	6 695	56 512
2008 (r)	87 127	105 526	153 549	259 074	27 632	86 205	113 837	7 050	..
2009 (p)	72 074	101 484	157 456	258 940	42 791	102 485	145 276	6 257	..

Sources: Natural Resources Canada; Statistics Canada.

.. Not available; (p) Preliminary; (r) Revised.

(1) Beginning in 1988, exports and imports are based on the Harmonized System and may not be in complete accordance with previous method of reporting. Exports in 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) Use of lead, primary and secondary in origin, as measured by a survey of consumers.

TABLE 5. ANNUAL AVERAGE LEAD PRICES,
LONDON METAL EXCHANGE, 1980-09

	London Metal Exchange			
	Settlement		Three Months	
	(US\$/t)	(US\$/lb)	(US\$/t)	(US\$/lb)
1980	909.12	41.24	911.46	41.34
1981	734.73	33.33	750.12	34.03
1982	544.08	24.68	562.53	25.52
1983	425.27	19.29	440.55	19.98
1984	444.36	20.16	445.25	20.20
1985	394.10	17.88	394.12	17.88
1986	406.89	18.46	407.26	18.47
1987	597.41	27.10	567.38	25.74
1988	655.83	29.75	635.68	28.83
1989	676.14	30.67	659.36	29.91
1990	817.85	37.10	790.82	35.87
1991	557.84	25.30	568.90	25.81
1992	540.04	24.50	553.56	25.11
1993	406.38	18.43	420.36	19.07
1994	549.01	24.90	564.10	25.59
1995	630.51	28.60	638.88	28.98
1996	773.96	35.11	771.22	34.98
1997	624.08	28.31	633.01	28.71
1998	528.42	23.97	533.29	24.19
1999	502.24	22.78	508.89	23.08
2000	454.22	20.60	468.07	21.23
2001	476.04	21.59	483.24	21.92
2002	452.52	20.53	461.65	20.94
2003	515.66	23.39	517.53	23.48
2004	888.41	40.30	850.63	38.58
2005	975.65	44.26	941.41	42.70
2006	1 285.28	58.30	1 280.47	58.08
2007	2 600.38	117.95	2 571.26	117.39
2008	2 078.83	94.29	2 080.91	94.39
2009	1 726.35	78.30	1 740.94	78.96

Source: International Lead and Zinc Study Group.

TABLE 6. MINE PRODUCTION OF LEAD, BY COUNTRY, 2005-09

	2005	2006	2007	2008	2009 (p)
	(000 tonnes)				
EUROPE					
Bulgaria	13	10	15	15	18
Greece	3	11	16	15	10
Ireland	72	62	57	50	49
Italy	6	6	3	3	3
Macedonia	—	10	32	40	40
Poland	51	50	51	48	39
Romania	12	12	1	—	—
Russia	36	34	48	60	78
Spain	—	—	—	—	3
Serbia and Montenegro	2	7	1	3	7
Sweden	61	56	63	64	72
Other	..	..	..	3	3
Total Europe	256	258	287	301	322
AFRICA					
Morocco	64	54	36	34	36
Namibia	14	11	11	14	13
South Africa	42	48	42	46	49
Other Africa	10	1	1	12	10
Total Africa	130	114	90	106	108
AMERICAS					
Canada	79	82	75	99	69
Mexico	134	133	137	141	155
Peru	319	313	329	345	302
United States	432	427	434	410	415
Other Americas	43	53	65	131	142
Total Americas	1 007	1 008	1 040	1 126	1 083
ASIA					
China	1 142	1 331	1 402	1 543	1 760
India	58	66	78	84	88
Iran	20	31	25	30	34
Japan	3	1	—	—	—
Kazakhstan	45	66	40	39	40
North Korea	20	25	35	33	33

Turkey	19	14	14	18	18
Other Asia	3	2	11	22	20
Total Asia	1 309	1 536	1 605	1 769	1 993
OCEANIA					
Australia	715	621	589	594	525
Total world	3 423	3 537	3 610	3 896	4 031

Sources: Natural Resources Canada; International Lead and Zinc Study Group.

– Nil; . . Not available; (p) Preliminary.

TABLE 7. REFINED LEAD PRODUCTION, BY COUNTRY, 2005-09

	2005	2006	2007	2008	2009 (p)
(000 tonnes)					
EUROPE					
Belgium	97	101	117	109	125
Bulgaria	81	76	87	91	83
Czech Republic	26	28	26	36	36
France	90	88	88	82	62
Germany	418	379	405	415	388
Italy	211	191	212	200	149
Poland	88	96	104	108	96
Russia	66	80	103	112	118
Spain	110	129	128	145	130
Sweden	73	75	70	56	49
United Kingdom	304	298	275	303	312
Other Europe	135	142	151	155	114
Total Europe	1 702	1 683	1 766	1 812	1 662
AFRICA					
Morocco	54	45	45	37	14
South Africa	65	67	59	62	58
Other Africa	11	9	13	17	18
Total Africa	130	121	117	116	90
AMERICAS					
Argentina	45	45	46	48	48
Brazil	42	44	45	48	48
Canada	230	250	237	259	259
Mexico	256	253	255	255	234
Peru	122	120	117	114	26
United States	1 293	1 303	1 303	1 280	1 240

Other Americas	55	57	55	69	70
Total Americas	2 043	2 072	2 058	2 073	1 925
ASIA					
China	2 391	2 715	2 788	3 206	3 708
India	59	104	124	165	207
Japan	275	280	276	279	247
Kazakhstan	142	139	118	98	89
Malaysia	42	44	17	39	42
South Korea	256	240	260	270	290
Thailand	61	61	67	73	60
Other Asia	248	261	274	252	247
Total Asia	3 486	3 844	3 924	4 382	4 890
OCEANIA					
Australia	268	241	238	261	235
New Zealand	7	7	11	9	13
Total Oceania	276	248	249	270	248
Total world	7 636	7 968	8 114	8 653	8 815

Sources: Natural Resources Canada; International Lead and Zinc Study Group.
(p) Preliminary.

TABLE 8. REFINED LEAD USE BY COUNTRY, 2005-09

	2005	2006	2007	2008	2009 (p)
(000 tonnes)					
EUROPE					
Austria	28	30	25	34	33
Czech Republic	103	86	77	76	93
France	215	210	210	190	117
Germany	407	387	408	369	314
Ireland	53	48	58	42	35
Italy	269	285	269	276	220
Netherlands	30	30	26	25	22
Poland	94	108	101	99	78
Russia	80	79	76	75	68
Spain	270	272	260	248	233
United Kingdom	271	270	239	236	208
Other Europe	185	190	190	180	144
Total Europe	2 002	1 995	1 939	1 850	1 565
AFRICA					

Algeria	15	14	13	10	9
Egypt	7	5	5	6	5
South Africa	74	75	69	74	59
Other Africa	18	17	17	17	15
Total Africa	113	111	104	107	88
AMERICAS					
Brazil	119	114	102	129	126
Canada	42	41	32	31	38
Mexico	267	271	235	215	167
United States	1 586	1 611	1 510	1 515	1 426
Other Americas	127	122	128	123	107
Total Americas	2 132	2 159	2 007	2 013	1 864
ASIA					
China	1 973	2 213	2 573	3 211	3 860
India	160	170	175	181	187
Indonesia	72	79	85	103	86
Iran	61	65	68	65	55
Japan	291	303	279	261	189
Malaysia	85	90	68	64	55
South Korea	384	337	342	312	320
Taiwan	132	135	111	70	102
Thailand	129	141	134	124	127
Other Asia	215	246	270	261	251
Total Asia	3 533	3 779	4 105	4 652	5 232
OCEANIA					
Australia	28	27	25	23	20
New Zealand	1	2	2	2	2
Total Oceania	29	29	27	26	22
Total World	7 809	8 073	8 182	8 648	8 771

Sources: Natural Resources Canada; International Lead and Zinc Study Group.
(p) Preliminary.

TABLE 9. WESTERN WORLD PRODUCTION OF LEAD FROM RECYCLING, BY COUNTRY, (1) 2005-09

	2005	2006	2007	2008	2009 (p)
	(000 tonnes)				
EUROPE					
Austria	22	22	22	23	23
Belgium	103	101	117	109	125

France	90	88	88	82	62
Germany	277	265	294	302	272
Greece	—	6	11	11	10
Ireland	23	22	22	20	18
Italy	162	156	164	158	134
Netherlands	17	16	16	16	17
Slovenia	15	15	15	15	14
Spain	110	129	128	145	130
Sweden	46	50	44	43	40
United Kingdom	143	166	164	165	154
Other Europe	11	13	14	13	3
Total Europe	1 019	1 049	1 099	1 102	1 002
AFRICA					
Algeria	6	5	6	6	6
Morocco	3	4	5	5	5
Nigeria	3	3	3	8	8
South Africa	65	67	59	62	58
Other Africa	2	2	4	2	4
Total Africa	79	81	77	83	81
AMERICAS					
Argentina	35	35	36	38	39
Brazil	42	44	45	48	48
Canada	120	134	141	154	157
Colombia	10	10	10	10	10
El Salvador	10	10	10	11	12
Mexico	110	114	114	114	117
United States	1 155	1 150	1 183	1 184	1 134
Venezuela	35	36	36	47	48
Total Americas	1 517	1 533	1 575	1 606	1 565
ASIA					
India	35	56	70	103	144
Indonesia	18	18	18	18	18
Iran	49	52	54	68	69
Japan	168	172	172	172	151
Malaysia	30	35	12	27	30
Philippines	30	30	34	34	32
South Korea	73	62	74	76	78
Taiwan, China	55	54	54	38	36
Thailand	61	61	67	73	60

Other Asia	74	74	81	78	77
Total Asia	593	614	624	687	695
OCEANIA					
Australia	38	35	37	40	30
New Zealand	7	7	11	9	13
Total Oceania	45	42	48	49	43
Total Western World	3 253	3 319	3 423	3 528	3 387

Sources: Natural Resources Canada; International Lead and Zinc Study Group.

– Nil; (p) Preliminary.

(1) Refined lead and lead alloys (lead content) produced from scrap, waste, and residues.

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