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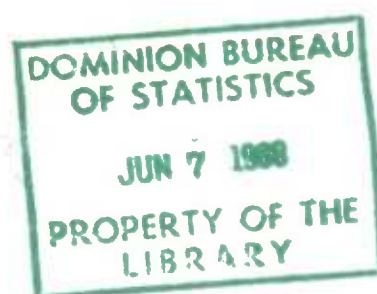
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FELDSPAR AND QUARTZ MINES

1964



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FELDSPAR AND QUARTZ MINES

1964

The Feldspar and Quartz Mines are part of Other Non-metal Mines - Industry 079 of the Standard Industrial Classification Manual, Catalogue No. 12-501.

Owing to the very close physical association of feldspar and quartz in many Canadian deposits (pegmatites), it is difficult for some operators to make a separation of all data pertaining to the mining of each individual mineral; for this reason, the general statistics relating to employment, fuel and electricity, etc., have been combined in this report. Since 1936 corresponding statistics relating to the production of nepheline syenite have been included with those pertaining to the commercial production of feldspar and quartz.

Quebec produced feldspar; nepheline syenite output came from Ontario only; quartz (silica) in various forms was produced in Quebec, Ontario, Manitoba, Saskatchewan and British Columbia.

Data presented in this report under the heading of Feldspar and Quartz Mines (Tables 1-8) reflect the full implementation of the revised Standard

Industrial Classification (S.I.C.) and the New Establishment Concept including an extension of the latter to cover total activities of mining establishments (see Explanatory Notes section of this report). Commodity statistics reflecting total production from all sources, world figures on production, trade data, etc. are presented along the same general lines as in the earlier issues of this report.

The combination of improvements in internal procedures with the introduction of the final stage of the establishment concept in the annual Census of Mining produced changes which, for some industries, required major adjustments in industry statistical data - see Explanatory Notes. However, in the case of the industry under review in this report, the changes were relatively minor as evidenced in the comparative series of statistics presented in Tables 1 and 2. The reduction in the number of establishments which is indicated is the result of the exclusion of non-producers. These latter are no longer being included as establishments under the new definition.

SYMBOLS

The following standard symbols are used in Dominion Bureau of Statistics publications:

- .. figures not available.
- ... figures not appropriate or not applicable.
- nil or zero.
- amount too small to be expressed.
- ▮ preliminary figures.
- † revised figures.
- x confidential to meet secrecy requirements of the Statistics Act.

TABLE 1. Principal Statistics, Feldspar and Quartz Mines, 1957-63

Basis: Revised Standard Industrial Classification

Year	Estab- lish- ments	Em- ployees	Salaries and wages	Cost of fuel and electricity	Cost of materials and supplies	Value of production	Value added ¹
	number				dollars		
1957	24	411	1,552,680	350,604	431,728	5,685,182	4,571,535
1958	28	414	1,646,943	376,011	587,369	4,858,399	3,728,517
1959	30	429	1,685,867	386,190	583,378	5,773,221	4,577,424
1960	23	364	1,400,559	292,827	450,055	5,205,978	4,378,979
1961	23	339	1,312,770	224,025	374,735	4,795,170	3,820,235
1962	20	380	1,559,605	261,515	543,634	5,528,543	4,574,332
1963	20	381	1,564,114	343,299	686,380	6,332,183	5,302,504

¹ Value of production less cost of process supplies, etc., fuel and electricity.

Note: Includes details for nepheline syenite mines. See also footnote Table 2.

TABLE 2. Principal Statistics, Feldspar and Quartz Mines,¹ 1961-64

Basis: Revised Standard Industrial Classification and New Establishment Concept

Year	Estab- lish- ments	Mining activity							Total activity				
		Production and related workers			Cost of fuel and elec- tricity	Cost of materials and supplies	Value of production	Value added	Working owners and partners		Employees		Value added
		Number	Man- hours paid	Wages					Number	With- drawals	Number	Salaries and wages	
No.	'000	\$'000						\$'000		\$'000			
1961	11	240	509	909	284	794	4,866	3,789	x	x	307	1,274	3,800
1962	13	293	636	1,176	327	875	5,756	4,554	x	x	361	1,540	4,586
1933	15	268	551	1,068	343	1,033	5,728	4,351	x	x	338	1,449	4,365
1964	16	303	657	1,296	453	1,326	7,552	5,773	x	x	395	1,784	5,795

¹ Refer to Explanatory Notes for description of concepts and definitions and an explanation of differences in Tables 1 and 2. See also text page 3.

Note: Includes details for nepheline syenite mines.

TABLE 3. Employment and Payroll, Feldspar and Quartz Mines, 1961-63

Basis: Revised Standard Industrial Classification

Year	Employees										Salaries and wages				
	Production and related workers				Adminis- trative and office		Sales and distribution		Total		Production and related workers		Adminis- trative and office	Sales and distri- bution	Total
	Mining		Other								Mining	Other			
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female					
	number										\$'000				
1961	275	1	—	—	54	9	—	—	329	10	968	—	345	—	1,313
1962	314	1	—	—	56	9	—	—	370	10	1,211	—	349	—	1,560
1963	318	—	—	—	57	6	—	—	375	6	1,203	—	361	—	1,564

Note: Includes details for nepheline syenite mines.

TABLE 4. Employment and Payroll, Feldspar and Quartz Mines, 1961-64

Basis: Revised Standard Industrial Classification and New Establishment Concept

Year	Employees										Salaries and wages				
	Production and related workers				Adminis- trative and office		Sales and distribution		Total		Production and related workers		Adminis- trative and office	Sales and distribution	Total
	Mining		Other								Mining	Other			
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female					
	number										\$'000				
1961	239	1	—	—	57	10	—	—	296	11	909	—	365	—	1,274
1962	293	—	—	—	59	9	—	—	352	9	1,176	—	364	—	1,540
1963	268	—	—	—	63	7	—	—	331	7	1,068	—	381	—	1,449
1964	303	—	—	—	79	13	—	—	382	13	1,296	—	488	—	1,784

Note: Includes details for nepheline syenite mines.

TABLE 5. Production and Related Workers, Feldspar and Quartz Mines, 1963 and 1964

Basis: Revised Standard Industrial Classification and New Establishment Concept

Month	1963				1964			
	Mine		Mill	Total	Mine		Mill	Total
	Surface	Under-ground			Surface	Under-ground		
	number							
January	88	—	162	250	81	—	159	240
February	81	—	166	247	81	—	161	242
March	99	—	163	262	93	—	157	250
April	97	—	164	261	114	—	174	288
May	109	—	166	275	137	—	173	310
June	94	—	170	264	149	—	200	349
July	97	—	174	271	152	—	201	353
August	115	—	173	288	160	—	193	353
September	97	—	177	274	136	—	209	345
October	85	—	181	266	145	—	199	344
November	91	—	193	284	105	—	181	286
December	79	—	184	263	96	—	174	270
Averages	94	—	173	267	121	—	182	303

Note: Includes details for nepheline syenite mines.

TABLE 6. Purchased Fuel and Electricity Used, Feldspar and Quartz Mines, 1963 and 1964

Basis: Revised Standard Industrial Classification and New Establishment Concept

Description	1963		1964	
	Quantity	Cost	Quantity	Cost
		\$'000		\$'000
Bituminous coal:				
(a) From Canadian mines	ton	—	—	—
(b) Imported	"	—	—	—
Sub-bituminous coal (from Alberta mines only)	"	—	—	—
Anthracite coal	"	—	—	—
Lignite coal	"	—	—	—
Coke	"	—	—	—
Gasoline (including gasoline used in cars and trucks)	Imp. gal.	103,735	112,215	41
Fuel oil including kerosene or coal oil	"	897,398	1,315,080	170
Wood	cord	—	—	—
Gas:				
(a) Liquefied petroleum gases	Imp. gal.	2,414	3,540	1
(b) Other manufactured gas	M cu. ft.	—	—	—
(c) Natural gas	"	—	9,367	4
Other fuel	"	—	—	—
Electricity purchased	kwh.	20,482,640	23,698,879	237
Steam purchased	"	—	—	—
Total fuel and electricity used		343		453
Electricity generated (a) For own use		—	—	—
(b) For sale		—	—	—

Note: Includes details for nepheline syenite mines.

TABLE 7. Materials and Supplies,¹ Feldspar and Quartz Mines, 1963 and 1964

Basis: Revised Standard Industrial Classification and New Establishment Concept

Description	Cost	
	1963	1964
	\$'000	
Ore or other semi-processed materials purchased and used in mine/mill operations	85	63
Containers, shipping materials and supplies used	158	193
Operating maintenance and repair supplies used (excluding fuel)	707	927
Amount paid out to others for work done on materials owned by establishments	83	142
Totals	1,033	1,326

¹ Refer to Explanatory Notes for explanation of differences in Tables 7 and 8 with data published in earlier years.

Note: Includes details for nepheline syenite mines.

TABLE 8. Value of Production, Feldspar and Quartz Mines, 1963 and 1964

Basis: Revised Standard Industrial Classification and New Establishment Concept

Description	Value	
	1963	1964
	\$'000	
1. Value of production	5,728	7,552
2. Amount received in payment for work done on materials and products owned by others	—	—
Less adjustment for value of sales taxes, excise duties and outward transportation charges which could not be deducted from individual commodity items described above	—	—
Total value of production and work done	5,728	7,552

Note: Includes details for nepheline syenite mines.

TABLE 9. Drilling Completed on Feldspar and Quartz Deposits, 1964

	Footage drilled ¹
Diamond drilling for exploration (testing):	
By companies with their own equipment and personnel	—
By contractors	4,534
Other drilling:	
Diamond drilling for breaking rock or ore:	
By companies with their own equipment and personnel	—
By contractors	—
Drilling by percussion and other machines ²	413,748

¹ Drilling as reported by firms classified to this industry.² This is not complete as some companies do not compile these data.TABLE 10. Taxes Paid by Feldspar and Quartz Mines,¹ 1964

Taxes paid	Dollars
Dominion income taxes	30,536
Provincial taxes	44,533
Municipal taxes	20,864

¹ (a) Includes nepheline syenite mines and other mines classified to this industry.

(b) Includes related corporate activities associated with operations of feldspar and quartz mines.

TABLE 11. Specified Miscellaneous Expenditures by Companies Engaged in Feldspar and Quartz Mines Operations,¹ 1964

	Dollars
(a) Workmen's compensation	60,726
(b) Silicosis assessment	42,683
(c) Unemployment insurance	14,466
(d) Aggregate cost of structures, roads, machinery, equipment, etc., built by or purchased from outside contractors or suppliers and chargeable to Fixed Assets Account	314,831
(e) Book value of fixed assets (new structures, roads, machinery, equipment, etc., including major repairs and alterations) produced by own employees and chargeable to Fixed Assets Account	52,855
(f) Other capital expenditures not reported in (d) and (e)	—
(g) Cost of materials and supplies used in the production of machinery and equipment and in the construction of roads and new structures (including major repairs and alterations by own employees and chargeable to Fixed Assets Account)	18,953
(h) Cost of office supplies used during the year, not chargeable to Fixed Assets Account. Excludes cost of stamps and meter expenses	20,141

¹ (a) Includes nepheline syenite mines and other mines classified to this industry.

(b) Includes related corporate activities associated with Canadian operations of feldspar and quartz mines not allocable separately elsewhere.

FELDSPAR

Feldspar shipments in 1964 amounted to 9,149 tons valued at \$212,052 compared with 8,608 tons valued at \$197,031 in 1963. During the past eight years all of the feldspar shipped was mined in Quebec.

The greater of the production of feldspar is used in the pottery, glass, enamelware, and other ceramic trades, and the remainder mainly in scouring soaps and cleansers and for bonding of fired abrasive wheels and other shapes. Some coarsely-crushed spar, usually made from impure waste or

quarry fines, is sold for stucco dash, artificial stone, chicken grit, etc. Small tonnages of specially selected crude (dental spar) are used in the manufacture of artificial teeth, and such material commands a larger premium.

Most of the feldspar used is of the high-potash type, though some high-soda spar is used for blending purposes and in low-fired enamels and glazes. Practically all colours are equally acceptable for ceramic uses, but for cleaner purposes the pale shades of white to buff are demanded.

TABLE 12. Producers' Shipments of Feldspar, Crude and Ground, All Industries,¹ 1955-64

Year	Quantity tons	Value ² \$	Year	Quantity tons	Value ² \$
1955	18,152	355,879	1960	13,862	239,273
1956	18,153	364,849	1961	10,507	229,626
1957	20,450	393,284	1962	9,994	222,460
1958	20,387	359,966	1963	8,608	197,031
1959	17,953	301,372	1964	9,149	212,052

¹ See footnote Table 19.

² Excluding the value of containers.

TABLE 13. Available Data on Consumption of Feldspar, 1960-64

	1960	1961	1962	1963	1964
(a) By uses					
	tons				
Glass .....	...	...	...	...	...
Scouring powders, cleansers	564	603	883	537	521
Clay products (pottery, tile, insulators, etc.)	6,002	5,975	5,407	5,068	5,396
Electrical apparatus	324	292	...	...	...
Miscellaneous non-metallics .....	...	...	...	...	...
Total accounted for	6,890	6,870	6,290	5,603	5,917
(b) By provinces					
Quebec	2,248	2,986	2,525	787	546
Ontario	3,639	2,671	2,388	2,726	3,253
Alberta	—	10	—	30	—
British Columbia	1,003	1,203	1,377	2,062	2,118
Canada	6,890	6,870	6,290	5,603	5,917

TABLE 14. Imports and Exports of Feldspar, 1962-64

	1962		1963		1964	
	Tons	Value \$	Tons	Value \$	Tons	Value \$
Imports:						
Feldspar	1,901	43,846	2,600	59,217	...	...
Exports:						
Feldspar	3,698	87,499	3,282	78,921	3,386	20,436

Source: Trade of Canada, "Imports by Commodities", Catalogue No. 65-007 and "Exports by Commodities", Catalogue No. 65-004.

TABLE 15. World Production of Feldspar, by Countries¹

(Taken from the "Minerals Yearbook" published by the United States Bureau of Mines)

Country ¹	1960	1961	1962	1963	1964
long tons					
North America:					
Canada (sales)	12,376	9,381	8,923	7,686	8,169
United States (sold or used)	502,380	496,808	492,476	548,954	587,194
South America:					
Argentina	8,418	11,474	7,245	12,599	6,390
Brazil ²	39,000	39,000	39,000	39,000	39,000
Chile	1,095	2,280	1,138	417	814
Colombia	14,800	14,800	15,250	12,300	11,426
Peru	236	992	287	217	837
Uruguay	713	877	692	282	883
Europe:					
Austria	4,573	3,907	4,976	2,077	1,603
Finland	9,158	13,303	14,921	12,618	10,561
France	83,658	170,470	170,194	170,764	193,260
Germany, West	264,204	265,450	269,770	273,610	278,355
Italy	85,076	93,228	98,367	100,487	106,905
Norway	53,337	68,895	54,100	65,000	65,300
Poland .....	..	..	..	26,300	26,300 ³
Portugal	1,699	2,892	3,674	396	10,994
Spain	11,924	8,194	10,728	12,401	16,466
Sweden	54,517	55,868	53,348	44,920	50,785
U.S.S.R. ⁴	195,000	195,000	195,000	195,000	195,000
Yugoslavia	13,780	20,215	31,578	29,413	33,260
Asia:					
Ceylon	32	106	56	109	4
Hong Kong	2,511	1,206	937	1,680	1,556
India	10,484	9,706	18,918	20,901	19,781
Japan ³	91,454	50,986	46,991	53,339	61,445
Korea, Republic of .....	..	7,520	4,651	11,392	13,468
Pakistan, West .....	..	..	55	1,520	48
Philippines	3,896	14,526	15,325	6,564	7,924
Viet-Nam, South .....	..	..	..	..	..
Africa:					
Angola .....	..	..	..	796	493
Eritrea	984	2,953	425	490 ²	9,800 ²
Ethiopia .....	..	..	..	..	..
Kenya .....	..	1	..	..	..
Madagascar .....	..	13	..	..	1
Malagasy Republic (Madagascar) .....	..	..	..	..	..
South Africa, Republic of	15,600	23,290	28,209	41,372	35,525
South-West Africa .....	..	89	465	2,197	1,893
United Arab Republic (Egypt)	354	..	..	..	4,653
Oceania:					
Australia	8,414	8,209	8,513	8,842	9,012
World totals (estimate) ^{1,2}	1,490,000	1,600,000	1,600,000	1,710,000	1,815,000

¹ Feldspar is produced in China, Czechoslovakia and Rumania, but data are not available; no estimates are included in the total except for Czechoslovakia.

² Estimate.

³ In addition, the following quantities of aplite and other feldspathic rock were produced: 1960, 91,339 tons; 1961, 132,041 tons; 1962, 168,543 tons; 1963, 211,814 tons; 1964, 258,510 tons.

⁴ Less than 1/2 unit.

NEPHELINE SYENITE

Nepheline syenite shipped by Canadian producers in 1964 amounted to 290,300 tons valued at \$2,097,172 compared with 254,000 tons valued at \$2,699,202 in the preceding year. All of Canada's output of nepheline syenite was mined in the Blue Mountain area, Peterborough county, Ontario, by two firms, the Industrial Minerals of Canada Ltd. and the International Minerals and Chemical Corporation (Canada) Limited.

Nepheline syenite is quartz-free crystalline rock consisting principally of nephelinite (a silicate of alumina, potash, and soda), albite, and microcline feldspar. To be of commercial interest it must be amenable to treatment for the removal of iron-bearing impurities such as magnetite, biotite, hornblende, and tourmaline, so that the iron-oxide Fe_2O_3 content can be reduced to under 0.08 per cent. Finely divided iron impurities frequently cannot be removed by dry milling methods, and render otherwise promising deposits of nepheline syenite useless for commercial operation.

Specifications for glass-grade nepheline syenite call for all minus 28 mesh material, and, for pottery grade, all through 200 mesh or finer. High-intensity magnetic separation reduces the iron-oxide content from about 1.50 per cent in the feed to under 0.08 per cent in the finished product. Dry milling methods are used throughout the processing.

Nepheline syenite finds wide use in the ceramic industry where it replaces feldspar as a source of alumina and the alkalis in making glass pottery, floor and wall tile, refractory cements, whiteware and porcelain products, enamels, and varied ceramic products. The lower fusibility and greater fluxing action of nepheline syenite as compared with that of the traditional vitrifying agents enables a manufacturer to either fire the ware at lower temperature or use a reduced amount of vitrifying agent and still attain the desired properties. In glass batches, the low iron content (0.06 to 0.08 per cent Fe_2O_3) of nepheline syenite, combined with its high alumina and alkali content, makes it a desirable means of introducing alumina, especially where low iron is important.

TABLE 16. Producers' Shipments of Nepheline Syenite, All Industries,¹ 1955 - 64

Year	Quantity	Selling value ²	Year	Quantity	Selling value ²
	tons	\$		tons	\$
1955	146,068	2,099,512	1960	240,636	2,891,095
1956	180,006	2,574,140	1961	240,320	2,572,169
1957	200,016	2,754,060	1962	254,418	2,533,003
1958	201,306	2,613,446	1963	254,000	2,699,202
1959	228,722	2,613,446	1964	290,300	3,097,172

¹ See footnote Table 19.² Value of containers excluded.

TABLE 17. Available Data on Consumption of Ground Nepheline Syenite, 1960 - 64

	1960	1961	1962	1963	1964
	tons				
(a) By uses					
Glass and glass wool	27,810	31,849	35,864	33,838	33,858
Clay products	2,961	1,715	2,985	4,195	4,953
Mineral wool	5,737	3,127	4,109	3,424	4,336
Total accounted for	36,508	36,691	42,958	41,457	43,147
(b) By provinces					
Quebec	11,732	14,171	15,241	16,203	17,144
Ontario	20,930	18,324	22,399	20,464	20,680
Other	3,848	4,196	5,318	4,790	5,323
Total accounted for	36,508	36,691	42,958	41,457	43,147

TABLE 18. Exports of Nepheline Syenite, 1955 - 64

Year	Quantity	Value	Year	Quantity	Value
	tons	\$		tons	\$
1955	118,275	1,753,117	1960	193,298	2,373,354
1956	139,305	1,935,315	1961	194,598	2,249,346
1957	164,342	2,235,843	1962	193,658	2,210,884
1958	160,081	2,098,421	1963	203,262	2,213,945
1959	178,120	2,345,341	1964	226,971	2,630,185

Source: Trade of Canada, "Exports by Commodities," Catalogue No. 65-004.

QUARTZ (SILICA)

Shipments of quartz or siliceous material during 1964 amounted to 2,117,273 tons valued at \$4,506,038 compared with 1,836,612 tons worth \$3,687,979 shipped in the preceding year. The production included crude and crushed quartz, quartzite and sandstone, as well as natural silica sands and gravels which were used as fluxes. No shipments were made from a quartz crystal deposit near Lyndhurst, Ontario.

In Quebec substantial tonnages of silica rock were crushed and screened for use in the manufacture of ferrosilicon or further milled to pro-

duce sand for silicon carbide. In Ontario most of the shipments were for use in making silica-brick, silicon carbide and ferrosilicon, and the fluxing of nickel-copper ores. In Manitoba silica flux is also used in the smelting of nickel-copper ores. In Saskatchewan the output consisted of low-grade natural silica sands or gravels for use as flux at the Flin Flon Smelter of Hudson Bay Mining and Smelting Co. Ltd. Core and moulding sand which have a high silica content was included in the quartz or silica industry.

TABLE 19. Producers' Shipments of Quartz (Silica), All Industries,¹ 1955 - 64

Year	Tons	Value ²	Year	Tons	Value ²
		\$			\$
1955	1,869,913	2,039,575	1960	2,260,766	3,266,705
1956	2,142,234	3,036,543	1961	2,194,054	3,152,882
1957	2,139,246	3,185,186	1962	2,085,620	3,817,445
1958	1,453,656	2,538,150	1963	1,836,612	3,687,979
1959	2,163,546	3,436,730	1964	2,117,273	4,506,038

¹ These tables include shipments from other industries which produce, as a secondary activity, the commodities listed therein.² Value of containers is excluded.

TABLE 20. Producers' Shipments of Quartz,^{1,2} by Provinces, All Industries, 1963 and 1964

Province	1963		1964	
	Tons	Value \$	Tons	Value \$
Nova Scotia	2,861	43,000	—	—
Quebec	401,063	2,266,273	459,195	2,692,249
Ontario	952,166	644,287	1,127,425	836,937
Manitoba	279,641	468,867	301,472	644,157
Saskatchewan	160,398	86,615	187,179	169,977
British Columbia	40,483	178,937	42,002	162,718
Canada	1,836,612	3,687,979	2,117,273	4,506,038

¹ See footnote Table 19.² Includes both crude and crushed quartz, crushed sandstone and quartzite and natural silica sands.TABLE 21. Production¹ of Natural Low-grade Silica Sand and Silica Gravel as Non-ferrous Smelter Flux, All Industries,² 1962-64

	1962		1963		1964	
	Tons	Value \$	Tons	Value \$	Tons	Value \$
Ontario	776,557	187,753	609,878	189,152	651,493	150,371
Saskatchewan and Manitoba	291,760	454,081	307,482	186,280	328,023	269,977
Canada	1,068,317	641,834	917,360	375,432	979,516	420,348

¹ Included in totals shown in Tables 19 and 20.² See footnote Table 19.

TABLE 22. Imports and Exports of Silica and Specified Products of Silica, 1963 and 1964

	1963		1964	
	Tons	Value \$	Tons	Value \$
Imports:				
Ground flint stone	1,812	38,110	...	...
Silica sand for manufacturing	787,157	3,045,078	771,900	3,059,670
Silex or crystalized quartz	11,882	204,696	5,176	327,305
Silica fire-brick .....	...	1,281,854	...	1,564,216
Quartz, piezo electric	6	286,018	..	..
Exports:				
Quartzite	47,437	216,489	146,206	425,371

Source: Trade of Canada, "Imports by Commodities", Catalogue No. 65-007 and "Exports by Commodities", Catalogue No. 65-004.

TABLE 23. Available Data on the Consumption of Silica Sand and Ground Quartz, 1960-64

	1960	1961	1962	1963	1964
	tons of 2,000 pounds				
By industries					
Paints, pigments and varnishes	1,124	1,236	1,376	1,494	1,597
Soaps and cleaning compounds	13,316	14,824	28,467	15,059	15,297
Clay products	5,977	5,866	5,938	7,131	4,895
Refractories .....	...	674	2,851	899	1,291
Miscellaneous non-metallic minerals	1,971	1,968	2,066	2,830	3,371
Roofing paper	4,340	4,555	5,139	5,160	6,222
Glass	286,674	312,828	341,649	329,563	298,009
Abrasives	140,269	132,006	105,731	111,646	130,746
Iron foundries	112,357	438,092	117,486	139,192	164,589
Heating equipment	17,915	16,282	15,116	13,870	9,514
Boilers, tanks and plate work	2,147	2,037	1,432	1,584	654

TABLE 23. Available Data on the Consumption of Silica Sand and Ground Quartz, 1960-64 - Concluded

	1960	1961	1962	1963	1964
	tons of 2,000 pounds				
By industries - Concluded					
Farm implements	6,822	5,419	2,937	3,133	3,429
Railway rolling stock	7,097	6,726	3,874	3,705	9,311
Iron and steel mills	82,569	72,623	92,896	99,367	143,700
Industrial chemicals	26,109	24,108	24,210	25,446	29,787
Miscellaneous chemicals	1,052	1,555	1,762	2,131	2,286
Stone products	823	975	689	625	1,078
Cement manufacturing	242,139	207,118	115,257	142,491	134,634
Mineral wool .....	...	18,433	22,979	22,686	27,901
Brass and copper products	64	979	907	1,365	1,678
Pulp and paper .....	...	-	-	-	-
Gypsum products	4,212	3,549	1,608	3,909	1,061
Fabricated structural metal	1,458	1,255	1,598	1,322	603
Miscellaneous machinery and equipment	8,208	22,888	27,541	31,087	27,884
Office and store machinery	138	-	-	-	-
Motor vehicles parts	28,357	31,162	34,692	73,233	97,330
Hardware, tools and cutlery	248	314	470	278	300
Miscellaneous metal fabricating	22,131	24,902	27,318	28,506	30,782
Total accounted for	1,017,517	1,352,374	985,989	1,067,712	1,147,949
By provinces					
Nova Scotia, Newfoundland	3,856	1,645	1,000	1,769	2,967
New Brunswick	1,922	3,123	2,669	2,651	2,557
Quebec	409,355	422,117	401,894	419,192	409,187
Ontario	457,897	824,840	489,474	536,641	628,512
Manitoba	38,716	21,182	22,077	45,885	35,509
Saskatchewan	14,488	321	358	339	238
Alberta	47,495	47,518	57,595	50,893	56,028
British Columbia	43,788	31,628	10,922	10,342	12,954
Canada	1,017,517	1,352,374	985,989	1,067,712	1,147,949

List of Establishments classified to this Industry, 1964

(Does not include establishments classified to other industries, which as a secondary activity, recovered products typical of this industry)

Name of firm	Head office address	Location of mine or mill
Quebec:		
Baskatong Quartz Products	455 Craig St. W., Montreal	Baskatong Twp.
Charette, F.	Glen Almond	Papineau
Dominion Industrial Mineral Corp. Ltd.	25 St. Joseph St., Lachine	St. Donat De Montcalm
Donaldson, Wilfred	Glen Almond	Papineau
Hebert & Larocque	Glen Almond	Glen Almond
Industrial Minerals of Canada Ltd.	7 King St. E., Toronto, Ontario	St. Canut
International Minerals & Chemicals Corp. Ltd.	4 King St. West, Toronto 1	Derry Twp., Baskatong
Lachaine, Régis	St. Pierre de Wakefield	St. Pierre de Wakefield
Montpetit, E., & Fils	133, rue Principale, Melocheville	Melocheville
Sicotte, Armand & Fils	Lafèche	Howick
Union Carbide Exploration Ltd.	123 Eglinton Ave. E., Toronto, Ontario	Melocheville
Ontario:		
Industrial Minerals of Canada Ltd.	7 King St. W., Toronto	Nephton
International Minerals & Chemicals Corp. Ltd.	4 King St. West, Toronto 1	Blue Mountain
Union Carbide Canada Ltd.	123 Eglinton Ave. E., Toronto	Killarney
Manitoba:		
Selkirk Silica Co. Ltd.	8th Floor, Boyd Bldg., Winnipeg	Baskatong
British Columbia:		
Pacific Silica Ltd.	Box 39, Oliver	Oliver

EXPLANATORY NOTES

(Including Concepts and Definitions)

INTRODUCTION

The Census of Mines, Quarries and Oil Wells is an annual mail survey covering Canada's Mineral Industries based on the Standard Classification of Industries. While principal statistics are collected and compiled for all mineral industries not all can be published separately by province because of the confidential nature of the data in certain provinces.

The reporting unit for the Census is designated as the establishment (see definition of Establishment in following section) and a return is requested from every establishment classified to a mineral industry. When an establishment is operated for only part of a year a report is required covering the period of operation.

There are four different questionnaires used in this Census: (a) short form (introduced in 1965) (b) long form (c) head office questionnaire and (d) commodity questionnaire. The short and long forms are used to obtain principal statistics and commodities shipped from establishments classified to mineral industries and differ only in the amount of detail requested.

The head office questionnaire is generally used for company head offices and/or auxiliary units separately located from the mineral establishment(s). (see following notes on Head offices and auxiliary units). The Commodity questionnaire is used to survey certain establishments to collect information on the quantity and value of goods of own production shipped or used by such establishments in order to achieve full coverage of domestically produced commodities. (See the following note under Value of production).

General

This report is one in a series of 18 publications which relate to the operations of industries comprising Major Groups 1, 3, and 4 of Division 4, Mines (including Milling) Quarries and Oil Wells of the revised Standard Industrial Classification (S.I.C.). These groups are respectively Metal Mines, Non-metal Mines and Quarries and Sand Pits. Industries comprising Major Group 2 (Mineral Fuels) are covered in a separate series of reports. The industries included in Major Group 5, Services Incidental to Mining are not covered by separate reports. However, certain relevant statistics are published in various publications, for example, "Contract Drilling for the Mining Industry" (Catalogue No. 26-207), "Construction in Canada" (Catalogue No. 64-201) and a special report "Private and Public Investment in Canada" (available on request from the Bureau or the Queen's Printer). The Bureau has also developed a new survey "Annual Survey of Mining and Exploration Companies". This survey is being introduced for the 1967 reporting period and will attempt to bring together details on exploration, development and capital and repair expenditures for the mining universe (excluding oil and gas).

The publication of this series of 18 reports constitutes the final phase of the implementation of the revised Standard Classification for these three Major Groups (see above). Because of its size and complexity, this project has to be carried out in several stages and over a period of years. These stages were as follows: (a) reclassification of establishments according to the revised S.I.C. (b) implementation of a new establishment definition (c) an extension of the establishment definition to cover the non-mining activities of mining establishments. The first stage was completed with the 1960 Census of Mines, etc. and the results were published in the 1960 and 1961 reports on the basis of the revised Standard Industrial Classification. This part of the project was confined entirely to a re-coding of existing reporting units. Under the revised Standard Industrial Classification reporting establishments are classified or allotted to specific industries in the classification system on the basis of the value of principal products made or shipped. Full details concerning the revised classification system are contained in the "Standard Industrial Classification Manual", Catalogue No. 12-501, which is available from either the Queen's Printer or the Dominion Bureau of Statistics.

The second stage in the project consisted of the implementation of the new definition of the reporting unit i.e. "establishment" as it applied to **mining activities** of mining establishments (see following note on Establishment). Results of the 1962 Census of Mining reflected this change in concept and, in order to provide comparability of data for previous years, the 1962 reports contained principal statistics on the basis of the new establishment definition for years back to 1957. This naturally included the projection of stage one.

The third stage in the project which was the extension of the definition of the establishment to cover **total activities** of mining establishment, is reflected in the 1964 data presented in the present report. By definition "total activity" relates to all operational data and excludes such non-operational items as rent, interest and dividends. Statistics on man-hours included in the earlier publications for the mining industry will continue to be included as part of the regular series but will be confined to production and related workers as in the reports for the Census of Manufactures. Adjustments and revisions made in the statistics for mining activities covering the period 1961-63 and carried in the mining series of publications for this period were further revised in the course of the final stage of the programme to bring them in line with reporting procedures followed in the 1964 Census of Mining which reflect the final application of the new concept. The 1961-63 statistics on mining statistics on the new basis are thus not comparable with those published in earlier issues in this series. However, the 1961-63 statistics are shown in this publication in both their previously published and revised forms in order to provide a link with the immediate past.

Reference has already been made to changes implemented and in the course of implementation in the mining industries in reports published in this series prior to the 1964 issues; however a more complete account of the changes and additions and brief descriptions of the principal industry statistics are given in the following sections of those notes. This latter includes as well a special section dealing specifically with the impact of a new concept in the treatment of the Smelting and Refining industry on the metal mines industries. A description of conceptual and definitional changes appropriate to the statistics for Major Group 4, Mineral Fuels will be included in the relevant industry reports for this group.

Metal Mines

The effect of the application of a special concept to the reporting procedures followed by plants carrying on integrated mining/smelting/refining operations will be evident in the comparison of the 1961-64 data particularly for the items Materials and supplies and Value of production shown in the publications on Metal Mines and the data published in reports prior to 1964. The industries in which the application of this concept had a major effect are those included in S.I.C. Major Group 1 - Metal Mines of the Annual Census of Mining (Mines (including Milling) Quarries and Oil Wells) but more particularly the following:

Copper-Gold-Silver Mines
Nickel-Copper Mines
Silver-Lead-Zinc Mines

These industries which are dominated by a sector of vertically integrated companies involved in mining and manufacturing (smelting and refining) operations have historically created significant distortions in the statistics for these industries. These were caused, for the most part, as a result of applying a value to the ores, concentrates, etc. which were part of the materials (inputs) of the Smelting and Refining industry. The method of valuation used was based on the recoverable metal content of these materials, that is, ores, concentrates, etc. A similar procedure was followed in valuing the output portion of these mines. Since the major output of the mines served as an input to the Smelting and

Refining industry and in turn became a part of the output of the Smelting and Refining industry there was, in effect, a duplication of values for recoverable metal content in the mining and manufacturing sector (smelting and refining). The procedure followed also tended to understate the total output value of the mines sector because the recoverable metal content was valued at a lower level in the processing operations that is, as ores, concentrates, etc. before smelting and/or refining.

Prior to the full implementation of the establishment concept to include total activities, the "Materials and supplies" section included primarily a limited number of consumable materials such as explosives, drill steel, lubricants, etc. Many kinds of supplies, for example, maintenance and repair supplies were not reported. The extension of the Materials and supplies section in accordance with the total activities concept to provide for a more complete coverage of materials and supplies accounts for a major part of the increase in the total cost of Materials and supplies used. In the case of the vertically integrated companies the procedure followed omitted treatment charges such as milling, smelting refining, etc. from the input side of the mines sector involving these companies as well as from the output side of the Smelting and Refining industry. As a result the cost of materials (inputs) reported, particularly for the industries in the mines sector mentioned above was considerably understated.

As a result of the foregoing it was necessary to find some statistical device which would eliminate the above practices and permit the derivation of more meaningful principal statistics—for both the metal mines and for the smelting and refining industry.

While it has been suggested that smelting and refining should be treated as part of the metal mines, and that the statistics should be compiled on this basis, this would be difficult to justify from the statistical viewpoint. Smelting and refining by the nature of its operations constitutes a

manufacturing activity and is considered such, not only in the Canadian and International classification systems but also in the systems of most foreign countries. To include it as part of the mining universe would not only make international comparisons virtually impossible but would affect the importance of Canada's manufacturing industries even more drastically than the changes which resulted from the approach adopted.

After a thorough study of these problems and consultations with the firms involved, it was found that the only satisfactory solution was to continue to consider smelting and refining as a manufacturing industry and to treat such operations of vertically integrated companies as "custom" operations regardless of whether or not the smelting and refining plants (establishments) of such companies were concerned solely with the smelting and refining of ore, concentrates, etc. of their own company. This procedure eliminated the need to arbitrarily value the ores, concentrates, etc. transferred to the smelter and to value the output of the smelter and refinery in terms of commodities produced. Although, for the purpose of commodity statistics, these are still valued on the basis of recoverable metal content, the revenue from integrated operations accrues to the mines concerned and is not duplicated, as in the past, in both the mining and the smelting and refining industries. Thus the revenue from smelting and refining in such integrated operations now consists primarily of treatment costs of own ores, etc. plus any revenue from toll charges of non-company ores, by-products, etc.

The effects of allocating the final revenues of the vertically integrated companies included in this industry to the metal mining industries and the broadening of coverage for materials used, as well as any changes resulting from the implementation of the revised Standard Industrial Classification and the New Establishment Concept, are reflected in the tables of principal statistics for the years 1961 to 1964. Additionally, these tables reflect the inclusion of the non-mining activities, i.e. the total activity concept.

CONCEPTS AND DEFINITIONS

Establishment

A mining establishment is typically a mine, mine/mill (concentrator), quarry, pit, bog, or plant principally engaged in commercial production activities. In many cases a mining company consists of a single establishment but it is not uncommon for a company to consist of a number of establishments some of which may be in mining i.e. mine/mill and others in manufacturing i.e. smelter, cement plant, etc. In addition a number of locations may be involved. Such firms are requested to submit a separate Census of Mining report for each mineral establishment which can meet the reporting requirements embodied in the following definition of the "establishment".

"The smallest unit which is a separate operating entity capable of reporting the following principal statistics:

- Materials and supplies used
- Goods purchased for resale as such
- Fuel and power consumed
- Number of employees and salaries and wages
- Man-hours worked and paid
- Inventories
- Shipments or sales."

Each establishment is required to report on all the activities carried out within its accounting boundaries (except non-operating revenues such as rent, interest and dividends) and data on the different activities (mining etc., trading in goods not of own manufacture, construction by own labour force, revenue from services, etc.) are requested to be reported separately. It should be noted that the statistics for separate activities are not completed consistent since some respondents cannot distinguish, in their records, materials, shipments and inventories relating solely to their own mining activities. For example, inventory of commodities purchased

for re-sale may not be distinguishable from inventory of own mineral commodities. Complete consistency, therefore, can be obtained only at the "all operations" (total activity) level and for studies or statistical measures requiring accurate coordinated data, the "total activity" statistics should be used.

The number of establishments represents the number of operating units that are principally engaged in the activities of the mineral industries to which they have been classified. These units do not necessarily represent the total number engaged in the production of a commodity mainly produced in a certain industry. Some commodities are produced as secondary products in other mineral and non-mineral industries. It should be noted that head offices and auxiliary units which are surveyed separately are not included in the establishment count, (see following notes on Head offices and auxiliary units).

Head Offices and Auxiliary Units

Head offices and auxiliary units of companies classified to the mineral industries such as sales offices, administrative offices, warehouses, laboratories, etc. are now surveyed as part of the Census of Mining.

These head offices and auxiliary units are either included in an establishment report or are surveyed by means of the head office questionnaire. The former is the most common case where a single establishment firm has its executive personnel, sales office, etc. located at the site of the mine (establishment). The special head office questionnaire is generally used where a firm, regardless of the number of establishments, has separately located offices or auxiliary units. Such offices or units do not constitute establishments within the Census of Mining as they do not normally generate operational revenues, but give rise only to cost of operations

(mainly salaries and wages) which are automatically included in the value of shipments or sales. Although not considered as establishments, and hence, not included in the "establishment" count for an industry, the operational costs are reflected in either the "Industry" statistics (3 or 4 digit level) or the "Major group" statistics (2 digit level) according to the following rules:

- (a) In the case of single establishment firms, statistics of offices and units located in a different municipality to the mining establishment are classified to the same industry (3 or 4 digit) as the mining establishment;
- (b) In the case of multi-establishment firms, the statistics for such offices and units are coded to the same industry as the establishments of the firm, when all establishments are in the same industry (3 or 4 digits). When establishments of such firms are coded (1) to different industries within a major group, (2) to industries in different major groups or (3) to industries in different divisions of the Standard Industrial Classification, then the statistics are included in the major group totals (2 digit level) in which the major part of the company's operations are classified. Although this may result in some distortion of major group statistics in the case of (2) and (3) the statistics at the industry (3 or 4 digit) level in all cases will be left free of these company-wide data.

Employees

(a) Production and related workers - Mining activities

In addition to those engaged directly in mining production activities, they include those employed in storing, inspecting handling, packing, warehousing, etc. They also include employees engaged in maintenance, repair, janitorial and watchman services and line supervisors (working foremen) engaged in similar work to that of the employees they supervise. For those establishments reporting on the "long" form, production and related workers engaged in mining activity are reported as those receiving pay during the last pay period of each month, an average for the year being obtained by summing the monthly figures and dividing by 12. This procedure is followed even though the establishment did not operate in all months in order to arrive at equivalent annual full-time employment. The numbers are somewhat affected by turnover, in that employment is overstated when an employee changes employment during a pay period. The man-hours of production and related workers in mining activity represent total man-hours paid (total hours at work during the calendar year plus hours not worked but nevertheless paid for, such as paid vacations, sick leave, statutory holidays, etc.). In reporting overtime hours, respondents are requested to report only hours actually at work. It should be noted that the division of hours paid into production and related workers payrolls results in average hourly earnings and does not represent hourly wage rates which are collected and published by the Department of Labour and which are based on selected occupations.

(b) Production and related workers - Non-mining activities

Such employees include those on mining establishments' payrolls engaged in activities such as construction undertaken for the use of these establishments and any other production workers who are not engaged directly in the production of ore and/or concentrates.

(c) Administrative and office employees

This category includes all executive and supervisory officials such as presidents, vice-presidents, comptrollers, secretaries, treasurers, etc., together with managers, professional, technical and research employees, superintendents and plant supervisors above the line supervisor or working foreman level, and clerical staff. Also included are employees in activities such as advertising, credit collections, purchasing, personnel, legal, medical, etc. It should be noted that prior to 1961 this category also included working owners, and partners. Also included in this category are employees located at head offices or auxiliary units separately located from the establishment; in accordance to the rules outlined under "Head offices and auxiliary units" above.

(d) Sales and distribution workers

This category includes office personnel whose salaries are charged to selling expense, e.g. travelling salesmen. It may also include some sales employees who are reported as part of a mining establishment but are not working at the establishment. These are generally broken down by location in cases where more than 15 employees are involved in any one location. The figures exclude persons working on a commission basis who are not considered regular employees of the establishment.

(e) Total employees

This total comprises the foregoing categories including employees located at separately located head offices and auxiliary units. The numbers of employees included under categories (b), (c) and (d) are reported in the form of annual averages and represent as closely as possible full time employment; adjustments are made when reported figures indicate the existence of part-time or seasonal employment.

Working Owners or Partners

These are not now included in the statistics of employees and salaries and wages. There is some duplication in numbers when a person owns more than one establishment and is reported as a working owner on each Census return. Withdrawals of working owners are defined as amounts withdrawn by owners or partners for normal living expenses excluding withdrawals for payment of income tax.

Salaries and Wages

Salaries and wages refer to gross earnings of employees before deductions for income tax and employees contributions to social services such as sickness, accident and unemployment insurance, pensions, etc. They include all salaries, wages, bonuses, profits shared with employees, the value of room and board where provided, commissions (paid to regular employees only) as well as any other allowance forming part of the worker's earnings. Payments for over-time are included.

Fuel and Electricity

Figures for fuel refer to amounts actually used (including fuel used in cars, trucks, locomotives, etc.), not to purchases unless the quantities are substantially the same. Any fuel and electricity produced by establishments for internal consumption are not included in the total cost. Values represent laid down cost at the establishment including freight, duty, etc. Although fuel and electricity used is considered part of mining activity it should be noted that it also includes relatively small amounts used in non-mining activities since these cannot be reported separately.

Materials and Supplies

(a) Mining activities

Figures represent quantities and laid down cost values, at the establishment, of materials, supplies and purchased components owned and used during the year in mining activities and related processes. These statistics represent only commodity items or physical goods (cost of services or overhead charges such as advertising, insurance, depreciation, etc. are not included) whether purchased from others or received as transfers (in the form of materials, components or semi-processed goods) from other establishments of the reporting company. Included are maintenance and repair supplies not chargeable to fixed assets accounts and any amounts charged by other establishments for work done on materials owned by the reporting establishment. Cost of repairs or maintenance done by outside contractors and cost of returnable containers are not included.

(b) Non-mining activities

1. Purchases for re-sale as such

Figures represent cost of materials or products purchased from others by the reporting establishment (or received as transfers from other establishments of the reporting company) for re-sale as such in the same condition as purchased. Included are any finished products received on consignment from other countries.

2. Other materials and supplies used

Figures represent the cost of materials and supplies, if any, used in new construction and in the production of machinery and equipment (for the use of the reporting establishment) by the establishment's own employees. Included are materials used for any capital repairs and alterations carried out by the establishment's employees. Amounts paid to outside contractors for construction and repair work are not included nor is the cost of purchased machinery and equipment. Also included is the cost of office supplies not chargeable to fixed assets accounts and the cost of such other items of materials and supplies used as food, beverages and supplies for establishment-operated cafeterias and lunch counters, first aid and medical supplies, laboratory supplies, etc.

Value of Production

(a) Value of production of goods produced in the establishment

These figures represent the values in Canadian dollars of products shipped by the reporting establishments adjusted by changes in value between closing and opening inventory values of goods-in-process and finished products on hand. Included are revenues from repairs and custom work performed for other establishments and the cost (book value) of any goods produced by the mining establishment and shipped on a rental basis.

All products and by-products of own production shipped from the establishment are covered, including transfer shipments to sales outlets, distributing warehouses or to other processing plants of the reporting firm, when such units are treated as separate establishments. Production values are net of returned goods, discounts, returns, allowances, sales tax, excise taxes and duties, returnable containers and charges for outward transportation by common or contract carriers. Transportation or delivery expense incurred by the reporting establishment's own carriers are included.

Shipments of goods of own production of establishments which are coded to some other division of the Standard Industrial Classification (on the basis of principal activity) but which are engaged in mining as a subsidiary activity are collected by means of the Commodity questionnaire referred to earlier. Such shipments together with shipments of goods of own production of establishments forming the universe of mineral industries are compiled and recorded under appropriate headings in the various mineral industry publications; however, operational details relating to the production of such commodities are not included in the principal statistics shown in the reports for individual mineral industries.

(b) Shipments of goods not of own manufacture

These figures represent the net selling value at establishment (net of discounts, returns, allowances, sales

taxes and excise duties and taxes and transportation charges by common or contract carriers) of all products or materials (including products transferred from other establishments of the reporting firm) sold as such in the same condition as purchased or received as transfers. All sales of consignment goods from other countries are included.

(c) Other revenue

Figures represent the book value of fixed assets, if any, (new construction and machinery and equipment including major repairs, alterations, additions, modifications, installation and assembly work) produced during the year for the use of reporting establishments by the establishment's own employees and for which depreciation accounts are maintained. Included also are any revenues from the sale of electricity, servicing revenues, commissions on sales (when not included in value of sales), revenue for company-operated cafeterias and lunch counters and revenue from outside installation or construction work not related to the establishment's own products, sale of used materials (excluding sale of used fixed assets) research and development work, etc. As mentioned previously the figures do not include non-operating revenue such as rent, dividends, interest, etc.

Value Added

(a) By mining activities

Figures are compiled by deducting the cost of operating materials, supplies, etc. and fuel and electricity consumed from the value of production.

(b) By non-mining activities

The figures are compiled by deducting the cost of goods purchased for re-sale (adjusted for changes in the value of inventories of goods purchased for re-sale) and the cost of non-mining materials and supplies used from the value of shipments of goods not of own manufacture, plus other revenue.

(c) By total activities

The figures consist of value added by mining activities plus value added by non-mining activities. "Value added" is sometimes referred to as net output or net production. However, to arrive at the National Accounts concept of net production, or Gross Domestic Product at "Factor cost" it would be necessary to subtract also the cost of advertising, insurance and other business expenses which are not collected as part of the annual Census of mining. "Value added" figures for the primary industries, manufacturing and construction are published in DBS publication Catalogue No. 61-202. "Survey of Production".