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THE CANADIAN MINERAL INDUSTRY

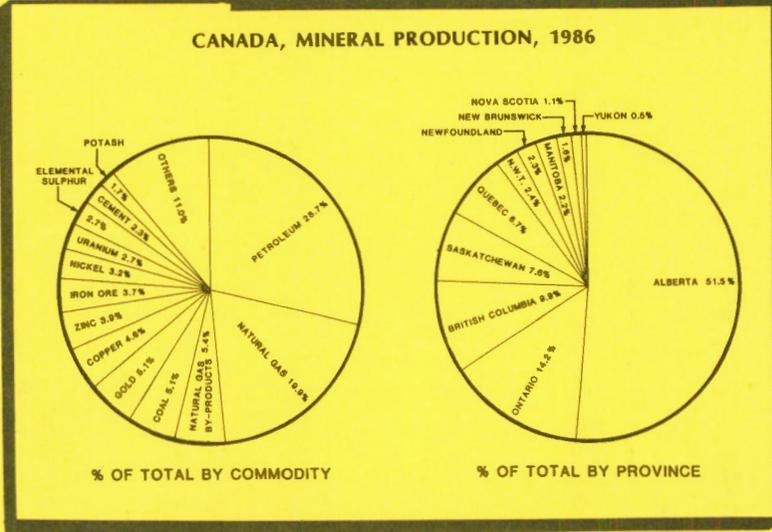
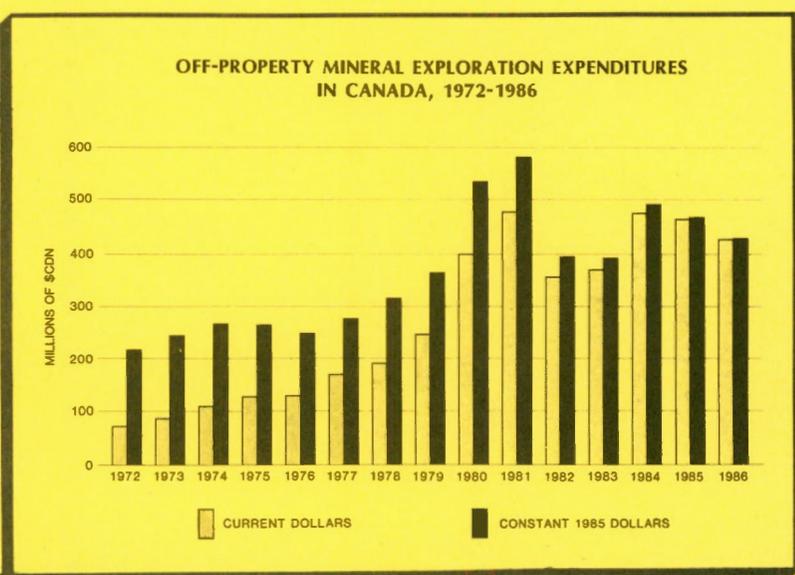
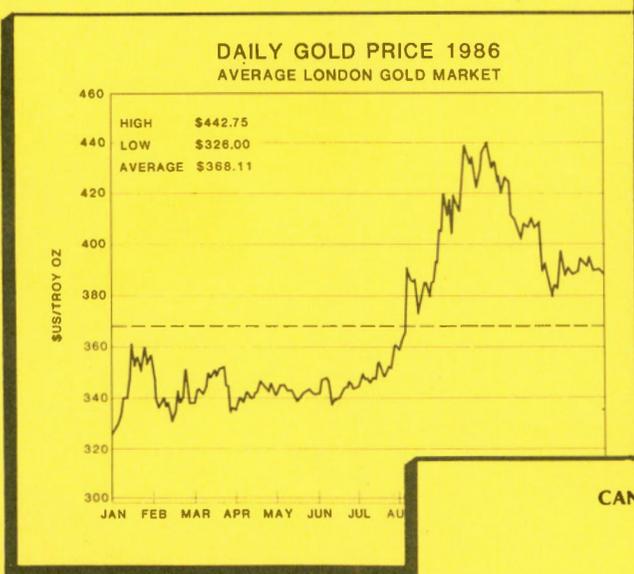
MONTHLY REPORT

DECEMBER 1987

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THE CANADIAN MINERAL INDUSTRY

MONTHLY REPORT



**Energy, Mines and
Resources Canada**

**Hon. Gerald S. Merrithew,
Minister of State
(Forestry and Mines)**

**Énergie, Mines et
Ressources Canada**

**L'Hon. Gerald S. Merrithew,
Ministre d'État
(Forêts et Mines)**

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PREFACE

This publication is prepared in the Mineral Policy Sector of the Department of Energy, Mines and Resources. It is compiled from many sources using the best information available to us. This report is intended to be a general review of the more important current developments that affect, or may affect the Canadian mineral industry. It should not be considered an authority for exact quotation or an expression of the official views of the Government of Canada.

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THE CANADIAN MINERAL INDUSTRY FOR DECEMBER

The following constitutes a brief summary of the Canadian mineral industry based on information that became available in December.

HIGHLIGHTS

1. Domestic demand for steel mill products improved in the 4th quarter of 1987. A quota system was therefore required to allocate some steel products which were in short supply.
2. According to the Metal Market Weekly, the price of ferrous scrap rose dramatically in the last half of 1987 from US\$72/t in July to US\$132/t in November. Ferrous scrap is an important material input for integrated and electric furnace steel mills.
3. Mr Jack Davis, Minister of Energy, Mines and Petroleum Resources for the Province of British Columbia, was the keynote speaker at the 4th International Tungsten Symposium held in September 1987, in Vancouver. He expressed the view that more exploration and research will be necessary in Canada if the Canadian Mineral Industry is to remain competitive in world markets.
4. During 1987, more than 40 projects to develop additional metal production capability in Canada were publicly announced. Over the next few years, these projects are expected to inject more than \$700 billion into the Canadian economy.
5. The price of copper continued to rise in December, reaching a high of 145.5 US cents/lb on December 29th. Most analysts, however, predict that current high prices will not be sustained beyond the first half of 1988.

ECONOMIC TRENDS

Table 1 provides information on the volume of production of Canada's leading minerals for the first ten months of 1986 and 1987. When comparing the ten month output of 1986 to that of 1987, gold, silver, zinc and potash showed large increases in output in 1987 relative to 1986, while copper, molybdenum and nickel showed decreases in output over the same time period.

Table 2 provides information on Canada's Gross Domestic Product at factor cost by industry.

The value of GDP is shown in annualized seasonally adjusted constant 1981 prices.

The annual rate shown for any given month is calculated by multiplying the figure for that month by twelve. It is important to note however, that if a particular month has been influenced by special factors such as a strike, the annualized data will reflect this bias.

Factor cost refers to output that is valued exclusive of excise taxes and duties, and provincial and municipal sales tax. Factor cost does however, include subsidies and other taxes that are not a function of the level of output or sale.

Seasonally adjusted data remove the effects of repetitive and clearly defined seasonal fluctuations from time series data. Such a practice permits the isolation of trends in the economy that might otherwise be obscured. Seasonal factors include such items as climate, trade practices and social institutions such as Christmas and Easter.

The GDP data is subject to ongoing revision.

GDP at Factor Cost in 1981 prices increased 0.5% in October. This gain was the ninth consecutive monthly increase. Forty percent of the October gain resulted from the exceptional increase in the volume of activity on stock exchanges associated with the stock market crash.

Table 3 shows the prices of selected minerals for October and November.

Tables 4 and 5 provide information on the cost of fuel and electricity consumed by the mineral manufacturing industries over the years 1979 through 1985, inclusive.

The remaining tables, 6 through 16, deal with the transportation, and loading and unloading of crude and fabricated materials. Tables 6, 7 and 8 provide information specific to the transportation of minerals by Canadian railways, while Tables 9 and 10 deal with minerals transported by water through the St. Lawrence Seaway. These tables show that minerals continue to contribute significantly to freight revenues. Tables 11 through 16 give detailed data pertaining to the loading and unloading of crude and fabricated minerals in both coastwise and international shipping.

TABLE 1. CANADA, PRODUCTION OF LEADING MINERALS ('000 TONNES EXCEPT WHERE NOTED)

		1986			1987			Percentage Changes		
		September	October	Total 10 months	September	October	Total 10 months	October 1987	October 1987	1st 10 months
								October 1986	September 1987	1987 1986
Metals										
Copper		62.7	67.7	612.6 ^r	63.8	63.0	611.6	-6.9	-1.2	-0.2
Gold	kg	9 470.8	9 249.7	86 994.2 ^r	10 402.0 ^r	11 429.8	93 694.8	+23.6	+9.9	+7.7
Iron ore		3 430.4	3 640.4 ^r	29 689.5 ^r	3 402.0	3 799.2	29 727.2	+4.4	+11.7	+0.1
Lead		35.2	28.7	240.8	53.6	29.2	326.2	+1.7	-45.5	+35.5
Molybdenum	t	941.7	1 005.0	10 014.0 ^r	951.5 ^r	829.1	9 484.4	-17.5	-12.9	-5.3
Nickel		16.6	19.8	142.0	17.8	19.1	157.4	-3.5	+7.3	+10.8
Silver	t	125.6	93.3	921.5 ^r	132.1 ^r	119.8	997.1	+28.4	-9.3	+8.2
Uranium ¹	t	927.8	1 408.5	9 292.4	922.6	1 479.9	10 634.2	+5.1	+60.4	+14.4
Zinc		128.8	81.1	898.4 ^r	131.1	123.3	1 039.7	+52.0	-5.9	+15.7
Nonmetals										
Asbestos		56.6	63.0	538.3	56.0	60.7	546.6	-3.6	+8.4	+1.5
Clay products	\$000	17 344.8	20 054.8	152 521.1	18 507.3	21 049.1	177 982.9	+5.0	+13.7	+16.7
Gypsum		767.4	978.2	7 870.4	929.0	1 034.1	7 914.5	+5.7	+11.3	+0.6
Potash K ₂ O		613.0	477.8	5 559.6	617.8	628.2	6 255.6	+31.5	+1.7	+12.5
Cement		1 080.6	1 221.1 ^r	8 804.2 ^r	1 282.6	1 350.7	10 300.7	+10.6	+5.3	+17.0
Lime		190.6	199.5	1 871.6	189.2	204.0	1 900.0	+2.2	+7.8	+1.5
Salt		794.1	1 042.1 ^r	8 720.5 ^r	826.0	1 046.0	7 936.2	+0.4	+26.6	-9.0
Fuels										
Coal		4 183.2	5 175.1 ^r	46 943.9	5 479.2	..	..	..	..	..
Natural gas	million m ³	6 347.0	7 638.0 ^r	72 700.0	7 228.0	..	..	..	..	..
Crude oil and equivalent	000 m ³	7 678.0	8 062.0 ^r	75 963.0	7 802.0	..	..	..	..	..

¹ Tonnes uranium (1 tonne U = 1.2999 short tons U₃O₈).

^r Revised; .. Not available.

TABLE 2. CANADA, REAL GROSS DOMESTIC PRODUCT AT FACTOR COST BY INDUSTRY, IN 1981 PRICES, MONTHLY (SEASONALLY ADJUSTED AT ANNUAL RATES)

Industry Sector	1986	1987		Percentage Change	
	October	August	September	October	Oct. '87 Oct. '86
		(\$ millions)			
Total Economy	364 129.0	382 370.6	384 945.5	386 995.0	+6.3
Primary Industries					
Agriculture	12 101.1	11 862.0	11 776.8	11 862.0	-2.0
Forestry	2 333.5	2 509.2	2 415.6	2 540.4	+8.9
Fishing and Trapping	713.2	691.2	729.6	656.4	-8.0
Mines, Quarries and Oil Wells	20 759.7	22 755.6	22 806.0	23 025.6	+11.0
Mining Industries	7 671.3	8 228.4	8 586.0	8 562.0	+11.6
Gold Mines	1 145.4	1 327.2	1 316.4	1 497.6	+30.7
Iron Mines	505.3	576.0	558.0	542.4	+7.3
Other Metal Mines	4 038.3	4 194.0	4 382.4	4 272.0	+5.8
Nonmetal Mines	713.6	841.2	805.2	800.4	+12.2
Asbestos Mines	148.7	170.4	171.6	162.0	+8.9
Mineral Fuels					
Coal Mines	997.3	999.6	1 239.6	1 179.6	+18.3
Crude Petroleum and Natural Gas	11 791.3	12 865.2	12 457.2	12 717.6	+7.9
Secondary Industries					
Manufacturing	70 875.6	74 787.6	76 336.8	76 321.2	+7.7
Non-durable Manufacturing	31 947.9	32 766.0	33 027.6	32 964.0	+3.2
Durable Manufacturing	38 927.7	42 021.6	43 309.2	43 357.2	+11.4
Primary Metal Industries	5 659.5	6 085.2	6 273.6	6 249.6	+10.4
Primary Steel Industries	2 181.0	2 452.8	2 454.0	2 473.2	+13.4
Steel, Pipe and Tube Industry	253.5	387.6	405.6	396.0	+56.2
Iron Foundries	419.3	448.8	483.6	436.8	+4.2
Smelting and Refining	2 184.7	2 145.6	2 256.0	2 235.6	+2.3
Nonmetallic Mineral Products	2 245.6	2 445.6	2 433.6	2 470.8	+10.0
Clay Products Industry	107.6	97.2	87.6	94.8	-11.9
Cement Industry	302.9	330.0	326.4	337.2	+11.3
Ready-Mix Concrete Industry	379.9	422.4	436.8	445.2	+17.2
Construction Industry	25 303.8	27 622.8	27 523.2	27 374.4	+8.2
Transportation and Storage	15 951.2	16 502.4	17 196.0	17 343.6	+8.7
Communications	10 366.0	11 323.2	11 355.6	11 312.4	+9.1
Other Utilities	10 782.8	11 487.6	11 253.6	11 317.2	+5.0
Wholesale Trade	18 811.9	20 661.6	21 415.2	21 314.4	+13.3
Retail Trade	24 016.5	25 572.0	25 701.6	25 958.4	+8.1
Finance, Insurance and Real Estate	51 753.3	54 793.2	54 552.0	55 882.8	+8.0
Community, Business and Personal					
Service	37 881.8	38 613.8	38 643.5	38 781.4	+2.4

TABLE 3. METAL PRICES - 1987

	October	November
Copper		
Electrolytic, U.S. producer f.o.b. refinery, cents (U.S.)	87.453	107.128
Electrolytic, Comex, 1st pos. plus 5¢, cents (Cdn.)	115.283	145.351
Electrolytic, Standard, LME cash, cents (U.S.)	87.632	109.671
Lead		
New York, cents (U.S.)	42.000	42.000
Montreal, cents (Cdn.)	55.750	55.750
LME cash, cents (U.S.)	27.249	29.099
Silver		
New York, cents (U.S.) per troy oz.	756.159	666.184
Toronto, cents (Cdn.) per troy oz.	1 022.130	907.990
LME cash, cents (U.S.) per troy oz.	763.285	669.110
Zinc		
St. Louis, H.G., cents (U.S.)	41.745	42.379
Montreal, Electrolytic, cents (Cdn.)	57.000	58.500
LME cash, cents (U.S.)	34.889	38.442
Tin		
New York, Straits, cents (U.S.)	318.167	323.842
Metals Week, composite, cents (U.S.)	424.799	433.277
Gold		
London, p.m., US\$ per troy oz.	465.355	467.569
Average, (Sharps Pixley) US\$ per troy oz.	465.559	467.855
High, (Sharps Pixley) US\$ per troy oz.	481.000	492.500
Low, (Sharps Pixley) US\$ per troy oz.	454.350	457.550
Mercury		
US\$ per flask	355.000	349.737
Nickel		
Major Producer Cathode, cents (Cdn.)	419.038	421.160
Major Producer Cathode, cents (U.S.)	320.000	320.000
LME cash, US\$	2.582	2.693
Antimony		
New York, dealers, cents (U.S.)	110.190	109.316
Platinum		
New York, refined, US\$ per troy oz.	600.000	600.000
Cadmium		
New York, producers, US\$	2.785	3.250
Aluminum		
LME cash, cents (Cdn.)	116.578	100.352
LME cash, cents (U.S.)	89.025	76.249
Cobalt		
Shot/cathode/250 kg., US\$	7.000	7.000
U.S. spot cathode, US\$	6.562	6.510
Tungsten		
LMB ore, low, US\$/MTU	38.750	46.800
GSA domestic, US\$/STU	31.350	31.350
Molybdenum		
M.W. dealer oxide, US\$	2.859	2.726
Uranium		
Nuexco, US\$ U ₃ O ₈	16.700	16.750

Average U.S. Exchange Rate for October = 1.30949524, November = 1.31611000.

Note: Prices are per pound unless otherwise stated.

TABLE 4. CANADA, CONSUMPTION OF FUEL AND ELECTRICITY IN THE MINERAL MANUFACTURING INDUSTRIES, 1985

	Primary Metal Industries	Nonmetallic Mineral Products Industries	Petroleum and Coal Products Industries	Total
	(\$000)			
Coal and coke	47 022	56 224	-	103 246
Gasoline	5 759	8 304	1 393	15 456
Fuel oil, kerosene, diesel oil	124 740	71 594	2 709	199 043
Liquefied petroleum gas	9 857	3 585	5 563	19 005
Natural gas	374 553	203 069	240 194	817 816
Other fuels	13 935	38 096	8 886	60 917
Electricity purchased	512 526	152 967	111 744	777 236
Total value of fuels and electricity purchased	1 088 392	533 838	370 489	1 992 719

Note: Totals may not add due to rounding.
- Nil.

TABLE 5. CANADA, COST OF FUEL AND ELECTRICITY USED IN THE MINERAL MANUFACTURING INDUSTRIES, 1979-85

	Unit	1979	1980	1981	1982	1983	1984	1985
Primary metals								
Fuel	\$000	357 775	421 426	538 175	526 073	555 381	605 177	575 867
Electricity purchased	million kWh	18 451	20 535	20 429	16 848	17 524	18 904	..
	\$000	260 317	316 884	357 186	345 614	396 632	463 357	512 526
Total cost of fuel and electricity	\$000	618 092	738 317	895 361	871 687	952 014	1 068 535	1 088 392
Nonmetallic mineral products								
Fuel	\$000	280 846	271 481	333 061	328 566	342 315	368 216	380 871
Electricity purchased	million kWh	5 163	4 633	4 573	3 973	3 983	4 439	..
	\$000	98 296	102 765	114 062	116 243	125 310	143 243	152 967
Total cost of fuel and electricity	\$000	379 142	374 248	447 123	444 809	467 624	511 459	533 838
Petroleum and coal products								
Fuels	\$000	74 968	88 311	137 463	134 303	187 624	221 369	258 745
Electricity purchased	million kWh	3 555	3 705	3 669	3 476	3 491	3 517	..
	\$000	63 395	72 186	80 517	86 448	94 259	99 727	111 744
Total cost of fuel and electricity	\$000	138 363	160 498	217 980	220 751	281 883	321 095	370 489
Total mineral manufacturing industries								
Fuel	\$000	713 589	781 218	1 008 699	988 942	1 085 391	1 194 762	1 215 483
Electricity purchased	million kWh	27 169	28 873	28 671	24 297	24 997	26 860	..
	\$000	422 008	491 834	551 765	548 305	616 201	706 327	777 236
Total cost of fuel and electricity	\$000	1 135 597	1 273 063	1 560 464	1 537 247	1 701 521	1 901 089	1 992 719

.. Figures no longer available.

TABLE 6. CANADA, CRUDE MINERALS TRANSPORTED BY CANADIAN RAILWAYS, 1983-85

	1983	1984	1985
	(kilotonnes)		
Metallic minerals			
Iron ores and concentrates	30 281	35 269	39 197
Nickel-copper ores and concentrates	2 738	4 228	4 161
Alumina and bauxite	3 091	3 523	3 227
Copper ores and concentrates	1 488	1 495	1 467
Zinc ores and concentrates	1 571	1 693	1 452
Lead ores and concentrates	588	1 507	604
Metallic ores and concentrates, n.e.s.	73	41	73
Nickel ores and concentrates	97	-	-
Total metallic minerals	39 927	47 756	50 181
Nonmetallic minerals			
Potash (KCl)	9 239	10 937	9 891
Sulphur, n.e.s.	4 477	5 948	6 355
Gypsum	5 065	5 449	5 492
Limestone, n.e.s.	2 715	2 832	2 312
Phosphate rock	2 017	2 102	1 838
Sulphur, liquid	1 440	1 989	1 529
Salt, rock	941	819	650
Sand, industrial	816	927	879
Clay	534	607	633
Sodium carbonate	484	492	485
Sodium sulphate	496	440	386
Limestone, industrial	257	264	418
Sand, n.e.s.	263	319	321
Nepheline syenite	291	274	241
Nonmetallic minerals, n.e.s.	143	168	181
Salt, n.e.s.	112	102	101
Limestone, agricultural	59	94	85
Asbestos	120	99	81
Stone, n.e.s.	117	72	70
Peat and other mosses	19	27	22
Abrasives, natural	32	33	20
Barite	44	23	13
Silica	13	12	11
Total nonmetallic minerals	29 713	34 029	32 014
Mineral fuels			
Coal, bituminous	24 284	37 577	41 539
Coal, lignite	1 235	1 627	1 336
Coal, n.e.s.	70	85	54
Natural gas and other crude bituminous substances	11	28	37
Oil, crude	50	4	5
Total mineral fuels	25 650	39 321	42 971
Total crude minerals	95 290	121 106	125 166
Total revenue freight moved by Canadian railways	222 830	254 581	250 608
Percent crude minerals of total revenue freight	42.8	47.6	49.9

n.e.s. Not elsewhere specified; - Nil.

TABLE 7. CANADA, FABRICATED MINERAL PRODUCTS TRANSPORTED BY CANADIAN RAILWAYS, 1983-85

	1983	1984	1985
	(kilotonnes)		
Metallic mineral products			
Ferrous mineral products			
Iron and steel scrap	1 720	2 272	2 533
Sheets and strips, steel	657	1 022	1 072
Ingots, blooms, billets, slabs of iron and steel	1 300	1 064	907
Bars and rods, steel	642	705	715
Structural shapes and sheet piling, iron and steel	282	441	495
Plates, steel	413	430	426
Pipes and tubes, iron and steel	209	285	334
Castings and forgings, iron and steel	125	139	106
Rails and railway track material	108	94	59
Ferroalloys	45	48	43
Other primary iron and steel	20	27	29
Pig iron	50	65	22
Wire, iron or steel	12	12	6
Total ferrous mineral products	5 583	6 604	6 747
Nonferrous mineral products			
Aluminum and aluminum alloy fabricated material, n.e.s.	733	781	889
Zinc and alloys	484	504	536
Copper and alloys, n.e.s.	423	467	407
Aluminum paste, powder, pigs, ingots, shot	252	160	273
Other nonferrous base metals and alloys	13	177	179
Lead and alloys	146	149	170
Slag, dross, etc.	126	116	99
Nonferrous metal scrap	94	105	98
Copper matte and precipitates	5	526	4
Total nonferrous mineral products	2 276	2 985	2 655
Total metallic mineral products	7 859	9 589	9 402
Nonmetallic mineral products			
Fertilizers and fertilizer materials, n.e.s.	1 747	2 195	1 815
Portland cement, standard	1 589	1 409	1 687
Sulphuric acid	1 067	1 322	1 422
Gypsum basic products, n.e.s.	108	198	254
Nonmetallic mineral basic products, n.e.s.	268	271	224
Cement and concrete basic products, n.e.s.	245	188	164
Natural stone basic products, chiefly structural	193	202	160
Lime, hydrated and quick	156	155	139
Dolomite and magnesite, calcined	55	78	77
Glass basic products	72	57	47
Fire brick and similar shapes	32	46	28
Bricks and tiles, clay	20	8	12
Asbestos and asbestos-cement basic products	4	3	9
Refractories, n.e.s.	12	10	5
Plaster	11	5	3
Total nonmetallic mineral products	6 644	6 147	6 046
Mineral fuel products			
Refined and manufactured gases, fuel type	2 753	2 711	2 825
Diesel fuel	2 053	1 967	1 690
Gasoline	1 332	1 273	1 077
Other petroleum and coal products	758	694	701
Fuel oil, n.e.s.	829	843	680
Coke, n.e.s.	606	663	672
Petroleum coke	467	516	521
Asphalts and road oils	183	306	374
Lubricating oils and greases	330	372	337
Total mineral fuel products	9 311	9 345	8 877
Total fabricated mineral products	23 814	25 081	24 325
Total revenue freight moved by Canadian railways	222 830	254 581	250 608
Fabricated mineral products as a percentage of total revenue freight	10.7	9.9	9.7

n.e.s. Not elsewhere specified.

TABLE 8. CANADA, CRUDE AND FABRICATED MINERALS TRANSPORTED BY CANADIAN RAILWAYS, 1956-85

	Total Revenue Freight	Total Crude Minerals	Total Fabricated Minerals	Total Crude and Fabricated Minerals	Crude and Fabricated Minerals as Percent of Revenue Freight
1956	172.0	68.7	21.8	90.5	52.6
1957	157.9	64.2	17.1	81.3	51.5
1958	139.2	52.4	15.2	67.6	48.6
1959	150.6	62.8	15.3	78.1	52.9
1960	142.8	57.1	14.5	71.6	50.1
1961	138.9	54.1	13.6	67.7	48.7
1962	146.0	60.3	13.8	74.1	50.8
1963	154.6	62.9	15.5	78.3	50.6
1964	180.0	74.6	15.9	90.5	50.3
1965	186.2	80.9	17.3	98.2	52.7
1966	194.5	80.6	17.8	98.4	50.6
1967	190.0	81.2	17.7	98.9	52.1
1968	195.4	86.7	18.8	105.5	54.0
1969	189.0	81.9	27.6	109.5	57.9
1970	211.6	97.5	28.4	127.9	60.4
1971	214.5	95.6	27.4	123.0	57.3
1972	215.8	89.4	27.6	117.0	54.2
1973	241.2	113.1	29.1	142.2	59.0
1974	246.3	115.3	30.9	146.2	59.4
1975	226.0	110.6	26.6	137.2	60.7
1976	238.5	116.6	25.5	142.1	59.6
1977	247.2	121.1	25.7	146.8	59.4
1978	238.8	107.7	26.2	133.9	45.1
1979	257.9	127.2	26.6	153.8	59.6
1980	254.4	124.8	24.6	149.4	58.8
1981	246.6	120.7	26.4	147.1	59.7
1982	212.5	95.7	21.0	116.7	54.9
1983	222.8	95.3	23.8	119.1	53.5
1984	254.6	121.1	25.1	146.2	57.4
1985	250.6	125.2	24.3	149.5	59.7

TABLE 9. CANADA, CRUDE AND FABRICATED MINERALS TRANSPORTED THROUGH THE ST. LAWRENCE SEAWAY¹, 1984-86

	Montreal - Lake Ontario Section			Welland Canal Section		
	1984	1985	1986	1984	1985	1986
	(tonnes)					
Crude minerals						
Iron ore	11 421 521	8 679 210	8 026 080	10 088 727	6 788 799	5 839 484
Coal	452 898	607 108	609 619	6 603 148	5 807 694	5 775 521
Salt	898 931	657 494	874 520	1 725 967	1 521 180	1 882 656
Other crude minerals	842 988	1 099 291	1 201 223	694 588	732 510	851 262
Stone, ground or crushed	117 233	258 745	271 945	537 585	815 313	1 005 726
Aluminum ores and concentrates	185 500	200 890	196 830	185 452	198 890	175 508
Clay and bentonite	157 206	162 410	161 366	157 206	162 410	161 366
Sand and gravel	6 992	1	16 009	318 736	176 291	82 436
Phosphate rock	5 484	23 522	28 730	-	-	-
Stone, rough	206	302	203	206	302	182
Total crude minerals	14 008 959	11 688 973	11 386 525	20 311 615	16 203 389	15 774 141
Fabricated mineral products						
Iron and steel, manufactured	3 566 220	2 798 848	2 922 806	3 182 737	2 407 431	2 385 475
Coke	793 112	802 266	867 412	858 598	921 887	993 268
Scrap iron and steel	303 619	635 622	740 276	325 725	753 927	782 966
Fuel oil	745 378	558 770	641 156	678 186	628 613	603 625
Iron and steel, bars, rods, slabs	861 123	791 144	615 469	769 358	675 205	455 565
Cement	10	175 111	152 616	531 399	309 120	347 060
Gasoline	237 388	111 419	206 107	251 160	141 601	186 564
Other petroleum products	134 353	84 179	110 263	134 139	76 295	114 252
Pig iron	243 817	103 610	96 925	218 538	89 263	71 730
Tar, pitch and creosote	51 533	35 892	39 222	74 189	69 324	54 810
Lubricating oils and greases	17 430	41 964	25 850	17 106	41 962	15 290
Iron and steel, nails, wire	25 888	13 229	10 527	10 822	12 287	9 030
Total fabricated minerals	6 979 871	6 162 054	6 428 629	7 051 957	6 126 915	6 019 635
Total crude and fabricated minerals	20 988 830	17 841 027	17 815 154	27 363 572	22 330 304	21 793 776
Total, all products	47 505 456	37 321 698	37 581 808	53 916 858	41 851 760	41 612 770
Crude and fabricated minerals as a percent of total	44.2	47.8	47.4	50.8	53.4	52.3

¹ Total cargo transported regardless of travel direction.

- Nil.

TABLE 10. CANADA, CRUDE AND FABRICATED MINERALS TRANSPORTED THROUGH THE ST. LAWRENCE SEAWAY¹, 1957-86

	Montreal - Lake Ontario Section				Welland Canal Section			
	Total All Products	Total Crude Minerals (kilotonnes)	Total Fabricated Minerals	Crude and Fabricated Minerals as Percent of All Products	Total All Products	Total Crude Minerals (kilotonnes)	Total Fabricated Minerals	Crude and Fabricated Minerals as Percent of All Products
1957	11 059	4 439	1 392	52.7	20 296	11 305	2 421	67.6
1958	10 670	3 064	1 020	38.3	19 300	8 994	2 107	57.5
1959	19 252	7 725	2 197	51.5	24 953	12 117	2 246	57.6
1960	18 460	5 760	2 904	46.9	26 563	12 679	2 606	57.5
1961	21 212	6 706	2 358	42.7	28 490	12 599	2 378	52.7
1962	23 271	7 531	2 522	43.2	32 215	15 625	2 342	55.8
1963	28 198	9 507	2 804	43.7	37 490	18 094	2 524	55.0
1964	35 701	13 127	3 558	46.7	46 644	23 489	3 095	57.0
1965	39 352	13 788	6 024	50.3	48 477	23 555	4 933	58.8
1966	44 538	16 376	6 340	51.0	53 648	25 712	5 329	57.8
1967	39 918	17 800	6 430	60.7	47 945	26 010	5 459	65.6
1968	43 496	19 312	8 425	63.8	52 712	29 075	7 587	69.6
1969	37 256	12 682	8 263	56.2	48 601	25 090	6 715	65.4
1970	46 445	15 554	8 932	52.7	57 121	27 233	7 156	60.2
1971	48 069	14 204	9 263	48.8	57 205	23 903	7 914	55.6
1972	48 607	13 425	9 837	47.9	58 146	24 808	7 701	55.9
1973	52 285	17 111	9 639	51.1	60 958	26 907	7 718	56.8
1974	40 049	16 137	7 018	57.8	47 500	23 952	5 437	61.9
1975	43 554	15 698	6 071	50.0	53 387	26 100	5 129	58.5
1976	49 348	20 884	7 181	56.9	58 368	29 914	6 323	62.1
1977	57 456	23 008	9 918	57.3	65 079	30 459	8 933	60.5
1978	51 658	15 057	8 558	45.7	59 576	22 700	7 759	51.1
1979	50 187	16 408	8 104	48.8	60 023	24 851	7 940	54.6
1980	42 142	12 248	6 009	43.3	54 074	20 487	5 405	47.9
1981	45 876	15 453	5 711	46.1	53 389	22 132	5 529	51.8
1982	38 841	9 146	4 997	36.4	44 474	15 057	4 333	45.9
1983	45 061	12 443	5 422	39.6	50 145	17 412	5 618	45.9
1984	47 505	14 009	6 980	44.2	53 917	20 312	7 056	50.8
1985	37 322	11 689	6 152	47.8	41 852	16 203	6 127	53.4
1986	37 582	11 387	6 429	47.4	41 613	15 774	6 020	52.3

¹ Total cargo transported regardless of travel direction.

TABLE 11. CANADA, CRUDE MINERALS LOADED AND UNLOADED IN COASTWISE SHIPPING, 1986^P

	Loaded				Unloaded			
	Atlantic	Great Lakes	Pacific	Total	Atlantic	Great Lakes	Pacific	Total
	(tonnes)							
Metallic minerals								
Iron ore and concentrates	4 915 096	609 595	1 179	5 525 870	741 143	4 783 548	1 179	5 525 870
Titanium ore	2 180 709	-	-	2 180 709	2 180 709	-	-	2 180 709
Zinc ore and concentrates	-	-	24 580	24 580	-	-	24 580	24 580
Metallic ores and concentrates, n.e.s.	1 116	-	272	1 388	1 116	-	272	1 388
Total metals	7 096 921	609 595	26 031	7 732 547	2 922 968	4 783 548	26 031	7 732 547
Nonmetallic minerals								
Limestone	1 358	3 024 332	1 502 093	4 527 783	1 358	3 024 332	1 502 093	4 527 783
Salt	1 428 598	1 421 801	-	2 850 399	2 013 122	837 277	-	2 850 399
Sand and gravel	256 698	29 398	882 593	1 168 689	256 698	29 398	882 593	1 168 689
Gypsum	748 313	-	29 201	777 514	535 718	212 595	29 201	777 514
Stone, crude, n.e.s.	450	137 596	15 651	153 697	450	137 596	15 651	153 697
Potash	913	102 244	-	103 157	23 139	80 018	-	103 157
Quartz-silica	47 261	-	862	48 123	-	47 261	862	48 123
Sulphur crude and refined	5 773	-	-	5 773	5 773	-	-	5 773
Crude nonmetallic minerals, n.e.s.	3 039	-	45	3 084	3 039	-	45	3 084
Total nonmetals	2 492 403	4 715 371	2 430 445	9 638 219	2 839 297	4 368 477	2 430 445	9 638 219
Mineral fuels								
Coal and peat for fuel	141 906	2 037 154	95 130	2 274 190	198 206	2 037 154	38 830	2 274 190
Petroleum, crude	256 228	-	-	256 228	256 228	-	-	256 228
Total mineral fuels	398 134	2 037 154	95 130	2 530 418	454 434	2 037 154	38 830	2 530 418
Total crude minerals	9 987 458	7 362 120	2 551 606	19 901 184	6 216 699	11 189 179	2 495 306	19 901 184
Total all commodities	18 150 300	22 598 009	19 766 842	60 506 152	25 200 354	15 634 250	19 671 548	60 506 152
Crude minerals as a percent of all commodities	55.0	32.6	12.9	32.9	24.7	71.6	12.7	32.9

^P Preliminary; - Nil; n.e.s. Not elsewhere specified.

TABLE 12. CANADA, FABRICATED MINERALS LOADED AND UNLOADED IN COASTWISE SHIPPING, 1986^P

	Loaded				Unloaded			
	Atlantic	Great Lakes	Pacific	Total	Atlantic	Great Lakes	Pacific	Total
	(tonnes)							
Metallic mineral products								
Ferrous mineral products								
Structural shapes, iron and steel	3 242	173 850	46 705	223 797	3 242	173 850	46 705	223 797
Plates and sheets, steel	787	38 030	2 722	41 538	787	38 030	2 722	41 538
Primary iron, steel	25 191	20	1 134	26 345	-	25 211	1 134	26 345
Castings and forgings, steel	790	-	9 072	9 862	790	-	9 072	9 862
Pipes and tubes, iron and steel	536	-	2 903	3 439	536	-	2 903	3 439
Wire, iron and steel	873	-	-	873	873	-	-	873
Bars and rods, steel	699	-	-	699	699	-	-	699
Rails and railway track material	26	149	-	175	26	149	-	175
Aluminum and aluminum products	116 802	-	-	116 802	116 802	-	-	116 802
Total metallic mineral products	148 946	212 049	62 536	423 530	123 755	237 240	62 536	423 530
Nonmetallic mineral products								
Cement	34 348	722 346	77 552	834 247	50 922	705 773	77 552	834 247
Sulphuric acid	10 457	-	19 278	29 735	10 457	-	19 278	29 735
Bricks, tiles and pipes, clay	1 162	128	2 000	3 290	1 162	128	2 000	3 290
Fertilizers and fertilizer material, n.e.s.	8 300	-	-	8 300	2 329	5 971	-	8 300
Other nonmetallic mineral products	2 968	27	-	2 995	2 968	27	-	2 995
Cement basic products	107	-	1 077	1 184	107	-	1 077	1 184
Glass basic products	158	-	-	158	158	-	-	158
Asbestos basic products	150	-	-	150	150	-	-	150
Total nonmetallic mineral products	57 650	722 501	99 907	880 059	68 253	711 899	99 907	880 059
Mineral fuel products								
Fuel oil	3 903 913	803 875	1 123 875	5 831 663	4 125 273	607 025	1 099 366	5 831 663
Gasoline	2 062 889	388 399	555 435	3 006 724	2 134 870	335 745	536 109	3 006 724
Asphalts and road oils	31 353	39 002	-	70 355	21 728	48 627	-	70 355
Petroleum coke	16 000	6 348	-	22 348	22 348	-	-	22 348
Lubricating oils and greases	4 469	-	107	4 576	862	3 607	107	4 576
Other petroleum and coal products	15 591	9 590	-	25 181	11 798	13 383	-	25 181
Total mineral fuel products	6 034 215	1 247 214	1 679 417	8 960 847	6 316 879	1 008 387	1 635 582	8 960 847
Total fabricated mineral products	6 240 811	2 181 764	1 841 860	10 264 436	6 508 887	1 957 526	1 798 025	10 264 436
Total all commodities	18 150 300	22 589 009	19 766 842	60 506 152	25 200 354	15 634 250	19 671 548	60 506 152
Fabricated mineral products as a percent of all commodities	34.4	9.7	9.3	17.0	25.8	12.5	9.1	17.0

^P Preliminary; - Nil; n.e.s. Not elsewhere specified.

TABLE 13. CANADA, CRUDE AND FABRICATED MINERALS LOADED AT CANADIAN PORTS IN COASTWISE SHIPPING, 1957-86

	Total All Commodities	Total Crude Minerals (kilotonnes)	Total Fabricated Minerals	Crude and Fabricated Minerals as Percent of All Products
1957	34 354	8 696	7 832	48.1
1958	34 808	7 673	7 258	42.9
1959	36 494	9 984	7 819	48.8
1960	37 058	8 786	8 229	45.9
1961	41 861	9 527	8 857	43.9
1962	39 763	8 361	9 768	45.6
1963	40 328	7 998	9 942	44.5
1964	47 171	8 522	11 194	41.8
1965	48 200	9 183	11 766	43.5
1966	55 122	10 155	12 653	41.4
1967	49 799	11 509	12 207	47.6
1968	50 921	13 698	13 245	52.9
1969	51 890	12 746	14 181	51.9
1970	57 301	14 415	14 818	51.0
1971	55 128	14 783	15 374	54.7
1972	55 326	14 197	15 290	53.3
1973	55 314	16 573	15 615	58.2
1974	53 633	11 723	16 575	52.8
1975	54 373	15 687	17 510	61.1
1976	53 882	15 924	16 208	59.6
1977	58 309	18 131	17 435	61.0
1978	60 668	18 318	16 619	57.6
1979	79 950	22 130	17 486	50.2
1980	82 761	22 947	17 134	48.4
1981	71 271	17 849	16 669	48.4
1982	65 881	16 473	13 214	45.1
1983	67 598	21 248	12 025	49.2
1984	68 698	22 798	11 909	50.5
1985	61 717	19 867	10 291	48.9
1986 ^P	60 506	19 901	10 264	49.9

P Preliminary.

TABLE 14. CANADA, CRUDE MINERALS LOADED AND UNLOADED AT CANADIAN PORTS IN INTERNATIONAL SHIPPING TRADE, 1984-86

	1984		1985		1986P	
	Loaded	Unloaded	Loaded	Unloaded	Loaded	Unloaded
	(tonnes)					
Metallic minerals						
Iron ore and concentrates	31 005 195	5 565 570	32 669 302	6 457 303	30 321 884	6 140 184
Copper ores and concentrates	1 129 159	102 695	1 179 258	224 479	1 344 875	92 763
Titanium ore	743 771	14 204	1 032 233	3 782	(2)	(2)
Zinc ore and concentrates	821 896	299	655 418	160	645 143	403
Nickel ore and concentrates	120 390	8 730	113 252	6 053	(1)	(1)
Lead ore and concentrates	65 567	7 551	110 289	1 916	85 068	11 446
Other nonferrous ores, concentrates and metal scrap, n.e.s.	87 948	26 125	108 701	67 437	1 403 697	346 250
Alumina, bauxite ore	42 803	3 655 040	45 877	3 320 373	27 136	3 825 085
Manganese ore	-	188 864	2 522	182 024	(2)	(2)
Total metals	34 016 729	9 569 078	35 916 852	10 263 527	33 827 803	10 416 131
Nonmetallic minerals						
Gypsum	5 556 660	126 685	5 806 971	77 902	5 781 274	177 148
Sulphur	5 848 191	3	5 371 105	-	4 743 012	42 001
Potash (KCl)	5 987 217	1 544	4 759 062	79 292	5 733 732	59 934
Salt	2 673 379	980 128	2 053 809	1 253 350	2 222 807	1 232 261
Limestone	1 508 547	1 619 486	1 090 691	861 734	1 114 655	1 208 292
Stone, crushed	91 946	20	875 543	991 178	(3)	(3)
Asbestos	552 180	559	506 633	727	189 219	1 241
Dolomite	631 129	12 914	377 041	17 674	(3)	(3)
Sand and gravel	42 389	1 548 098	249 850	1 489 944	295 463	1 321 022
Stone, crude, n.e.s.	35 953	35 770	95 879	91 446	(3)	(3)
Crude, nonmetallic minerals, n.e.s.	149 080	20 378	111 735	24 213	1 248 417	1 391 392
Phosphate rock	-	1 836 376	2 200	1 557 629	25 590	1 602 018
Clay materials, n.e.s.	745	7 216	1 236	1 541	716 438	345 832
Bentonite	26	152 262	165	176 349	(4)	(4)
China clay	-	21 179	54	15 379	(4)	(4)
Fluorspar	-	119 602	-	114 081	(3)	(3)
Barite	-	10 668	-	8 012	(3)	(3)
Total nonmetals	23 077 442	6 492 888	21 301 974	6 760 451	22 370 607	7 381 141
Mineral fuels						
Coal, bituminous	25 395 206	18 577 598	25 964 493	15 168 031	25 453 138	13 557 832
Petroleum, crude	230 035	8 310 602	694 576	9 693 288	1 306 998	12 408 485
Fuels, n.e.s.	32 970	109	343	2 565	3 401	37
Total fuels	25 658 211	26 888 309	26 659 412	24 863 884	26 763 537	25 966 354
Total crude minerals	82 752 382	42 950 275	83 878 238	41 887 862	82 961 947	43 763 626
Total all commodities	145 322 054	60 072 623	143 420 769	60 668 828	143 245 953	61 791 872
Crude minerals as a percent of all commodities	56.9	71.5	58.5	69.0	57.9	70.8

(1) Included with "Copper ores and concentrates". (2) Included with "Other nonferrous ores concentrates and metal scrap n.e.s.". (3) Included with "Crude nonmetallic minerals, n.e.s.". (4) Included with "Clay materials, n.e.s.". - Nil; n.e.s. Not elsewhere specified; P Preliminary.

TABLE 15. CANADA, FABRICATED MINERAL PRODUCTS LOADED AND UNLOADED AT CANADIAN PORTS IN INTERNATIONAL SHIPPING TRADE, 1984-86

	1984		1985		1986P	
	Loaded	Unloaded	Loaded	Unloaded	Loaded	Unloaded
	(tonnes)					
Metallic products						
Iron, pig	341 316	114 726	425 065	109 793	(1)	(1)
Iron and steel, other					982 533	1 816 062
plates and sheets	211 081	472 314	285 156	543 381	(1)	(1)
bars and rods	46 229	280 668	45 606	291 397	(1)	(1)
castings and forgings	16 004	141 290	43 478	129 390	(1)	(1)
rails and track material	56 903	22 461	29 946	62 771	(1)	(1)
pipes and tubes	13 312	213 191	28 105	316 062	(1)	(1)
wire and rope	19 334	200 094	14 141	176 398	(1)	(1)
structural shapes	33 317	137 938	9 267	132 351	(1)	(1)
Aluminum	299 463	109 309	446 744	98 430	(2)	(2)
Iron and steel, primary	402 526	2 960	561 992	2 339	(1)	(1)
Copper and alloys	189 132	61 686	176 556	45 850	(2)	(2)
Zinc and alloys	144 875	14 105	124 582	2 692	(2)	(2)
Nickel and alloys	51 337	37 775	45 156	33 752	(2)	(2)
Ferroalloys	35 958	27 405	45 026	39 117	(2)	(2)
Lead and alloys	19 773	3 594	21 844	801	(2)	(2)
Nonferrous metals, n.e.s.	6 310	24 374	8 193	32 995	716 447	174 269
Total metals	1 886 870	1 863 890	2 310 857	2 017 519	1 698 980	1 990 331
Nonmetallic products						
Cement	1 257 406	1 645	1 051 549	69 216	1 844 287	374 271
Cement basic products	282 120	8 242	534 736	81 305	(3)	(3)
Fertilizers, n.e.s.	566 091	365 746	224 809	200 035	(4)	(4)
Sulphuric acid	264 567	75	188 554	669 358	(4)	(4)
Nonmetallic mineral basic products	61 147	76 918	26 383	365 818	130 378	352 207
Building blocks, n.e.s.	17 216	148 009	17 471	186 522	(4)	(4)
Glass basic products	17 490	26 520	8 698	46 786	(4)	(4)
Asbestos basic products	6 367	788	1 972	630	(4)	(4)
Total nonmetals	2 472 404	627 943	2 054 172	1 619 670	1 974 665	726 478
Mineral fuel products						
Fuel oil	2 108 901	3 583 063	2 876 948	2 887 106	2 907 111	689 495
Gasoline	827 837	397 768	1 551 714	793 972	1 324 261	3 368 231
Coke	415 309	1 015 868	1 202 386	1 169 141	594 025	1 224 264
Petroleum and coal products, n.e.s.	211 737	58 759	790 650	154 065	404 956	291 282
Asphalts, road oils	31 904	58 749	12 777	58 778	(5)	(5)
Lubricating oils and greases	18 247	25 182	8 592	22 806	(5)	(5)
Coal tar, pitch	12 459	56 574	5 978	77 134	(5)	(5)
Total fuels	3 626 394	5 195 963	6 449 045	5 163 002	5 230 353	5 573 272
Total fabricated mineral products	7 985 668	7 687 796	10 814 074	8 800 191	8 903 998	8 290 081
Total all commodities	145 322 054	60 072 623	143 420 769	60 668 828	143 245 953	61 791 872
Fabricated mineral products as a percent of all commodities	5.5	12.8	7.5	14.5	6.2	13.4

(1) Included with "Iron and steel, other". (2) Included with "Nonferrous metals, n.e.s.". (3) Included with "Cement".
 (4) Included with "Nonmetallic mineral basic products". (5) Included with "Petroleum and coal products, n.e.s.". P Preliminary; n.e.s. Not elsewhere specified.

TABLE 16. CANADA, CRUDE AND FABRICATED MINERALS LOADED AT CANADIAN PORTS IN INTERNATIONAL SHIPPING TRADE, 1957-86

	Total All Commodities	Total Crude Minerals (kilotonnes)	Total Fabricated Minerals	Crude and Fabricated Minerals as Percent of All Products
1957	44 539	24 210	2 588	60.2
1958	36 559	16 602	1 642	49.9
1959	45 772	25 789	1 619	59.9
1960	45 872	24 671	2 039	58.2
1961	48 771	23 241	2 133	52.0
1962	54 676	30 446	2 296	59.9
1963	62 031	32 214	2 503	56.0
1964	75 760	42 087	2 602	59.0
1965	74 521	41 338	2 746	59.2
1966	76 192	41 374	3 350	58.7
1967	72 598	42 704	3 701	63.9
1968	78 663	48 680	2 960	65.6
1969	70 432	42 442	3 456	65.1
1970	95 807	55 849	4 965	63.5
1971	95 887	53 245	5 022	60.7
1972	98 988	51 912	9 091	61.6
1973	112 434	64 195	10 103	66.1
1974	106 110	64 093	9 041	68.9
1975	102 444	61 970	7 495	67.8
1976	114 815	71 527	6 108	67.6
1977	119 770	70 257	5 979	63.7
1978	116 522	62 291	7 556	59.9
1979	134 639	79 685	8 901	65.8
1980	138 161	67 898	11 770	57.7
1981	145 445	83 007	9 022	63.3
1982	125 282	65 594	7 115	58.1
1983	129 490	67 152	6 197	56.7
1984	145 322	82 752	7 986	62.4
1985	143 420	83 878	10 814	66.0
1986P	143 246	82 962	8 904	64.1

P Preliminary.

METALLIC MINERALS AND PRODUCTS

Copper
W. McCutcheon

Metals Prices US Cents/lb.

	London Metal Exchange (LME) Grade A Cash Settlement Dec. 1-31	Commodities Exchange, Inc. (COMEX) 1st Position Dec. 1-31
High	145.5	146.0
Low	111.8	111.0
Average	130.1	127.5
Average for 1987	80.1	77.8
1987 Average In Cdn Cents/lb.	106.2	103.1

The high prices for copper continued as consumers bid up the spot price to obtain metal to keep plants running. Producers, under financial pressure in 1985 and 1986, had operated only their most efficient facilities. Consumers had gotten used to maintaining minimum inventories. This effectively shortened the industry's supply "pipeline", removing the flexibility to expand rapidly to meet surges in demand. As the copper consumption has been significantly stronger than had been anticipated, the price has risen accordingly. Most analysts predict that the current high prices will not be sustained beyond the first half of 1988 and possibly the first quarter.

The backwardation of 3 month copper with respect to cash copper that started in early March continued through to the end of the year, reaching a high of 22.6 US cents/lb. on December 22. Fifteen month copper on the LME reached a backwardation of 47.8 US cents/lb. on December 31.

The combined LME and Comex stocks declined to 69 712 t on January 1, 1988, down sharply from 90 915 t on November 27, 1987. The combined inventories were 260 879 t on January 2, 1987.

Western Mining Corporation Holdings Limited has agreed to purchase Northgate Exploration Limited's, Chibougamau gold-copper operations.

Zambia began a program to rehabilitate rail facilities. New rail cars, rebuilt locomotives and track maintenance programs are included in the program, financed by the U.S. Agency for International Development, the Swedish International Development Agency and with assistance from Belgium. As well as relaying some track, bridges will be replaced.

The LME will include fire refined 99.9% pure copper as deliverable against the standard copper contract. The change will be effective April 1, 1988.

Iron and Steel

Bob McInnis

The Canadian steel industry operated at 78.0% of capacity, down from the 84.7% of October and the 81.1% rate of September. Domestic demand for steel-mill products was improving significantly in the last quarter with some customers being placed on quota for certain products. A similar, if not greater, increase in demand occurred in the United States. Along with the surge in steel demand, the price of ferrous scrap (the raw material used by electric furnace steel mills and an important input for integrated mills) has increased dramatically. The U.S. Metal Market Weekly steel composite price rose from about US\$72/ton in July to US\$132/ton in November. Also, inventories at Canadian steel service centers are the lowest in years.

On trade matters, the November report of the Steel Export Monitoring Programme showed that steel exports to the United States totalled 279 278 t, down from 285 419 t in October and 282 745 t in September. Exports to all countries totalled 331 727 t for the month of November.

Stelco Inc. announced that it will divide its operations on January 1, 1988 into two groups, Stelco Steel charged with steelmaking activities, and Stelco Enterprises, responsible for downstream products through existing business units, new joint ventures and acquisitions. These new groups will be stand-alone operations, each with its own president and each reporting directly to Stelco Inc.

EXPLORATION

Annual Field Expenditures on Off-Property Mineral Exploration in Canada, 1968-85

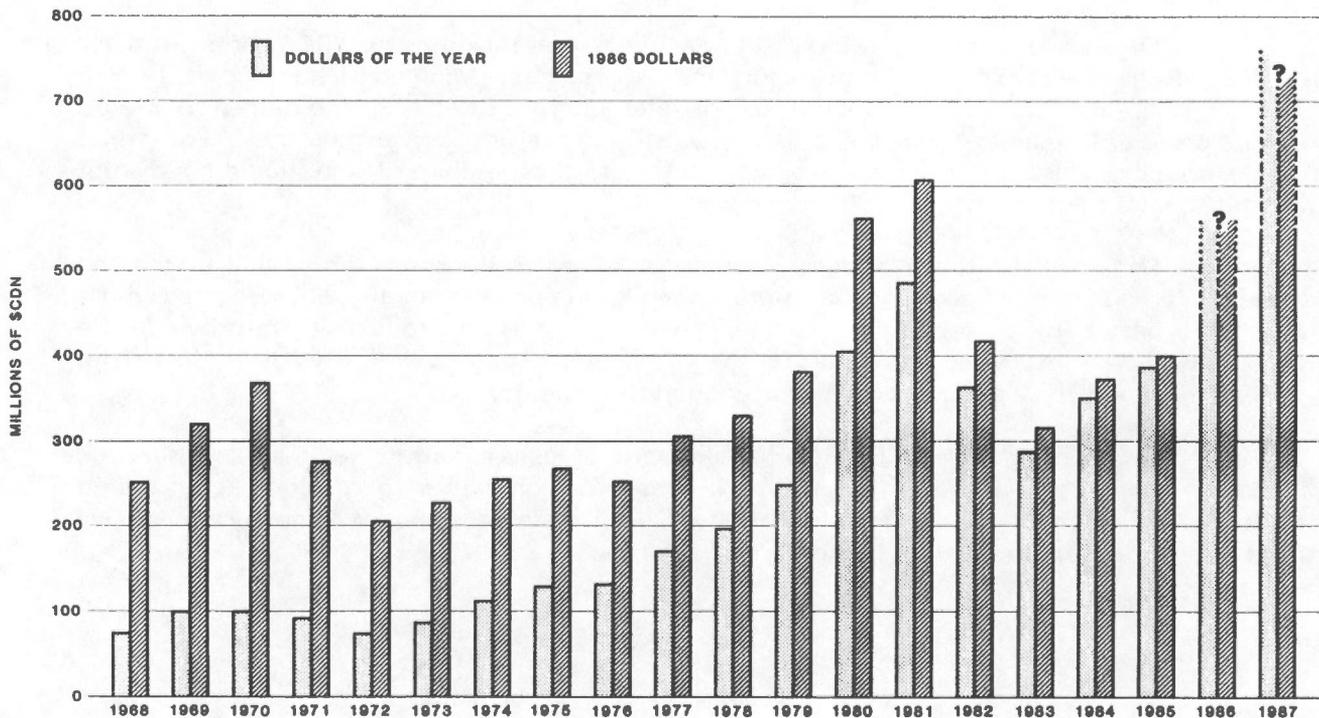
D.A. Cranstone

Off-property ("general") field expenditures are a good indicator of exploration activity away from current mines. Reliable field expenditure data are available as far back as 1968. Statistics Canada also gathers statistics on land costs (such as lease rentals) and various overhead and administration costs related to exploration, but has done so only since 1980. Such related costs generally add some 25% to field expenditures.

The graph below shows annual off-property field expenditures in dollars-of-the-year as well as in constant (1968) dollars (i.e., adjusted for inflation). Rising metal prices, especially in gold, which briefly reached US\$850 per ounce in 1980, led to the conspicuous peak in exploration in 1980/81. When metal prices declined, in 1982/83, so did exploration. From 1984 on, a growing interest in gold spurred exploration activity again, aided by the introduction in 1983 of flow-through shares as a financing vehicle with tax advantages for investors.

Off-property field expenditures in 1986, not yet entirely compiled, are expected to have been substantially higher than those of 1985, and field expenditures in 1987 are already certain to exceed the 1981 all-time high.

(Note: this bar graph supersedes the illustrative, outdated one on the cover).



SPECIAL ITEMS

Report on the 4th International Tungsten Symposium, Vancouver, B.C., September 7-10, 1987

D.R. Phillips

The symposium was organized by the Primary Tungsten Association (PTA) and the Consumer Reporting Group (CGR), and sponsored by Canada Tungsten Mining Corporation Limited (Cantung). It was attended by about 150 delegates from 21 countries. Dr. C. George Miller, President of the Mining Association of Canada (MAC), chaired the meeting. Mr. Jack Davis, British Columbia Minister of Energy Mines and Petroleum Resources was the key-note speaker.

The theme of Minister Davis' address was for more exploration and research in Canada to maintain its share of world markets for minerals in the short term and to increase its share in the long term. He appealed to all industry groups to communicate and cooperate with governments and universities, which may be working on projects of mutual interest, as an aid to efficient planning. He concluded that such cooperation would maintain the tungsten industry's competitiveness in relation to substitutes.

Mr. O. Hedebrant, Senior Vice-President of Sandvic AB, Sweden, proposed on behalf of the CGR the formation of an International Tungsten Industry Association (ITIA). The object of ITIA would be to develop and promote initiatives to expand current uses for tungsten, through market promotion, research, meetings and seminars. Members would include companies from consumer, producer and trading groups. He indicated ITIA could be launched as early as January 1988.

Following Mr. Hedebrant's proposal, a vote was taken at the symposium by companies in attendance. Thirty-seven companies voted, 36 of them affirmatively.

Of particular interest at the seminar were presentations by PRC representatives. Mr. Shen of China Minerals and Metals Import and Export Corp., (Minmetals) stated that the PRC would not add capacity before the year 2000. Mr Peter Johnson, Director of the Refractory Metals Association (RMA), indicated that the effect of substitution, production of near-net-shape metal parts, efficient recycling and improved production efficiency have stabilized, and should not disrupt tungsten market trends to the year 2000.

Mr. Wayne Lenton, President of Cantung, stated in his concluding remarks that he remained optimistic on the prospects for improved marketing practices by the PRC. He stressed the need for a better understanding of the markets of all tungsten products to improve future forecasting. He also expressed his support for the International Tungsten Industry Association (ITIA), claiming that it would be helpful for achieving market transparency.

In his closing remarks, Dr. George Miller reiterated his five strategies - namely: survival, financial, restructuring, operational, and marketing - for companies to consider as an aid to increasing their competitiveness on world markets. Dr. Miller stated that each company would have to determine the best mix of strategies for its own situation.

Development Projects Announced During 1987 for Metal Mines and Concentrators

André Lemieux

During 1987, more than 40 projects to develop additional metal production capability were publicly announced (see accompanying table). Over the next few years, these are expected to inject more than \$700 million into the Canadian economy, much of it in remote areas of the country. Such a large number of production commitments reflects the current high level of mineral industry activity in Canada.

Like many other indicators of industry activity, commitments to develop additional production capability show that efforts are firmly focused on gold. Almost all of the announced gold developments are for new mines and concentrators. In contrast, of the eight projects listed for other metals, five pertain to the further development of existing mines and only three will be new mines.

Effects on Reserves

Because of the focus on gold, Canadian gold reserves have almost doubled since 1981 and will continue to grow substantially as a result of current development projects. Reserves of other major nonferrous metals have declined over the same period: nickel 19%, copper 21%, zinc 24% and lead 29%, because of closures of unprofitable mines, downward reassessments of mineral inventories, and the lack of major new discoveries. Current development projects are inadequate to reverse this decline in reserves, which is endangering Canada's capability for sustained production of copper, zinc and lead at current levels into the late 1990s and beyond (see August, 1987 issue, pp. 19-20). Three of the major base-metal development projects announced during 1987 pertain to nickel, the reserves of which are already much larger, relative to production levels, than those of copper, zinc and lead.

**Development Projects Announced During 1987
For Metal Mines and Concentrators**

<u>Company</u>	<u>Project</u>	<u>Metal</u>	<u>Start-up Year</u>	<u>Estimated Develop- ment Cost (\$ million)</u>
PRECIOUS METALS				
INCO Gold, Golden Knight Resources Inc.	New 800 t/d Golden Pond East mine and 1 200 t/d concentrator, Casa Berardi, Quebec	Gold	1988	74
ERG Resources Inc., Pamour Inc.	New 1 million t/m tailings processing plant, Timmins, Ontario	Gold	1989	65
Lac Minerals Ltd.	New 1 800 t/d Bousquet No. 2 mine, Quebec	Gold	1990	60
Placer Dome Inc., Amoco Canada Petroleum Company Ltd.	Development of 2 000 t/d underground portion of Detour Lake mine, Ontario	Gold	1988	48.6
Placer Dome Inc.	New 500 t/d Dona Lake mine and con- centrator, Pickle Lake, Ontario	Gold	1989	40.5
Chevron Canada Resources Limited, North American Metals Corp.	New 360 t/d Golden Bear mine and concentrator, Dease Lake, British Columbia	Gold	1988	36
Cheni Gold Mines Inc.	New 500 t/d Laywers mine and concen- trator, Toodoggone area, British Columbia	Gold	1989	35.9
Madeleine Mines Ltd.	New 2 700 t/d Lac des Isles mine, concen- trator and reduction plant, northwestern Ontario and refinery, Calgary, Alberta	Pt group, gold nickel, copper	1988	35
Canamax Resources Inc.	New 450 t/d Kremzar mine and con- centrator, Wawa area, Ontario	Gold	1988	23.2
Canamax Resources Inc., Pacific Trans-Ocean Resources Ltd.	New 290 t/d Ketzar River mine and con- centrator, Yukon Territory	Gold	1988	22
Granges Exploration Ltd., Abermin Corporation	New 450 t/d Tartan Lake mine and concentrator, Flin Flon, Manitoba	Gold	1987	20
Lac Minerals Ltd.	New 1 140 t/d concentrator to process tail- ings and subsurface ore, Kirkland Lake, Ontario	Gold	1988	16
St. Joe Canada Inc.	New Golden Patricia mine and 150 t/d concentrator, Lake St. Joseph, Ontario	Gold	1988	15.2
St. Andrew Goldfields Ltd.	New 450 t/d Stock Township mine and concentrator, Matheson, Ontario	Gold	1988	15

Skyline Explorations Ltd.	New 180 t/d Reg mine and concentrator, Johnny Mountain, British Columbia	Gold	1988	12
Pioneer Metals Corporation	New 900 t/d Puffy Lake mine, Sherridon, Manitoba	Gold	1987	11
Emerald Lake Resources Inc., Place Resources Corporation	New 400 t/d Golden Rose mine and concentrator, Sturgeon Falls area, Ontario	Gold	1987	8
Eastmaque Gold Mines Ltd.	New 660 000 t/y concentrator to process tailings, Kirkland Lake, Ontario	Gold	1987	7.4
Northumberland Mines Limited	New 900 t/d Murray Brook mine and vat leaching plant, Bathurst District, New Brunswick	Gold	1988?	4.7
McFinley Red Lake Mines Limited	New 150 t/d Bateman Township concentrator, Ontario	Gold	1987	1.8
Giant Yellowknife Mines Limited	New 200 t/d pilot plant to process tailings from Giant mine, Yellowknife, N.W.T.	Gold	1988	0.7
Giant Bay Resources Ltd., Giant Yellowknife Mines Limited	New 10 t/d biotank leach demonstration plant, Salmita mine, Courageous Lake, N.W.T.	Gold	1987	0.45
Silverside Resources Inc., International Platinum Corporation	New 140 t/d Hellens-Eplett mine and concentrator, North Cobalt, Ontario	Silver	1987	0.4
Ateba Mines Inc.	Processing of waste from previous mining operations, Beardmore area, Ontario	Gold	1987	n.a.
Campbell Resources Inc., Meston Lake Resources Inc.	Commercial production, 635 t/d Joe Mann mine and concentrator, Chibougamau, Quebec	Gold	1987	n.a.
Belmoral Mines Ltd., Broulan Resources Inc.	New open pit Whitney mine, Timmins area, Ontario.	Gold	1987	n.a.
Belmoral Mines Ltd., Lenora Explorations Ltd.	New Omega mine, Kirkland Lake, Ontario	Gold	1987	n.a.
D'Or Val Mines Ltd.	New 680 t/d Beacon No. 2 mine and concentrator, Val d'Or area, Quebec	Gold	1987	n.a.
Mill City Gold Inc. Tyranax Gold Inc.	Processing of tailings from Tyranite mine, Gowganda, Ontario	Gold	1987	n.a.
Orofino Resources Limited	Reactivation of Scadding mine, Sudbury area, Ontario	Gold	1987	n.a.
Pamour Inc.	New heap-leaching operation	Gold	1987	n.a.
Seabright Resources Inc.	New 300 t/d Beaver Dam mine, Halifax County, Nova Scotia	Gold	1987	n.a.

Company	Project	Metal	Start-up Year	Estimated Development Cost (\$ million)
Seabright Resources Inc.	New 250 t/d Forest Hill mine, Guysborough County, Nova Scotia	Gold	1987	n.a.
Sumac Ventures Inc.	New heap leaching operation to process tailings and waste from Old Union mine, Grand Forks area, British Columbia	Gold	1987	n.a.
Treminco Resources Ltd.	Reactivation of Ptarmigan mine, Yellowknife, Northwest Territories	Gold	1987	n.a.
			Subtotal	553
OTHER METALS				
Hudson Bay Mining and Smelting Co., Limited (HBM&S), Outokumpu Mines Ltd.	New Namew Lake mine and concentrator, Manitoba	Nickel, copper	1988	53
INCO Limited	Development of lower portion of Coleman mine, Levack area, Ontario	Nickel, copper precious metals	1990	51
Minnova Inc.	New 450 000 t/y Ansil mine, Rouyn-Noranda area, Quebec	Copper, zinc gold, silver	1989	35
INCO Limited	Development of 1-C orebody, Thompson underground mine, Thompson, Manitoba	Nickel, copper, precious metals	1988	26.9
Westmin Resources Limited	Expansion of capacity from 3 000 to 4 000 t/d, Myra Falls, British Columbia	Zinc, copper, silver, gold, lead	1988	24
BP Canada Inc., Esso Resources Canada Limited, TransCanada PipeLines Limited	Development of A-2 zone, Selbaie mine, Joutel, Quebec	Copper, zinc, gold, silver	1988	9.5
Campbell Resources Inc.	Deepening of shaft (an additional 305 m), Cedar Bay mine, Chibougamau, Quebec	Copper, gold silver	1988	7.5
Audrey Resources Inc., Minnova Inc.	New 1 000 t/d Mobrún mine, Rouyn-Noranda area, Quebec	Zinc, copper, gold, silver	1987	n.a.
			Subtotal	207
			Grand Total	760

Source: Press reports.
n.a.: Not available.

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