Minister of Mines and Petroleum Resources

PROVINCE OF BRITISH COLUMBIA

ANNUAL- REPORT

for the Year Ended December 31

1973

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1974

BRITISH COLUMBIA DEPARTMENT OF MINES AND PETROLEUM RESOURCES

VICTORIA, B.C.

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The Honourable WALTER S. OWEN, Q.C., LL.D.,
Lieutenant-Governor of British Columbia.

MAY IT PLEASE YOUR HONOUR:

The Annual Report of the Mineral Industry of the Province for the year 1973 is herewith respectfully submitted.

LEO T. NIMSICK
Minister of Mines and Petroleum Resources

Minister of Mines and Petroleum Resources Office,
March 31, 1974

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ANNUAL REPORT OF THE MINISTER OF MINES AND PETROLEUM RESOURCES, 1973

CHAPTER 1

Introduction

A Departmental report on the mineral industry in the Province has been published annually since 1874. From 1874 to 1959 it was the Annual Report of the Minister of Mines, and since 1960 it has been the Annual Report of the Minister of Mines and Petroleum Resources.

Starting with 1969, the Annual Report of the Minister of Mines and Petroleum Resources contains a review of the mineral industry, and chapters dealing with Statistics, Departmental Work, Petroleum and Natural Gas, and Inspection of Mines. Technical reports on geology, mineral exploration, metal mines, placer, industrial minerals and structural materials, and coal which formerly were included in the Annual Report are published separately in a volume entitled Geology, *Exploration, and Mining in British Columbia.* A new series of annual publications of that name began with the 1969 volume.

This Annual Report contains a general review of the mineral industry. The chapter on Statistics records in considerable detail all phases of the mineral production of the Province. Current and past practices in arriving tit quantities and in calculating the values of products are described.

The organization of the Department and the work of its various branches are outlined in the chapter on Departmental Work.

The chapter on Petroleum and Natural Gas contains a general review and records in considerable detail the development and production statistics of that important industry.

Information concerning mine safety, fatal accidents, dangerous occurrences, etc., and the activities of the Inspection Branch are contained in the chapter on Inspection of Mines.

Review of the Mineral Industry

By Stuart S. Holland

Production—It seems appropriate in the 100th year of publication of the Annual Report to record that for the first time the annual value of mineral production of the Province has exceeded $1 billion.

In 1973 the value of British Columbia's mineral production amounted to $1,113,580,034. A new record was established for the 12th consecutive year and the previous year's total was exceeded by $477,362,258 or 75 per cent. The cumulative value to date now amounts to $9,926,698,273, 11.2 per cent of which was contributed in 1973.

The, values of the several classes of products are as follows:

	1972 $	1973 $	Change (Per Cent)
Metals	372,032,7 7 0	808,155,982	+117.2
Industrial minerals	25,764,120	27,969,664	+8.6
Structural materials	66,745,698	73~447,031	+10.0
coal	66,030,210	87,976,105	+33.2
Petroleum and natural gas	105,644,978	116,031,252	+9.8

The outstanding feature of the year was the enormous gain ~(53.0 per cent) in quantity of copper produced, 1973 being the climax year for all the porphyry tipper mines recently brought into production. There were significant increases in amounts of gold, molybdenum, zinc, coal, and natural gas. On the other hand, production of lead and crude oil diminished although their values were up.

Metal prices increased during the year and their higher average values were an important factor contributing to the record, total production. Notable increases were gold from $57.52 to $97.41 per ounce, silver from $1.663 to $2.566 per ounce, copper from 44.84 cents to 83.25 cents per pound; lead from 14.87 cents to 16.28 cents per pound; and zinc from 15.58 cents to 20.66 cents per pound. The average price received for molybdenum increased from $1.54 to ~$1.72 per pound primarily because discounts below the established list price were gradually reduced and an increased proportion was sold as molybdic oxide.

The increase of $436,123,212 or 117.2 per cent in value of total metal production was largely due to the enormous increase in quantity and value of copper. It is the most important commodity produced, contributing 73.6 per cent of the value of all metal production and 53.4 per cent of the value of the total mineral production. There were significant increases in values of zinc, gold, and molybdenum production as a result of increased quantities and average price of these metals.

The increase of $2,205,544 or 8.6 per cent in total value of industrial minerals was largely the result of increased sales of sulphur.

The increase of $6,701,333 or 10.0 per cent in value of structural materials is the result of the increase in value of cement, sand, and gravel.

The value of coal increased by $21,945,895 or 33.2 per cent because of increased volume of sales and a small increase in price received. Coal, next to copper, is the second ranking mineral commodity and its production is expected to continue to rise.

The value of petroleum and natural gas increased by $10,386,274 or 9.8 per cent, both crude oil and natural gas were up in total value despite an actual decrease in quaitity of crude oil produced.

It is anticipated that the total value of mineral production should increase further in 1974. Any possibility of a slight decline in copper production should be compensated by a higher average price. Higher average prices for the other major metals are also anticipated. Production and average unit value of coal are expected to rise during the year, and increased prices of crude oil and natural gas should enhance the value of these commodities in 1974.

Provincial revenue—Direct revenue to the Provincial Government derived from the entire mineral industry in 1973 was as follows:

	$
Free miners' certificate, recording fees, lease rentals, assessment payments, etc.	1,663,859.29
Royalties on iron concentrates	156,292.47
Rentals and royalties on industrial minerals and structural materials	386,606.27
Fifteen-per-cent mining tax	6,071,613.00
Coal licences and annual rentals	453,094.31
Petroleum and natural gas rentals, fees, etc.	8,103,408.00
Sale of Crown reserves	17,776,441.00
Royalties on oil, gas, and processed products	20,647,546.00
Miscellaneous petroleum and natural gas fees	27,028.00
Total	55,285,888.34

Expenditure by the industry—The total expenditures in 1973 by the mineral industry for exploration, development, and production were $653,650,160. Companies involved in the exploration, development, and production of metals, minerals, and coal spent $507,265,160 and companies involved in the exploration and production of petroleum and natural gas spent $146,385,000.

Metal mining—In 1973, 66 mines produced more than 91.75 million tons of ore. Fifteen, of which 11 were open-pit mines, produced more than 1 million tons each, and eight, of which two were open-pit mines, produced between 100,000 and 1 million tons each. The 13 open-pit mines produced 81.875 million tons of ore or 89 per cent of the total tonnage of ore mined.

During the year, mining operations were terminated by Placid Oil Company at their Bull River copper mine at Wardner, by Canex Placer Ltd. (Tungsten Division) at their Invincible and East Dodger tungsten mines at Salmo, by the Bradina Joint Venture at the Silver Queen mine at Owen Lake, and by King Resources Company at their Mount Copeland molybdenum mine near Revelstoke.

During the year, Noranda Mines, Limited in December reopened their Boss Mountain molybdenum mine which had been closed since December 1971; Cominco reopened their HB zinc lead mine at Salmo which had been closed since November 1966; Consolidated Churchill Copper Corporation Ltd. in November reopened their Magnum copper mine on Delano Creek which had been closed since October 1971; and Consolidated Columbia River Mines Ltd. reopened the Ruth Vermont mine in October, but the concentrator was closed for the winter to resume milling early in 1974.

The Trail smelter treated 8,174 tons of crude ore and 370,488 tons of concentrates from British Columbia mines as well as a large tonnage of concentrates, crude ore, and scrap from sources outside the Province. A total of 2,858,065 tons of concentrates was shipped to foreign smelters. Of the total metal production of the Province, concentrates representing 74.7 per cent of the total value were shipped to Japanese smelters and 4.8 per cent of the total value were shipped to smelters in the United States.

Destination of British Columbia Concentrates in 1973

	Lead	Zinc	Copper	Nickel-copper	Iron	Tungsten
	Tons	Tons	Tons	Tons	Tons	Tons
Trail	143,050	227,438				
Other Canadian			30,681	7,982	53,196	
United States	4,223	41,162	37,291		210,661	803
Japan		32,647	1,214,598	6,764	1,291,478	283
Other foreign			4,578		13,577	
Totals	147,273	301,247	1,287,148	14,746	1,568,912	1,086

Exploration and development—Since 1968 the trend of prospecting activity and exploration for coal, mineral, and metallic properties is displayed by the following tabulated statistics.

	1968	1969	1970	1971	1972	1973
Exploration cost	$34,665,000	$44,378,000	$52,182,630	$40,877,745	$39,066,798	$38,087,571
Number of companies or properties	389	422	493	419	403	363
Claims recorded	60,384	84,665	69,546	57,778	78,901	35,659
Certificates of work	66,229	88,954	118,633	106,704	97,573	128,641
Free miners' certificates—						
Individual	9,305	9,880	10,034	9,351	9,032	7,084
Companies	761	1,060	911	930	927	563

The number of mineral claims located in 1973 was 35,659, a decrease of 43,242 claims or 54.8 per cent from 78,901 in 1972. The most active area was in the Omineca Mining Division, where copper mineralization in volcanic rocks at the head of Sustut River received considerable attention. Claim staking was done in every mining division of the Province and especially so in Kamloops and Liard Divisions.

Footage of surface and underground diamond drilling was 777,040 feet, an increase of 363,696 feet or 80.0 per cent, and of percussion drilling was 206,950 feet, an increase of 42,155 feet or 25.6 per cent.

About 715 geological, geochemical, and geophysical reports were accepted in 1973 by the Department for assessment work credit. They represent approximately $4.6 million in exploration work done on claims.

The following statistics of expenditures on exploration and development of coal, mineral and metallic deposits, and mines are summarized from data recorded on !Statistics Canada forms They represent minimum amounts, but the response of the industry is sufficiently complete to provide figures that are substantially correct Comparable figures for petroleum and natural gas operations are not available.

EXPLORATION AND DEVELOPMENT EXPENDITURES, 1973

	Number of Mines Reporting	Physical Work and Surveys	Administration, Overhead, Land Costs, Etc.	Total
		$	$	$
A. Prospecting and exploration on undeclared mines—				
1. Metal mines	352	29,724,158	7,613,314	37,337,472
2. Coal mines	6	406,497	179,315	585,812
3. Others	5	124,164	40,123	164,287
Totals	363	30,254,819	7,832,752	38,087,571
B. Exploration on declared or operating mines—				
1. Metal mines	19	2,775,290	845,885	3,630,175
2. Coal mines	3	1,749,497	491,327	2,240,824
3. Others	—	—	—	—
Totals	22	4,524,787	1,346,212	5,870,999
C. Development on declared mines—				
1. Metal mines	—	—	—	—
2. Coal mines	—	—	—	—
3. Others	1	665,000	—	665,000
Totals	1	665,000	—	665,000
D. Development on operating mines—				
1. Metal mines	21	37,450,195	1,412,760	38,862,955
2. Coal mines	1	11,371,568	—	11,371,568
3. Others	5	9,026,693	24,490	9,051,183
Totals	27	57,848,456	1,437,250	59,285,706
E. Total expenditures on exploration and development—				
1. Metal mines—A(1)+B(1)+C(1)+D(1)	—	69,949,643	9,880,959	79,830,602
2. Coal mines—A(2)+B(2)+C(2)+D(2)	—	13,527,562	670,642	14,198,204
3. Others—A(3)+B(3)+C(3)+D(3)	—	9,815,857	64,613	—
Grand totals	—	93,293,062	10,616,214	103,909,276

Exploration includes all work done up to the time when a company declares its intention of proceeding to production, after that date the work is classed as development.

Major expenditures in 1973 by companies involved in the exploration, development, and mining of metals, minerals, and coal were as follows:

	$
Mining operations (metals, minerals, coal)	292,657,005
Mining operations (structural materials)	23,421,523
Repairs expenditures	87,277,356
Capital expenditures	47,219,711
Exploration and development	56,689,505
	103,909,276
	507,265,160

Capital and repair expenditures are listed separately because of difficulties in allocating them consistently. Actually, most of the repair expenditures should be applied to mining operations, and most of the capital expenditures to exploration and development.

Industrial minerals and structural materials—Activity in the industrial minerals and structural materials sector of the mining industry was about normal in British Columbia in 1973.

New work reported consisted of exploration of barite deposits along the Alaska Highway, exploration of an asbestos showing in the Menatatuline Range 75 miles southeast of Atlin, some diamond drilling on limestone deposits on Texada Island and near Kelly Lake, some trenching on pyrophyllite near Princeton, and geological examinations of silica near Greenwood and of talc near Keefers.

Coal mining-Total raw coal producing during 1973 was 10.85 million short tons, which at aggregate minehead value of $87.97 million ranked second after copper in terms of British Columbia mineral commodity value. These Coal production and value figures represent increases of 20 per cent and 33 per cent respectively, compared to 1972 output, which in itself had established all-time records for the Province. Tbe effect of a national railway strike during August and September, mid problems with port handling equipment during the latter part of 1973, curtailed product output during the year.

Five companies operated coal mines in the Province during 1973; of these, however, two companies (Kaiser Resources Ltd. and Fording Coal Limited) accounted for 99 per cent of output. Mine production statistics are state&on Table 8B (page A 48) ; several of the more significant factors derived from these are as follows:

(1) Eighty-eight per cent of raw coal production was derived from surface mining operations, with the balance of 12 per cent from underground mines.

(2) Clean coal output, which totalled 7.77 million short tons, averaged 71 per cent of total raw coal mined; This average recovery compares closely with that for 1972 (70 per cent) but differs in detail.

(3) Increased minehead value for 1973 coal sales ($87.97 million) resulted principally kom increased product output, combined with an average value increase of 5 per cent.

(4) About 96 per cent of total coal product output was exported to Japan. Domestic coke production, which accounted for some 3 per cent of output, represented the second large&market.

The principal British Columbia coal producer, Kaiser Resources Ltd., continued surface mining operations at the Harmer Ridge open-pit complex north of Sparwood, and in the North and South Balmer colliery at Michel. Surface mining accounted for 82.4 per cent of total raw coal production of 7.00 million tons; underground output of some 1.24 million tons was derived mostly from, the South Balmer hydraulic mine, where continued experience and success with this technique resulted in increased productivity.

For the first time since commencement of export shipments in 1970, the Company's financial position stabii during the latter part of 1973. This improvement resulted from major equity refinancing, increased export price, and improved operational profitability. An extensive exploration programme for evaluation of Crows Nest Industries' lands continued through most of the year.

Open-pit operations of Fording Coal Limited, situated some 40 miles north of Sparwood, attained total raw coal production of some 3.8 million short tons,

yielding 2.4 million tons product coal. The latter output, representing over 100 per cent increase compared to 1972, nevertheless fell short of the ~3.4 million short tons export commitment. General start-up problems' associated with 'full mine production and preparation plant throughput were experienced; however, the main factors affecting shortfall in offshore shipments were rail transportation, and particularly port handling equipment shut-downs. Contract price; effective at year-end and retroactive to April 1, 1973; was $21.55 per long ton FOB Roberts Bank terminal.

Production at Fording Coal Limited is derived from two major synclinal limbs, each containing up to 10 Kootenay Formation seams of sign&cant thickness. The westerly Greenhills pit is mined by dragline and the easterly Clode pit by, truck-shovel method. Exploration and development work during 1973 concentrated on extension of reserves in the vicinity of these pits.

Coleman Collieries Ltd. was a relatively minor producer in British Columbia during 1973. Production of 65,735 tons was taken from the westerly portion of the Tent Mountain open pit which straddles the British Columbia-Alberta boundary.

The property of Coalition Mining Limited occurs in high relief foothills terrain, east of the Sukunka Valley, some 38 miles by road south of Chetwynd. Exploration Of two seams of metallurgical grade coal which occur in the Upper Gething Formation has been proceeding since 1971. During 1973 a three-entry slope was advanced to about 2,500 feet in the Chamberlain seam. Coal produced during this trial mining programme (32,674 tons) was stockpiled at the mine. Although proven mineable reserves are in excess of 45 million short tons, development work was terminated, and the property put on a caretaker basis, pending resolution of financing and infrastructure development.

Bulkley Valley Coal Sales Ltd. operates a small underground mine near Telkwa, and produces a limited amount of coal during winter months for local domestic consumption.

Although the metallurgical coking coal market accounted for almost the entire sales volume during 1973, growing demand for thermal power requirements resulted in improved market outlook for steam coal. In response to this, Byron Creek Collieries commenced development of the Coal Mountain deposit at Corbii, and at year-end had negotiated sale of a 250,000-ton test shipment to Ontario Hydro.

Exploration work in the East Kootenay and northeastern Foothills areas continued at a fairly steady level during 1973. In addition to Kaiser and Fording development programmes previously noted, Rio Tinto Canadian Exploration Limited carried out a drilling and bulk-sampling programme at their Cabin Creek prospect in the Flathead district, and Byron Creek Collieries commenced drilling at Corbin. In northeastern British Columbia, Utah Mines Ltd. carried out an extensive drilling programme at their Carbon Creek prospect, and to a limited extent, in the Mount Gething and Dunlevy areas near Lake Williston. Further south, Denison Mines Liited reactivated their Quintette property with a detailed drilling and trenching programme at Babcock Mountain, and McIntyre Porcupine Mines Limited commenced geological mapping and limited trenching in the Kinuseo Creek area.

At year-end, 1,562 coal licences, covering approximately 900,000 acres, were held by some 32 companies or partnerships.

Petroleum and natural gas-The values of production of oil and natural gas increased substantially during 1973, up 10 and 12 per cent respectively over 1972. Crude oil production was 21,189,758 barrels, down 11 per cent. The major oil-producing fields, all decreased from 1972 and all under active water-flood programmes, were Boundary Lake, Peejay, Inga, and Milligan Creek.

Natural gas delivered to pipe-lines was 427,586,208 MSCF, an increase of 12 per cent, and the value to gas producers was $46,688,912. The major gas-producing fields were Clarke Lake, Yoyo, and Beaver River, although the. latter field experienced production problems during the second half of the year.

Footage drilled decreased 24 per cent, the first annual decline in four years. AU the drilling operations were conducted in the northeastern comer of the Province, except for one abandonment in the Bowser Basin area and a wildcat venture near Fernie that was still drilling at year-end. Considerable interest was evident in a shallow Mississippian gas play north of Fort Nelson, with only Limited success reported.

Expenditures in 1973 by companies involved in the exploration and production of petroleum and natural gas were:

	$
Exploration, land acquisition, and drilling	81,608,000
Development drilling	8,068,000
Capital expenditures	9,245,000
Natural gas plant operations	15,794,000
Field, well, and pipe-line operations	5,327,000
General (excluding income tax)	26,325,000
Total	146,385,000

Statistics

CHAPTER 2

CONTENTS

The statistics of the mineral industry are collected, compiled, and tabulated for this Report by the Economics and Statistics Branch, Department of Industrial Development, Trade, and Commerce, Victoria.

In the interests of uniformity and to avoid duplication of effort, beginning with the statistics for 1925, Statistics Canada and the Provincial departments have co-operated in collecting and processing mineral statistics.

Producers of metals, industrial minerals, structural materials, coal, and petroleum and natural gas are requested to submit returns in duplicate on forms prepared for use by the Province and by Statistics Canada.

As far as possible, both organizations follow the same practice in processing the data. The final compilation by Statistics Canada is usually published considerably later than the Annual Report of the Minister of Mines and Petroleum Resources for British Columbia. Differences between the values of production published by the two organizations arise mainly because Statistics Canada uses average prices considered applicable to the total Canadian production, whereas the British Columbia mining statistician uses prices considered applicable to British Columbia production.

Peat, classified as a fuel by Statistics Canada, is not included in the British Columbia statistics of mineral production being regarded as neither a fuel nor a mineral.

METHODS OF COMPUTING PRODUCTION

The tabulated statistics are arranged so as to facilitate comparison of the production records for the various mining divisions, and from year to year. From time to time, revisions have been made to figures published in earlier reports as additional data became available or errors become known.

Data are obtained from the certified returns made by producers of metals, industrial minerals and structural materials, and coal, and are augmented by data obtained from custom smelters. For placer gold, returns from operators are augmented by data obtained from the Royal Canadian Mint. For petroleum, natural gas, and liquid by-products, production figures supplied by the Petroleum and Natural Gas Branch of the Department of Mines and Petroleum Resources are compiled from the monthly disposition reports and the Crown royalty statement filed with the Department by the producers.

Values are in Canadian funds. Weights are avoirdupois pounds and short tons (2,000 pounds), and troy ounces. Barrels are 35 imperial gallons.

METALS

Average Prices

The prices used in the valuation of current and past production of gold, silver, copper, lead, and zinc are shown in the table on page A 26.

The price of gold used, & the average Canadian Mint buying-price for fine gold. In 1973 this was $97.41 per ounce.

The price used for placer gold originally was established arbitrarily at $17 per ounce, when the price of fine gold was $20.67 per ounce. Between 1931 and 1962 the price was proportion&y increased with the continuously changing price Of fine geld. Since 1962, Canadian Mint reports giving the fine-gold content have been available for all but a very small part of the placer gold produced, and the average price listed is derived by dividing ounces of placer gold into total amount received.

Prior to 1949 the prices used for silver, copper, lead, and zinc were the average prices of the markets indicated in the table on page A 26, converted into Canadian funds. The abbreviations in the table are Mont.—Montreal; N.Y.—New York; Lond.—London; E. St. L.—East St. Louis; and U.S.—United States.

Latterly the prices of silver, copper, lead,, and zinc arc average United States prices converted into Canadian funds. Average monthly prices are supplied by Statistics Canada from figures published in the Metal Markets section of *Metals Week*. Specifically, for silver it is the New York price; for lead it is the New York price; for zinc it is the price at East St. Louis of Prime Western; for copper it is the United States export refinery price. However, commencing in 1970 the copper price is the average of prices received by the various British Columbia shippers.

For antimony the average price for the year and for cadmium, the New York producers price to consumers are used. For nickel the price used is the Canadian price set by the International Nickel Company of Canada Ltd. The value per ton of the iron ore used in making pig iron at Kimberley is an arbitrary figure, being the average of several ores of comparable grade at their points of export from British Columbia.

Gross *and* Net *Content*

The gross content of a metal in ore, concencrate, or bullion is the amount of that metal calculated from an assay of the material, and the gross metal contents are the sum of individual metal assay contents. The net contents are the gross contents less smelter and refinery losses.

In past years there have been different methods used in calculating net contents, particularly in the case of one metal contained in the concentrate of another. The present method was established in 1963 and is outlined in the following table. For example, the net content of silver in copper concentrates is 98 per cent of the gross content, of cadmium in zinc concentrates is 70 per cent of the gross content, etc.

	Lead Concentrates	Zinc Concentrates	Copper Concentrates	Copper-Nickel Concentrates	Copper Matte
	Per Cent	Per Cent	Per Cent	Per Cent	Per Cent
Silver	98	98	98	—	98
Copper	*Less* 26 lb./ton	—	*Less* 10 lb./ton	85	*Less* 10 lb./ton
Lead	98	50	—	—	50
Zinc	50	90	—	—	—
Cadmium	—	70	—	—	—
Nickel	—	—	—	88	—

Value of Production

For indium, iron concentrate, mercury, molybdenum, rhenium, and tin the value of production is the amount received by the shippers.

For gold, silver, copper, lead, zinc, antimony, bismuth, cadmium, some iron concentrate, and nickel the value of production is calculated from the assay content of the ore, concentrate, or bullion less appropriate smelter losses, and an average price per unit of weight.

Prior to 1925 the value of gold and copper produced was calculated by using their true average prices and, in addition; for copper the smelter loss was taken into account.

The value of other metals was calculated from the gross metal content of ores or concentrates by using a metal price which was an arbitrary percentage Of the average price, as follows: Silver,.95 per cent; lead, 90 per cent; and zinc, 85 per cent.

It is these percentages of the average price that are listed in the table on page A 26.

For 1925 and subsequent years the value has been calculated by using the true average price (*see* p. A 26) and the net metal Contents, in accordance with the procedures adopted by Statistics Canada and the Department of Mines and Petroleum Resources.

In the statistical tables, for gold the values are calculated by multiplying the gross contents of g&by the average price for the year; for the other metals, by multiplying the net contents of metals as determined by means of the above table by the average price for the year.

INDUSTRIAL MINERALS AND STRUCTURAL MATERIALS

The values of production of industrial minerals and structural materials are approximately the amounts received at the point of origin.

FUEL

The value of production of coal is calculated using a price per ton (see p. A 26) which is the weighted average of the f.o.b. prices at the mine for the coal sold.

The values of production of natural gas, natural gas liquid by-products, and petroleum including condensate/pentanes plus are the amounts received for the products at the well-head.

NOTES ON PRODUCTS LISTED IN THE TABLES

Antimony—Antimony metal was produced at the Trail smelter from 1939 to 1944; since 1944 it has been marketed alloyed with lead. The antimony is a by-product of silver-lead ores: In 1907 the first recorded antimonial ore mined in British Columbia was shipped from the Slocan area to England. Since then other out-of-Province shipments have originated in the Bridge River, North Lardeau, Slocan, Spillimacheen, and Stuart Lake areas. In Table 7C the antimony assigned to individual mining divisions is the reported content of ore exported to foreign smelters; the antimony "not assigned" is that recovered at the Trail smelter from various ores received there. See Table 1, 3, and 7C.

Arsenious oxide—Arsenious oxide was recovered at foreign smelters from arsenical gold ores from Hedley between 1917 and 1931, and in 1942, and from the Victoria property on Rocher Déboulé Mountain in 1928. No production has been recorded since 1942. See Tables 1 and 7D.

Asbestos—British Columbia has produced asbestos since 1952 when the Cassiar mine was opened. All British Columbia production consists of chrysotile from the Cassiar mine near the Yukon border. This deposit is noted for its bigh percentage of valuable long fibre and for the low iron content of the fibre. The original claims were located at Cassiar in 1950, and the first fibre was shipped two years later. The fibre is milled from the ore at Cassiar, shipped by truck to Whitehorse, and then moved by rail to tidewater at Skagway. From 1953 to 1961 the fibre was valued at the shipping point in North Vancouver, but beginning in 1962 it has been valued at the mine, and values for the preceding years have been recalculated on that basis. *See* Tables 1, 3, and 7D.

Barite—Barite production began in 1940 and has been continuous since then, coming from several operations in the upper Colombia River valley. Some barite

is mined from lode deposits and the rest is recovered from the mill-tailings ponds of the former Silver Giant and Mineral King silver-lead-zinc ties. *See* Tables 1, 3; and 7D.

Bentonite—Small amounts of bentonite were produced between 1926 and 1944 from deposits in the coal measures near Princeton. There has been no production since 1944. See Tables 1 and 7D.

Bismuth—Since 1929 the Trail smelter has produced bismuth It is a by-product of lead refining and thus the production cannot be assigned to specific properties or mining divisions. See Tables 1, 3, and 7C.

Brick—*See* Clay and shale products.

Building-stone—Dimensional stone for building purposes is quarried when required from a granite deposit on Nelson Island and an andesite deposit on Haddington Island. Other stone close to local markets is quarried periodically or as needed for special building projects. See Table 7E.

Butane-Butane is recovered as a by-product at the gas-processing plant at Taylor and it oil refineries. *See* Tables 1, 3, and 7A.

Cadmium—Cadmium *has* been recovered as a by-product at the Trail zinc refinery since 1928. it occurs in variable amounts in the sphalerite of most British Columbia silver-lead-zinc ores. In Table 7C the cadmium assigned to individual mining divisions is the reported content of custom shipments to the Trail and foreign smelters; that "not assigned" is the remainder of the reported estimated recovery at the Trail smelter from British Columbia concentrates. *See* Tables 1, 3, and 7C.

Cement—Cement is manufactured from carefully proportioned mixtures of limestone, gypsum, and other mineral materials. It has been produced in British Columbia since 1905. Present producers are British Columbia Cement Company Limited, with a 700,000-tons-per-year plant at Bamberton, and Canada Cement Lafarge Ltd. with a 612,500-tons-per-year plant on Lulu Island and a 210,000-tons-per-year plant at Kamloops. *See* Tables 1, 3, and 7E.

Chromite—Two shipments of chromite are on record, 670 tons from Cascade in 1918 and 126 tons from Scottie Creek in 1929. *See* Tables 1 and 7C.

Clay and *shale products*—These include brick, blocks, tile, pipe, pottery, lightweight aggregate, and pozzolan manufactured from British Columbia clays and shales. Common red-burning clays and shales are widespread in the province,, but better grade clays are rare. The first recorded production was of bricks at Craigflower in 1853' and since then plants have operated in most towns and cities for short periods. Local surface clay is used at Haney to make common red brick, tile, and flower pots. Shale and fireclay from Abbotsford Mountain are used to make firebrick, facebrick, sewer pipe, flue-lining, and special fireclay shapes in plants *at* Kilgard, Abbotsford, *and South* Vancouver. A plant on Saturna Island makes light-weight expanded shale aggregate and pozzolan clinker from a local shale deposit. A plant at Quesnel makes pozzolan from burnt shale quarried south of Quesnel. Common clays and shales ate abundant in British Columbia, but fireclay and other high-grade clays are rare. Several hobby and art potteries and a sanitaryware plant are in operation, but these use mainly imported raw materials and their production is not included in the tables. See Tables 1, 3, and 7E.

Coal—Coal is almost as closely associated with British Columbia's -earliest history as is placer gold. Coal was discovered at Suquash on Vancouver Island in 1835 and at Nanaimo in 1850. The yearly value of coal production passed that of placer gold in 1883 and contributed a major part of the total mineral wealth for the next 30 years.

First production, by Mining Divisions: Cariboo, 1942; Fort Steele;. 1898; Kamloops, 1893; Liard, 1923; Nanaimo, 1836; Nicola, 1907; Omineca, 1918'; Osoyoos, 1926; Similkameen, 1909; and Skeena, 1912.

The Nanaimo and Comox fields produced virtually all of the coal until production started from the Crowsnest field in 1898. The Crowsnest field contains coking-coal and prospered in the early years of smelting and. railroad-building. Mining started in the Nicola-Princeton coalfield in 1907, at Telkwa in 1918, and on the Peace River in $923. The Nanaimo field was exhausted in 1953 when the last large mines closed, and only small operations on remnants were left. The colliery at Merrit closed in 1945 and at Coalmont in 1940. The closing of the last large tie at Tsable River in 1966, and of the last small one, near Wellington in 1968, marked the end of production from the once important Vancouver Island deposits.

Undeveloped fields include basins in the foothills of the Rocky Mountains north and south of the Peace River, the Groundhog basin in north-central British Columbia, the Hat Creek basin west of Ashcroft, and basins on Graham Island.

The enormous requirements for coking-coal in Japan created great activity in coal prospecting in various areas of British Columbia since 1968. The signing of large contracts with the Japanese resulted in preparations for production at several deposits in the East Kootenays. First shipments to Japan via special port facilities at North Vancouver and Roberts Bank began in 1970.

All the coal produced, including that used in making coke, is shown as primary mine production. Quantity from 1836 to 1909 is gross mine output and includes material lost in picking and washing. From 1910 the quantity is the amount sold and used, which includes sales to retail and wholesale dealers, industrial users, and company employees; coal used under company boilers, including steam locomotives: and coal used in making coke. See Tables 1, 3, 7A, 8A, and 8B.

Cobalt—In 1928 a recovery of 1,730 pounds of cobalt was made from a shipment of arsenical gold ore from the Victoria mine on Rocher Déboulé Mountain. In 1971, 113,545 pounds of cobalt were shipped from the Pride of Emory mine at Hope. *See* Tables 1 and 7C.

Coke-Coke is made from special types of coal. It has been produced in British Columbia since 1895. Being a manufactured product, its value does not contribute to the total mineral production as shown in Table 1. Up to 1966, coke statistics had been included in the Annual Report as Table 9, but this table has been discontinued. The coal used in making coke is still recorded in Table 8B.

Copper—Copper concentrates are shipped to Japanese and American smelters because no copper smelter has operated in British Columbia since 1935. Small amounts of gold and silver are commonly present and add value to the Ore, but some ores contain important amounts of gold (as at Rossland), silver (Silver King mine), lead and zinc (Tulsequah), or zinc (Britannia mine). Most of the smelting in British Columbia in early years was done on ore shipped direct from the mines without concentration, but modern practice is to concentrate the ore first.

Ore was smelted in British Columbia first in 1896 at Nelson (from Silver King mine) and at Trail (from Rossland mines), and four and five years later at Grand Forks (from Phoenix mine) and Greenwood (from Mother Lode mine). Later, small smelters were built in the Boundary district and on Vancouver and Texada Islands, and in 1914 the Anyox smelter was blown in. Copper smelting ceased in the Boundary district in 1919, at Trail in 1929, and at Anyox in 1935. British Columbia tipper concentrates were then smelted mainly at Tacoma, and since 1961 have gone chiefly to Japan.

Most of the production has come from southern British Columbia—from Britannia, Copper Mountain, Greenwood, Highland Valley, Merritt, Nelson, Rossland, Texada Island, and Vancouver Island, although a sizeable amount came from Anyox and some from Tulsequah. During recent years exploration for copper has been intense, interest being especially directed toward finding very large, low-grade deposits suitable for open-pit mining. This activity has resulted in the establishment of operating mines at Merritt (Craigmont) in 1961, in Highland Valley (Bethlehem) in 1962, on Babine Lake (Granisle) in 1966, near Peachland (Brenda) in 1970, Stewart (Granduc) and near Port Hardy (Island Copper) in 1971, near Babine Lake (Bell), McLeese Lake (Gibraltar), Highland Valley (Lornex), and Princeton (Ingerbelle) in 1972.

After a lapse of many years, copper has been produced comparatively recently on Vancouver Island at Jordan River, Courtenay, Benson Lake, Quatsino, and also at Buttle Lake, together with zinc and silver. At Tasu Harbour on Moresby Island and at Texada Island copper is produced as a by-product of iron-mining.

Copper is now the most valuable single commodity of the industry. Production in 1973 was 714.648 million pounds. *See* Tables 1, 3, 6, and 7B.

Crude oil—Production of crude oil in British Columbia began in 1955 from the Fort St. John field, but was not significant until late in 1961, when the 12-inch oil pipe-line was built to connect the oil-gathering terminal at Taylor to the Trans Mountain Oil Pipe Line Company pipe-line near Kamloops. In 1973, oil was produced from 27 separate fields, of which the Boundary Lake, Peejay, Milligan Creek, and Inga fields were the most productive.

In Tables 1, 3, and 7A, quantities given prior to 1962 under "petroleum, crude" are total sales, and from 1962 to 1965 include field and plant condensate listed separately. Full details are given in tables in the Petroleum and Natural Gas chapter of this Report.

Diatomite—Relatively large deposits of diatomite are found near the Fraser River in the Quesnel area, and small deposits are widespread throughout the Province. Small amounts of diatomite have been shipped from Quesnel periodically since 1928. A plant to process the material locally is located in Quesnel. *See* Tables 1, 3, and 7D.

Field condensate—Field condensate is the liquid hydrocarbons separated and recovered from natural gas in the field before gas processing. *See* Tables 1, 3, and 7A.

Fluorite (fluorspar)—Between 1918 and 1929, fluorite was mined at the Rock Candy mine north of Grand Forks for use in the Trail lead refinery. From 1958 to 1968, small quantities were produced as a by-product at the Oliver silica quarry. See Tables 1, 3, and 7D.

Flux—Silica and limestone are added to smelter furnaces as flax to Combine with impurities in the ore and form a slag which separates from the valuable metal. In the past silica was shipped from Grand Forks, Oliver, and tbe Sheep Creek area. Today silica from near Oliver and Sheep Creek and limestone, chiefly from Texada Island, are produced for flux. Quantities have been recorded since 1911. 'See Tables 1; 3, and 7D.

Gold, lode-Gold hasplayed an important part in mining in the Province. The first discovery of lode gold was on Moresby Island in 1852, when some gold was recovered from a small quartz vein. The first stamp mill was built in the Cariboo in 1816, and it seems certain that some arrastras—primitive grinding-mills-were built even earlier. These and other early attempts were short lived, and the successful milling of gold ores began about 1890 in the southern part of the Province. The

value of production was second only to that of coal by 1900 and continued to beveryimportant. At the start of World War II, gold-mining attained a peak yearly value of more than $22 million, but since the war it dwindled, owing to the. fact that the price for gold was fixed and the cost of mining rose and continues to rise.

In the early years, lode gold came mostly from the camps of Rossland, Nelson, McKinney, Fairview, Hedley, and also from the copper and other ores of the Boundary district. A somewhat later major producer was the Premier mine at Stewart. In the 1930's the price of gold increased and the value of production soared, new discoveries were made and old mines were revived. The principal gold camps, in order of output of gold, have been Bridge River, Rossland, Portland Canal, Hedley, Wells, and Sheep Creek. In 1971 the Bralorne mine in Bridge River closed, it was the last gold mine in the Province to operate. To date the gold mines have paid a total of about $82 million in dividends.

With the closing of the Bralorne mine, all lode gold is produced as a by-product of copper, copper-zinc-silver, and other base-metal mining. See Tables 1, 3, 6, and 7B.

Gold, placer—The early explorations and settlement of the Province followed rapidly on the discovery of gold-bearing placer creeks throughout the country. The first placer miners came in 1858 to mine the lower Fraser River bars upstream from Yale.

The year of greatest placer-gold production was 1863, shortly after the discovery of placer in the Cariboo. Another peak year in 1875 marked the discovery of placer on creeks in the Cassiar. A minor peak year was occasioned by the discovery of placer gold in the Granite Creek in the Tulameen in 1885. A high level of production ensued after 1899, when the Atlin placers reached their peak, output. Other important placer-gold camps were established at Goldstream, Fort Steele, Rock Creek, Omineca River, and Quesnel River. The last important strike was made on Cedar Creek in 1921, and coarse gold was found on Squaw Creek in 1927 and on Wheaton Creek in 1932.

Mining in the old placer camps revived during the 1930's under the stimulus of an increase in the price of fine gold from $20.67 per ounce to $35 per ounce in United States funds. Since World War II, placer-mining declined under conditions of steadily rising costs and a fixed price for gold but is showing sign of revival in response to freely floating gold price since 1972. Since 1858, more than 5.2 million ounces valued at almost $97 million has been recovered.

A substantial part of the production, including much of the gold recovered from the Fraser River upstream from Yale (in the present New Westminster, Kamloops, and Lillooet Mining Divisions) and much of the early Cariboo production, was mined before the original organization of the Department of Mines in 1874. Consequently; the amounts recorded are based on early estimates and cannot be accurately assigned to individual mining divisions;

The first year of production for major placer-producing mining divisions was: Atlin, 1898; Cariboo, 1859; Liard, 1873; Lillooet, 1858; Omineca, 1869.

In 1965, changes were made in the allocation of placer gold to the New Westminster and Similkameen Mining Divisions and "not assigned," to reconcile those *figures with* data incorporated in Bulletin *28, Placer Gold Production of British* Columbia. See Tables 1, 3, 6 and 7A.

Granules-Rock chips used for bird grits, exposed aggregate, roofing, stucco dash, terrazzo, etc., have been produced in constantly increasing quantities since 1930. Plants operate in Burnaby and near Grand Forks, Sirdar, Vananda, and Armstrong. See Tables 1, 3, and 7D.

Gypsum and gypsite—Production of gypsum and gypsite has been recorded since 1911. Between 1925 and 1956 more than 1,000,000 tons was shipped from Falkland and some was quarried near Cranbrook and Windermere. Since 1956 all production has come from Windermere. See Tables 1, 3, and 7D.

Hydromagnesite—Small shipments of hydromagnesite were made from Atlin between 1904 and 1916 and from Clinton in 1921. See Tables 1 and 7D.

Indium—Production of indium as a by-product of zinc-refining at the Trail smelter began in 1942. Production figures have not been disclosed since 1958.

Iron—Iron ore was produced in small quantities as early as 1885, commonly under special circumstances or as test shipment. Steady production started in 1951 with shipments of magnetite concentrates to Japan from Vancouver and Texada Islands.

Most of the known iron-ore deposits are magnetite, and occur in the coastal area. On the average they are low in grade and need to be concentrated. Producing mines have operated on Texada Island, at Benson Lake and Zeballos on Vancouver Island, and at Tasu and Jedway on Moresby Island. At Texada Island copper is a by-prod% of iron-mining, and in the Coast Copper mine at Benson Lake iron was a by-product of copper-mining. The latest operation, and to date the largest, is that of Wesfrob Mines Limited at Tasu, begun at the end of 1967; copper is produced as a by-product.

From January 1961 to August 1972, calcined iron sulphide from the tailings of the Sullivan mine was used for making pig iron at Kimberley. This was the first manufacture of pig in in British Columbia. The iron occurs as pyrrhotite and pyrite in the lead-zinc ore of the Sullivan mine. In the process of milling, the lead and zinc minerals are separated for shipment to the Trail smelter, and the iron sulphides are separated from the waste rock. Over the years a stockpile had been built containing a reserve of about 20 million tons or iron ore.

The sulphur was removed in making pig iron and was converted to sulphuric acid, which was used in making fertilizer. A plant built at Kimberley converted the pig iron to steel, and a fabricating plant was acquired in Vancouver. The iron smelter at Kimberley closed in August 1972. The entire production, credited to the Fort Steele Mining Division in Table 7C, is of calcine. See Tables 1, 3, 6, and 7C.

Iron oxide—Iron oxide, ochre, and bog iron were mined as early as 1918 from several occurrences, but mainly from limonite deposits north of Squamish. None has been produced since 1950. See Tables 1 and 7D.

Jade (nephrite)—Production of jade (nephrite) has been recorded only since 1959 despite there being several years of significant production prior to that date. The jade is recovered from bedrock occurrences on Mount Ogden and near Dease Lake and as alluvial boulders from the Fraser River; the Bridge River and its tributaries, Marshall, Hell, and Cadwallader Creeks; O'Ne-ell, Ogden, Kwanika, and Wheaton Creeks. See Tables 1, 3, and 7D.

Lead--Lead was the most valuable single commodity for many years, but it was surpassed in value of annual production by zinc in 1950, by copper in 1966, and in total production by zinc in 1966. Lead and zinc usually occur together in nature although not-necessarily in equal amounts in a single deposit. Zinc is the more abundant metal, but lead ore usually is more valuable than zinc ore because it contains more silver as a by-product. For a long time British Columbia produced almost all of Canada's lead, but now produces only about one-quarter of it. Most of the concentrated ore is smelted and the metal refined at Trail, but some concentrate is shipped to American and Japanese smelters.

Almost all of British Columbia's lead comes from the southeastern part of the Province. The Sullivan mine at Kimberley is now producing about 93 per cent of the Province's lead and has produced about 86 per cent of the grand total. This is one of the largest mines in the world and supports the great metallurgical works at Trail. Other mines are at the Pend d'Oreille River, North Kootenay Lake, Slocan, and southwest of Golden. In northwestern British Columbia less important parts of the total output have come from Tulsequah, the Premier mine, and several small mines in the general region of Hazelton.

A small amount of high-grade lead ore is shipped directly to the smelter, but most of the ore is concentrated by flotation and the zinc content is separated from the lead. All output from the Sullivan and other mines in British Columbia owned by Cominco Ltd. goes to the Trail smelter, but part of the output of other mines goes to American smelters. Lead was first produced in 1887, and the total production amounts to approximately 8 million tons.

In 1958, revisions were made in some yearly totals for lead to adjust them for recovery of lead from slag treated at the Trail smelter. *See* Tables 1, 3, 6, and 7B.

Limestone—Besides being used for flux and granules (where it is recorded separately), limestone is used in agriculture, cement manufacture, the pulp and paper industry, and for making lime. It has been produced since 1886. Quarries now operate at Cobble Hill, near Prince George, at Kamloops, and on the north end of Texada Island. *See* Tables 1, 3, and 7E.

Magnesium—In 1941 and 1942, Cominco Ltd. produced magnesium from magnesite mined from a large deposit at Marysville. *See* Tables 1 and 7C.

Magnesium sulphate—Magnesium sulphate was recovered in minor amounts at various times between 1915 and 1942 from small alkali lakes near Basque, Clinton, and Osoyoos. *See* Tables 1 and 7D.

Manganese—From 1918 to 1920 manganese ore was shipped from a bog deposit near Kaslo and from Hill 60 near Cowichan Lake, and in 1956 a test shipment was made from Olalla. *See* Tables 1 and 7C.

Mercury—Mercury was first produced near Savona in 1895. Since then small amounts have been recovered from the same area and from the Bridge River district. The main production to date was between 1940 and 1944 from the Pinchi Lake and Takla mines near Fort St. James. In 1968 the Pinchi Lake mine reopened and continues in operation. *See* Tables 1 and 7C.

Mica—No sheet mica has been produced commercially in British Columbia. Between 1932 and 1961 small amounts of mica schist for grinding were mined near Albreda, Armstrong, Oliver, Prince Rupert, and Sicamous. *See* Tables 1, 3, 7D.

Molybdenum—Molybdenum ore in small amounts was produced from high-grade deposits between 1914 and 1918. Recently, mining of large low-grade molybdenum and copper-molybdenum deposits has increased production to the point that molybdenum now ranks third in importance in annual value of metals produced in British Columbia. The upswing began when the Bethlehem mine recovered by-product molybdenum from 1964 to 1966. In 1965, the Endako and Boss Mountain mines, followed by the Coxey in 1966, and British Columbia Molybdenum mine in 1967, all began operations as straight molybdenum producers. In 1970, the Brenda mine, a combined copper-molybdenum producer, started operating, and Island Copper in 1971. Large-scale combined metal deposits at Lornex and Gibraltar mines were brought into production in 1972. *See* Tables 1, 3, 6, and 7C.

Natro-alunite—In 1912 and 1913, 400 tons of natro-alunite was mined from a small low-grade deposit at Kyuquot Sound. There has been no subsequent production. *See* Tables 1 and 7D.

Natural gas—Commercial production of natural gas began in 1954 to supply the community of Fort St. John. Since the completion in 1957 of the gas plant at Taylor and the 30-inch pipe-line to serve British Columbia and the northwestern United States, the daily average volume of production has increased to more than 1,200,000,000 cubic feet. In 1973 there were 37 producing gas fields, of which the Yoyo, Clarke Lake, and Beaver River were the most productive.

The production shown in Tables 1, 3, and 7A is the total amount sold of residential gas from processing plants plus dry and associated gas from the gas-gathering system; that is, the quantity delivered to the main transmission-line. The quantity is net after deducting gas used on leases, metering difference, and gas used or lost in the cleaning plant. The quantity is reported as thousands of cubic feet at standard conditions (14.4 pounds per square inch pressure, 60°F temperature, up to and including the year 1960, and thereafter 14.65 pounds per square inch pressure, 60°F temperature).

Full details of gross well output, other production, delivery, and sales are given in tables in the Petroleum and Natural Gas chapter of this Report.

Nickel—One mine, the Pride of Emory near Hope, shipped nickel ore in 1936 and 1937 and began continuous production in 1958. Since 1960, bulk copper-nickel concentrates have been shipped to Japan for smelting. *See* Tables 1, 3, and 7C.

Palladium—Palladium was recovered in 1928, 1929, and 1930 as a by-product of the Trail refinery and is presumed to have originated in copper concentrates shipped to the smelter from the Copper Mountain mine. *See* Tables 1 and 7C.

Perlite—In 1953 a test shipment of 1,112 tons was made from a quarry on François Lake. There has been no further production. *See* Tables 1 and 7D.

Petroleum, crude—*See* Crude oil.

Phosphate rock—Between 1927 and 1933, Cominco Ltd. produced 3,842 tons of phosphate rock for test purposes, but the grade proved to be too low for commercial use. More test shipments were made in 1964 but there has been no commercial production. *See* Tables 1 and 7D.

Plant condensate—Plant condensate is the hydrocarbon liquid extracted from natural gas at gas-processing plants. *See* Tables 1, 3, and 7A.

Platinum—Platinum has been produced intermittently from placer streams in small amounts since 1887, mostly from the Tulameen and Similkameen Rivers. Placer platinum also has been recovered from Pine, Thibert, McConnell, Rainbow, Tranquille, Rock, and Government Creeks; from Quesnel, Fraser, Cottonwood, Peace, and Coquihalla Rivers; and from beach placers on Graham Island. Some platinum recovered between 1928 and 1930 as a by-product at the Trail refinery is presumed to have originated in copper concentrates shipped to the smelter from the Copper Mountain mine. *See* Tables 1, 3, and 7C.

Propane—Propane is recovered from gas-processing plants at Taylor and Boundary Lake, and at oil refineries. *See* Tables 1, 3, and 7A.

Rhenium—Rhenium occurs in significant quantities only with molybdenite associated with porphyry copper deposits. It was first produced in 1972 by the Island Copper mine and is extracted as rhenium oxide from fumes produced during roasting of the molybdenite concentrate.

Rock—Production of rubble, riprap, and crushed rock has been recorded since 1909. See Tables 1, 3, and 7E.

Sand and gravel—Sand and gravel are used as aggregate in concrete work of all kinds. The output varies from year to year according to the state of activity of the construction industry. See Tables 1, 3, and 7E.

Selenium—The only recorded production of selenium, 731. pounds, was in 1931 from the refining of blister copper from the Anyox smelter. See Tables 1 and 7C.

Silver—Silver is recovered from silver ores or as a by-product of other ores. Most of it is refined in Trail, some goes to the Mint in gold bullion, and some is exported in concentrated ores of copper;: lead;. and zinc to American and Japanese smelters. Silver bullion was produced by the Torbrit mine from 1949 to 1959.

Invariably some silver is associated with galena, so that even low-grade lead ores, if mined in quantity, produce a significant amount of silver. Some silver is recovered from gold ores and some from copper ores, and although the silver in such ores is usually no more than a fraction of an ounce per ton, even that amount is important in a large-tonnage operation.

Silver-bearing ores were intensively sought in the early days. A metal of high unit value was the only one worth finding in regions remote from market, and in the 1880's and 1890's there was little point in prospecting for ores that did not contain values in silver or gold. Prospecting for silver ores started in southeastern British Columbia in about 1883, and from 1894 to 1905 British Columbia produced most of Canada's silver, many of the early ores being mined primarily for their silver content.

Production of silver began in 1887 from silver-copper and silver-lead ores in the Kootenays and has continued in this area to the present. Now, most of the silver is a by-product of lead-zinc ores and nearly all is refined at Trail, although some is exported with concentrates to American and Japanese smelters, or may go to the Mint in gold bullion. Today the greatest single source of silver is the Sullivan mine, which has been in production since 1900. By 1973 the Sullivan mine has accounted for:47 per cent of the total silver production of the Province. A significant total amount is contributed by the Lynx, Silmonac, Phoenix, Bethlehem, Granisle, Brenda, and Granduc mines. The only steady producer that is strictly a silver mine is the Highland Bell mine at Beaverdell, in operation since 1922. A former important mine, the Premier near Stewart, produced more than 41 million ounces of silver between 1918 and 1968. See Tables 1, 3, 6, and 7B.

Sodium carbonate—Sodium carbonate was recovered between 1921 and 1949 from alkali lakes in the Clinton area and around Kamloops. There has been no further production. *See* Tables 1 and 7D.

Stone (*see* Building-stone)—Cut stone for building purposes is prepared from rock produced at quarries in various parts of the Province when required. Two of the most productive quarries have operated on Haddington and Nelson Islands. *See* Tables 1, 3, and 7E.

Structural *materials*—In Table 7E the value of $5,972,171 for unclassified materials is the total for structural materials in the period 1886-1919 that cannot be allotted to particular classes of structural materials or assigned to mining divisions, and includes $726,323 shown against 1.896 in Table 2 that includes unclassified structural materials in that and previous years not assignable to particular years. The figure $3,180,828 in Table 7E under "Other Clay Products" is tbe value in the

period 1886–1910 that cannot be alloted to particular clay products or assigned to mining divisions. See Tables 1, 2, 3, 7A, and 7E.

Sulphur—The production of sulphur has been recorded since 1916. From 1916 to 1927 the amounts include the sulphur content of pyrite shipped. From 1928 the amounts include the estimated sulphur content of pyrite shipped, plus the sulphur contained in sulphuric acid made. from waste smelter gases. The sulphur content of pyrrhotite roasted at the Kimberley fertilizer plant is included since 1953. Since 1958, element& sulphur recovered from the Canadian Occidental Petroleum Ltd. plant at Taylor has been included. *See* Tables 1, 3, and 7D.

Talc—Between 1916 and 1936, talc was quarried at Leech River and at Anderson Lake to make dust for asphalt roofing. There has been no production since 1936. See Tables 1, 3, and 7D.

Tin—Tin, as cassiterite, is a by-product of the Sullivan mine, where it has been produced since 1941. The tin concentrate is shipped to an American smelter for treatment. *See* Tables 1, 3, and 7C.

Tungsten—Tungsten, very largely as scheelite concentrates, was produced from 1937 to 1958; first from the Columbia Tungstens (Hardscrabble) mine in the Cariboo in 1937 and during World War II from the Red Rose mine near Hazelton and the Emerald mine near Salmo. The Red Rose closed in 1954 and the Emerald in 1958. Small amounts of scheelite have been produced from the Bridge River, Revelstoke, and other areas Where demand was high. In 1970 production began from the Invincible mine near Salmo, which closed in 1973.

A very small amount of wolfram& came from Boulder Creek near Atlin. *See* Tables 1, 3, and 7C.

Volcanic Ash-The only recorded production of volcanic ash is 30 tons from the Cariboo Mining Division in 1954. See Tables 1 and 7D.

Zinc—Zinc was first produced in 1905. For many years lead was the most valuable single metal, but in 1950 the annual value of production of zinc surpassed that of lead and in 1966 the total value of zinc production exceeded that- of lead. In 1972 the annual production of zinc is exceeded by that of copper, coal, and crude oil. Zinc is invariably associated with lead, and most ores are mined for their combined values in zinc, lead, and silver, and rarely for their zinc content alone. Some zinc ores contain a valuable amount of gold, and zinc is associated with copper at the Lynx mine. Modern practice is to concentrate and separate the zinc mineral (sphalerite) from the lead mineral (galena). Most of the zinc concentrates go to the zinc-recovery plant at Trail, are roasted, and are convert&i electrolytically to refined metal. Some concentrates arc shipped to American or Japanese smelters;

More than 86 per cent of the zinc has been mined in southeastern British Columbia, at the Sullivan mine, and at mines near Ainsworth, Invermere, Moyie Lake, Riondel, Salmo, Slocan, and Spillimacheen. Other production has come from mines at Portland Canal and Tulsequah and is coming from Buttle Lake. The greatest zinc mine is the Sullivan, which has contributed about 74 per cent of the total zinc production of the Province.

Records for the period 1905 to 1908 show shipments totalling 18,845 tons-of zinc ore and zinc concentrates of unstated zinc content. In 1918, revisions were made to some yearly totals for zinc to adjust them for recovery of zinc from slag treated at the Trail smelter. See Tables 1, 3, 6; and 7B.

Prices[1] *Used in Valuing Production of Gold, Silver, Copper, Lead, Zinc, and Coal*

Year	Gold, Placer, Oz.	Gold, Fine, Oz.	Silver, Fine, Oz.	Copper, Lb.	Lead, Lb.	Zinc, Lb.	Coal, Short Ton
	$	$	Cents	Cents	Cents	Cents	$
1901	17.00	20.67	56.002 N.Y.	16.11 N.Y.	2.577 N.Y.		2.65
1902	———	———	49.55 „	11.70 „	3.66 „		2.63
1903	———	———	50.78 „	13.24 „	3.81 „		2.67
1904	———	———	53.36 „	12.82 „	3.88 „		2.62
1905	———	———	51.33 „	15.59 „	4.24 „		2.70
1906	———	———	63.45 „	19.28 „	4.81 „		2.61
1907	———	———	62.06 „	20.00 „	4.80 „		3.07
1908	———	———	50.22 „	13.20 „	3.78 „		3.11
1909	———	———	48.93 „	12.98 „	3.85 „		3.19
1910	———	———	50.812 „	12.738 „	4.00 „	4.60 E. St. L.	3.35
1911	———	———	50.64 „	12.38 „	3.98 „	4.90 „	3.18
1912	———	———	57.79 „	16.341 „	4.024 „	5.90 „	3.36
1913	———	———	56.80 „	15.27 „	3.93 „	4.80 „	3.39
1914	———	———	52.10 „	13.60 „	3.50 „	4.40 „	3.46
1915	———	———	47.20 „	17.28 „	4.17 „	11.25 „	3.43
1916	———	———	62.38 „	27.202 „	6.172 „	10.88 „	3.45
1917	———	———	77.35 „	27.18 „	7.91 „	7.566 „	3.48
1918	———	———	91.93 „	24.63 „	6.67 „	6.94 „	4.99
1919	———	———	105.57 „	18.70 „	5.19 „	6.24 „	4.92
1920	———	———	95.80 „	17.45 „	7.16 „	6.52 „	4.72
1921	———	———	59.52 „	12.50 „	4.09 „	3.95 „	4.81
1922	———	———	64.14 „	13.38 „	5.16 „	4.86 „	4.72
1923	———	———	61.63 „	14.42 „	6.54 „	5.62 „	4.81
1924	———	———	63.442 „	13.02 „	7.287 „	5.39 „	4.89
1925	———	———	69.065 „	14.042 „	7.848 Lond.	7.892 Lond.	4.79
1926	———	———	62.107 „	13.795 „	6.751 „	7.409 „	4.84
1927	———	———	56.370 „	12.920 „	5.256 „	6.194 „	4.81
1928	———	———	58.176 „	14.570 „	4.575 „	5.493 „	4.71
1929	———	———	52.993 „	18.107 „	5.050 „	5.385 „	4.74
1930	———	———	38.154 „	12.982 „	3.927 „	3.599 „	4.73
1931	———	———	28.700 „	8.116 „	2.710 „	2.554 „	4.35
1932	19.30	23.47	31.671 „	6.380 Lond.	2.113 „	2.405 „	4.04
1933	23.02	28.60	37.832 „	7.454 „	2.391 „	3.210 „	3.90
1934	28.37	34.50	47.461 „	7.419 „	2.436 „	3.044 „	4.00
1935	28.94	35.19	64.790 „	7.795 „	3.133 „	3.099 „	3.95
1936	28.81	35.03	45.127 „	9.477 „	3.913 „	3.315 „	4.23
1937	28.77	34.99	44.881 „	13.078 „	5.110 „	4.902 „	4.25
1938	28.93	35.18	43.477 „	9.972 „	3.344 „	3.073 „	4.01
1939	29.72	36.14	40.488 „	10.092 „	3.169 „	3.069 „	4.02
1940	31.66	38.50	38.249 „	10.086 „	3.362 „	3.411 „	4.26
1941	31.66	38.50	38.261 „	10.086 „	3.362 „	3.411 „	4.15
1942	31.66	38.50	41.166 „	10.086 „	3.362 „	3.411 „	4.13
1943	31.66	38.50	45.254 „	11.750 „	3.754 „	4.000 „	4.17
1944	31.66	38.50	43.000 „	12.000 „	4.500 „	4.300 „	4.25
1945	31.66	38.50	47.000 „	12.550 „	5.000 „	6.440 „	4.24
1946	30.22	36.75	83.650 „	12.800 „	6.750 „	7.810 „	4.68
1947	28.78	35.00	72.000 „	20.390 „	13.670 „	11.230 „	5.12
1948	28.78	35.00	75.000 Mont.	22.350 U.S.	18.040 „	13.930 „	6.09
1949	29.60	36.00	74.250 U.S.	19.973 „	15.800 U.S.	13.247 U.S.	6.51
1950	31.29	38.05	80.635 „	23.428 „	14.454 „	15.075 „	6.43
1951	30.30	36.85	94.550 „	27.700 „	18.400 „	19.900 „	6.46
1952	28.18	34.27	83.157 „	31.079 „	16.121 „	15.874 „	6.94
1953	28.31	34.42	83.774 „	30.333 „	13.265 „	10.675 „	6.88
1954	27.52	34.07	82.982 „	29.112 „	13.680 „	10.417 „	7.00
1955	28.39	34.52	87.851 „	38.276 „	14.926 „	12.127 „	6.74
1956	28.32	34.44	89.373 „	39.787 „	15.756 „	13.278 „	6.59
1957	27.59	33.55	87.057 „	26.031 „	14.051 „	11.175 „	6.76
1958	27.94	33.98	86.448 „	23.419 „	11.755 „	10.009 „	7.45
1959	27.61	33.57	87.469 „	27.708 „	11.670 „	10.978 „	7.93
1960	27.92	33.95	88.633 „	28.985 „	11.589 „	12.557 „	6.64
1961	29.24	35.46	93.696 „	28.288 „	11.011 „	11.695 „	7.40
1962	29.25	37.41	116.029 „	30.473 „	10.301 „	12.422 „	7.43
1963	29.31	37.75	137.965 „	30.646 „	12.012 „	13.173 „	7.33
1964	29.96	37.75	139.458 „	33.412 „	14.662 „	14.633 „	6.94
1965	28.93	37.73	139.374 „	38.377 „	17.247 „	15.636 „	7.03
1966	29.08	37.71	139.300 „	53.344 „	16.283 „	15.622 „	7.28
1967	28.77	37.76	167.111 „	51.022 „	15.102 „	14.933 „	7.75
1968	29.21	37.71	231.049 „	54.216 „	14.546 „	14.153 „	7.91
1969	29.37	37.69	192.699 „	66.656 „	16.039 „	15.721 „	8.00
1970	28.89	36.56	184.927 „	58.6982	16.336 „	16.006 „	7.40
1971	26.25	35.34	155.965 „	46.6962	13.950 „	16.286 „	10.03
1972	38.94	57.52	166.324 „	44.8392	14.876 „	15.579 „	10.96
1973	81.32	97.41	256.620 „	83.2342	16.285 „	20.657 „	11.53

[1] *See* page A 14 for detailed explanation.
[2] *See* page A 15 for explanation.

Table 1—Mineral Production: Total to Date. Past Year. and Latest Year

Products[1]	Total Quantity to Date	Total Value to Date	Quantity 1972	Value 1972	Quantity 1973	Value 1973
		$		$		$
Antimony lb.	55,229,839	18,735,987	679,601	419,042	1,660,331	1,192,118
Bismuth lb.	6,925,647	14,476,457	93,820	324,617	2,851	13,058
Cadmium lb.	41,964,653	79,049,923	695,650	1,759,995	810,779	2,951,236
Chromite tons	796	32,295				
Cobalt lb.	311,921	376,661	155,739	155,739	40,907	117,403
Copper lb.	5,721,958,926	2,047,380,171	467,012,694	209,403,822	714,648,946	594,830,904
Gold—placer oz.	5,240,107	97,300,473	691	26,905	3,831	311,524
lode, fine - - - a.	17,419,872	531,960,049	121,624	6,995,448	185,986	18,117,268
Iron concentrates tons	31,061,008	281,470,018	1,256,308	11,642,279	1,568,912	12,906,063
Lead lb.	16,458,073,374	1,441,949,395	194,249,571	28,896,566	186,680,656	30,400,945
Magnesium lb.	204,632	88,184				
Manganese tons	1,724	32,668				
Mercury[2] lb.	4,171,110	10,447,358				
Molybdenum lb.	199,952,170	336,877,117	28,041,603	43,260,349	30,390,928	52,260,232
Nickel lb.	49,933,039	49,347,348	3,240,483	4,601,486	2,467,472	3,775,232
Palladium oz.	749	30,462				
Platinum oz.	1,407	135,008				
Selenium lb.	731	1,389				
Silver oz.	507,543,315	396,374,754	6,926,036	11,519,650	7,681,514	19,712,301
Tin lb.	19,159,752	17,691,492	351,043	473,908	304,727	597,265
Tungsten (WO_3) lb.	20,040,128	48,087,713	1,273,196	2,167,663	1,411,800	4,243,759
Zinc lb.	15,297,732,440	1,549,368,185	268,347,996	47,172,894	302,874,331	62,564,751
Others		47,023,282		3,212,297		4,161,923
Totals		6,968,236,389		372,032,770		808,155,982
Industrial Minerals						
Arsenious oxide lb.	22,019,420	273,201				
Asbestos tons	1,227,098	239,205,584	105,807	20,870,241	108,966	21,102,892
Bentonite tons	791	16,858				
Fluxes tons	4,188,899	7,839,947	31,600	59,246	46,228	106,371
Granules tons	490,335	8,143,884	37,158	757,924	34,321	857,643
Gypsum and gypsite tons	5,183,650	17,557,457	388,315	1,087,196	365,249	1,114,009
Hydromagnesite tons	2,253	27,536				
Iron oxide and ochre tons	18,108	155,050				
Jade lb.	1,162,130	1,270,028	243,725	235,218	154,251	306,808
Magnesium sulphate tons	13,894	254,352				
Mica lb.	12,822,050	185,818				
Natro-alunite tons	522	9,398				
Perlite tons	1,112	11,120				
Phosphate rock tons	3,842	16,894				
Sodium carbonate tons	10,492	118,983				
Sulphur tons	8,197,669	104,175,417	297,707	2,306,933	316,035	4,187,387
Talc tons	1,085	34,871				
Others		5,876,819		447,362		294,554
Totals		385,173,217		25,764,120		27,969,664
Structural Materials						
Cement tons	15,702,225	281,387,434	890,926	21,014,112	950,772	24,935,624
Clay products		94,527,407		5,263,749		5,590,290
Rubble, riprap, crushed rock tons		61,774,442	3,321,764	4,032,548	2,843,010	4,160,009
Lime and limestone tons		63,735,329	2,026,309	3,357,927	2,153,936	3,633,870
Sand and gravel tons		347,223,788	34,826,518	33,076,196	33,898,934	35,119,590
Building-stone tons	1,164,719	9,224,579	194	1,166	204	7,648
Not assigned		5,972,171				
Totals		863,845,150		66,745,698		73,447,031
Coal						
Coal—sold and used tons	163,313,795	836,091,796	6,026,198	66,030,210	7,633,231	87,976,103
Petroleum and Natural Gas						
Crude oil bbl.	229,436,516	548,525,353	23,831,144	63,166,717	21,189,758	68,306,032
Field condensate bbl.	741,353	1,908,854	104,531	277,069	126,509	407,807
Plant condensate bbl.	14,068,549	6,507,612	1,018,012	327,820	1,132,701	222,463
Nat'l gas to pipe-line MSCF	2,990,984,716	312,820,618	379,969,499	41,616,824	427,586,208	46,688,912
Butane bbl.	6,327,982	2,015,537	340,904	106,533	685,936	212,640
Propane bbl.	4,948,717	1,573,747	480,047	150,015	623,866	193,398
Totals		873,351,721		105,644,978		116,031,252
Grand totals		9,926,698,273		636,217,776		1,113,580,034

[1] *See* notes on individual products listed alphabetically on pages A 16 to A 25.
[2] From 1968, excludes production which is confidential.

Table 2-Total Value of Mineral Production, 1836–1973

Year	Metals	Industrial Minerals	Structural Materials	Coal	Petroleum and Natural Gas	Total
	$	$	$	$	$	$
1836–86	52,808,750		43,650	10,758,565		63,610,965
1887	729,381		22,168	1,240,080		1,991,629
1888	745,794		46,432	1,467,903		2,260,129
1889	685,512		77,517	1,739,490		2,502,519
1890	572,884		75,201	2,034,420		2,682,505
1891	447,136		79,475	3,087,291		3,613,902
1892	511,075		129,234	2,479,005		3,119,314
1893	659,969			2,934,882		3,594,851
1894	1,191,728			3,038,859		4,230,587
1895	2,834,629			2,824,687		5,659,316
1896	4,973,769		726,323	2,693,961		8,394,053
1897	7,575,262		150,000	2,734,522		10,459,784
1898	7,176,870		150,000	3,582,595		10,909,465
1899	8,107,509		200,000	4,126,803		12,434,312
1900	11,360,546		250,000	4,744,530		16,355,076
1901	14,258,455		400,000	5,016,398		19,674,853
1902	12,163,561		450,000	4,832,257		17,445,818
1903	12,640,083		525,000	4,332,297		17,497,380
1904	13,424,755	2,400	575,000	4,953,024		18,955,179
1905	16,289,165		660,800	5,511,861		22,461,826
1906	18,449,602		982,900	5,548,044		24,980,546
1907	17,101,305		1,149,400	7,637,713		25,888,418
1908	15,227,991		1,200,000	7,356,866		23,784,857
1909	14,668,141		1,270,559	8,574,884		24,513,584
1910	13,768,731		1,500,000	11,108,335		26,377,066
1911	11,880,062	46,345	3,500,917	8,071,747		23,499,071
1912	18,218,266	17,500	3,436,222	10,786,812		32,458,800
1913	17,701,432	46,446	3,249,605	9,197,460		30,194,943
1914	15,790,727	51,810	2,794,107	7,745,847		26,382,491
1915	20,765,212	133,114	1,509,235	7,114,178		29,521,739
1916	32,092,648	150,718	1,247,912	8,900,675		42,391,953
1917	27,299,934	174,107	1,097,900	8,484,343		37,056,284
1918	27,957,302	281,131	783,280	12,833,994		41,855,707
1919	20,058,217	289,426	980,790	11,975,671		33,304,104
1920	19,687,532	508,601	1,962,824	13,450,169		35,609,126
1921	13,160,417	330,503	1,808,392	12,836,013		28,135,325
1922	19,605,401	251,922	2,469,967	12,880,060		35,207,350
1923	25,769,215	140,409	2,742,388	12,678,548		41,330,560
1924	35,959,566	116,932	2,764,013	9,911,935		48,752,446
1925	46,480,742	101,319	2,766,838	12,168,905		61,517,804
1926	51,867,792	223,748	3,335,885	11,650,180		67,077,605
1927	45,134,289	437,729	2,879,160	12,269,135		60,720,313
1928	48,640,158	544,192	3,409,142	12,633,510		65,227,002
1929	52,805,345	807,502	3,820,732	11,256,260		68,689,839
1930	41,785,380	457,225	4,085,105	9,435,650		55,763,360
1931	23,530,469	480,319	3,538,519	7,684,155		35,233,462
1932	20,129,869	447,495	1,705,708	6,523,644		28,806,716
1933	25,777,723	460,683	1,025,586	5,375,171		32,639,163
1934	35,177,224	486,554	1,018,719	5,725,133		42,407,630
1935	42,006,618	543,583	1,238,718	5,048,864	–	48,837,783
1936	45,889,944	724,362	1,796,677	5,722,502		54,133,485
1937	65,224,245	976,171	2,098,339	6,139,920		74,438,675
1938	55,959,713	916,841	1,974,976	5,565,069		64,416,599
1939	56,216,049	1,381,720	1,832,464	6,280,956		65,711,189
1940	64,332,166	1,073,023	2,534,840	7,088,265		75,028,294
1941	65,807,630	1,253,561	2,845,262	7,660,000	–	77,566,453
1942	63,626,140	1,434,382	3,173,635	8,237,172		76,471,329
1943	55,005,394	1,378,337	3,025,255	7,742,030	–	67,151,016
1944	42,095,013	1,419,248	3,010,088	8,217,966		54,742,315
1945	50,673,592	1,497,720	3,401,229	6,454,360	–	62,026,901
1946	58,834,747	1,783,010	5,199,563	6,732,470	–	72,549,790
1947	95,729,867	2,275,972	5,896,803	8,680,440		112,583,082
1948	124,091,753	2,358,877	8,968,222	9,765,395		145,184,247
1949	110,219,917	2,500,799	9,955,790	10,549,924	–	133,226,430
1950	117,166,836	2,462,340	10,246,939	10,119,305		139,995,418

Table 2—Total Value of Mineral Production, 1836–1973—Continued

Year	Metals	Minerals Industrial	Structural Materials	Coal	Petroleum and Natural Gas	TOW
	$	$	$	$	$	$
1951	153,598,411	2,493,840	10,606,048	10,169,617	———	176,867,916
1952	147,857,523	2,181,464	11,596,961	9,729,739	———	171,365,687
1953	126,755,705	3,002,673	13,555,038	9,528,279	———	152,841,695
1954	123,834,286	5,504,114	14,395,174	9,154,544	6,545	152,894,663
1955	142,609,505	6,939,490	15,299,254	8,986,501	18,610	173,853,360
1956	149,441,246	9,172,792	20,573,631	9,346,518	319,465	188,853,652
1957	125,353,920	11,474,050	25,626,939	7,340,339	1,197,581	170,992,829
1958	104,251,112	9,958,768	19,999,576	5,937,860	4,806,233	144,953,549
1959	105,076,530	12,110,286	19,025,209	5,472,064	5,967,128	147,651,217
1960	130,304,373	13,762,102	18,829,989	5,242,223	9,226,646	177,365,333
1961	128,565,774	12,948,308	19,878,921	6,802,134	11,612,184	179,807,321
1962	159,627,293	14,304,214	21,366,265	6,133,986	27,939,726	229,371,484
1963	172,852,866	16,510,898	23,882,190	6,237,997	36,379,636	255,863,587
1964	180,926,329	16,989,469	26,428,939	6,327,678	36,466,753	267,139,168
1965	177,101,733	20,409,649	32,325,714	6,713,590	44,101,662	280,652,348
1966	208,664,003	22,865,324	43,780,272	6,196,219	54,274,187	335,780,005
1967	235,865,318	29,364,065	44,011,488	7,045,341	67,096,286	383,382,498
1968	250,912,026	26,056,782	45,189,476	7,588,989	75,281,215	405,028,488
1969	294,881,114	20,492,943	55,441,528	6,817,155	86,756,009	464,388,749
1970	309,981,470	22,020,359	46,104,071	19,559,669	90,974,467	488,640,036
1971	301,059,951	21,909,767	59,940,333	45,801,936	99,251,158	527,963,145
1972	372,032,770	25,764,120	66,745,698	66,030,210	105,644,978	636,217,776
1973	808,155,982	27,969,664	73,447,031	87,976,105	116,031,252	1,113,580,034
Totals	6,968,236,389	385,173,217	863,845,150	836,091,796	873,351,721	19,926,698,273

Table 3—Mineral Production for the 10 Years, 1964–1973

Description	1964		1965		1966		1967		1968	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Metals										
Antimony ..... lb.	1,591,523	$ 700,270	1,301,787	$ 689,947	1,405,681	$ 745,011	1,267,686	$ 671,874	1,159,960	$ 614,779
Bismuth ..... lb.	213,428	480,213	144,630	446,907	47,435	198,848	142,507	572,878	207,783	868,533
Cadmium ..... lb.	1,864,255	6,040,186	466,586	1,297,110	1,169,570	3,017,491	994,365	2,784,222	1,341,437	3,823,095
Cobalt ..... lb.										
Copper ..... lb.	115,554,700	38,609,136	85,197,073	32,696,081	105,800,568	56,438,255	172,739,548	88,135,172	160,993,338	87,284,148
Gold—placer ..... oz.	1,842	55,191	866	25,053	1,535	44,632	891	25,632	670	19,571
lode, fine ..... oz.	138,487	5,227,884	117,124	4,419,089	119,508	4,506,646	126,157	4,763,688	123,896	4,672,242
Iron concentrates ..... tons	2,002,562	20,419,487	2,165,403	21,498,581	2,151,804	20,778,934	2,154,443	20,820,765	2,094,745	21,437,569
Lead ..... lb.	268,737,503	39,402,293	250,183,633	43,149,171	211,490,107	34,436,934	208,131,894	31,432,079	231,627,618	32,782,257
Molybdenum ..... lb.	28,245	47,063	7,289,125	12,405,344	17,094,927	27,606,061	17,517,543	31,183,064	19,799,793	32,552,722
Nickel ..... lb.	3,398,560	2,854,790	3,322,000	2,790,480	3,187,712	2,731,869	4,180,842	3,946,715	3,317,160	3,372,225
Silver ..... oz.	5,269,642	7,348,938	4,972,084	6,929,793	5,549,131	7,729,939	6,180,739	10,328,695	7,130,866	16,475,795
Tin ..... lb.	352,350	535,572	377,207	735,554	710,752	1,130,096	437,804	621,682	358,191	497,885
Tungsten (WO_3) ..... lb.										
Zinc ..... lb.	400,796,562	58,648,561	311,249,250	48,666,933	305,124,440	47,666,540	262,830,908	39,248,539	299,396,264	43,550,181
Others		556,745		1,351,690		1,632,747		1,330,313		2,961,024
Totals		180,926,329		177,101,733		208,664,003		235,865,318		250,912,026
Industrial Minerals										
Asbestos ..... tons	67,460	11,714,494	85,851	14,491,195	88,771	15,718,741	92,192	18,273,220	74,667	14,833,891
Fluxes (quartz, limestone) ..... tons	73,021	237,298	59,231	240,076	23,913	112,314	48,052	221,212	42,259	157,679
Granules (quartz, limestone, granite) ..... tons	19,289	397,639	29,033	447,954	23,956	424,667	31,283	305,655	30,237	436,928
Gypsum and gypsite ..... tons	188,303	581,873	207,858	602,788	206,026	576,873	230,044	691,592	246,374	689,847
Jade ..... lb.	11,537	13,804	7,129	9,249	11,633	13,225	20,160	24,341	49,015	105,670
Sulphur ..... tons	278,385	3,860,436	341,873	4,428,617	342,478	5,834,523	314,490	9,654,603	320,521	9,650,285
Others		183,925		189,770		184,981		193,442		182,482
Totals		16,989,469		20,409,649		22,865,324		29,364,055		26,056,782
Structural Materials										
Cement ..... tons	537,396	10,040,776	601,878	11,199,607	707,519	12,918,301	709,977	13,581,850	656,363	13,634,166
Clay products		3,008,158		3,899,634		4,100,192		3,945,207		4,388,505
Lime and limestone ..... tons	1,211,320	2,055,195	1,420,085	2,482,451	1,483,949	2,696,011	1,645,253	2,822,138	2,016,892	3,337,277
Rubble, riprap, and crushed rock ..... tons	1,449,449	1,285,318	2,715,411	1,938,088	1,590,189	1,890,992	2,287,407	2,967,195	3,385,712	3,524,439
Sand and gravel ..... tons	17,708,225	10,013,970	20,936,994	12,686,959	24,320,013	21,959,733	23,210,746	20,643,673	22,665,961	20,271,723
Building-stone ..... tons	846	25,522	2,252	118,975	76,720	215,043	3,577	51,425	1,654	33,366
Totals		26,428,939		32,325,714		43,780,272		44,011,488		45,189,476
Coal										
Sold and used ..... tons	911,326	6,327,678	950,763	6,713,590	850,821	6,196,219	908,790	7,045,341	959,214	7,588,989
Petroleum and Natural Gas										
Crude oil ..... bbl.	11,525,476	23,396,716	13,470,757	28,693,662	16,638,181	36,268,683	19,656,799	44,748,477	22,151,353	50,082,837
Field condensate ..... bbl.	26,367	63,436	31,782	70,874	39,571	86,265	40,570	92,357	54,163	122,408
Plant condensate ..... bbl.	922,211	587,685	947,429	576,107	974,564	312,360	1,016,045	267,941	960,252	247,455
Natural gas delivered to pipe-line ..... MSCF	118,959,880	12,192,816	138,814,144	14,493,255	161,264,334	17,339,587	198,626,177	21,667,136	224,233,203	24,531,445
Butane ..... bbl.	461,759	147,763	477,990	152,956	500,973	160,312	588,118	188,197	527,546	168,814
Propane ..... bbl.	244,804	78,337	358,776	114,808	334,315	106,980	413,058	132,178	400,800	128,256
Totals		36,466,753		44,101,662		54,274,187		67,096,286		75,281,215
Grand totals		267,139,168		280,652,348		335,780,005		383,382,498		405,028,488

Description	1969		1970		1971		1972		1973	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Metals										
Antimony lb.	820,122	$ 508,476	726,474	$ 1,104,040	323,525	$ 243,614	679,601	$ 419,042	1,660,331	$ 1,192,118
Bismuth lb.	62,488	288,070	132,135	828,486	82,521	388,674	93,820	324,617	2,851	13,058
Cadmium lb.	1,141,133	4,016,788	939,310	3,343,944	1,036,713	2,011,223	695,650	1,759,995	810,779	2,951,236
Cobalt lb.	----	----	----	----	113,545	103,099	155,739	155,739	40,907	117,403
Copper lb.	167,415,411	111,592,416	212,371,731	124,657,958	280,619,150	131,037,918	467,012,694	209,403,822	714,648,946	594,830,904
Gold—placer oz.	399	11,720	491	14,185	177	4,647	691	26,905	3,831	311,524
lode, fine oz.	117,481	4,427,506	100,809	3,685,476	85,781	3,031,844	121,624	6,995,448	185,986	18,117,268
Iron concentrates tons	2,074,854	19,787,845	1,879,065	17,391,883	1,929,868	18,153,612	1,256,308	11,642,379	1,568,912	12,906,063
Lead lb.	210,072,565	33,693,539	214,838,525	35,096,021	248,827,301	34,711,408	194,249,571	28,896,566	186,680,656	30,400,945
Molybdenum lb.	26,597,477	47,999,442	31,276,497	52,561,796	21,884,729	36,954,846	28,041,603	43,260,349	30,390,928	52,260,232
Nickel lb.	2,979,130	3,396,208	3,408,203	4,703,320	2,543,578	3,497,420	3,240,483	4,601,486	2,467,472	3,775,232
Silver oz.	5,760,534	11,100,491	6,511,316	12,041,181	7,673,546	11,968,046	6,926,036	11,519,660	7,681,514	19,712,301
Tin lb.	288,427	470,136	263,716	421,946	318,999	421,079	351,043	473,908	304,727	597,265
Tungsten (WO_3) lb.	----	----	----	----	1,335,808	3,012,540	1,273,196	2,167,663	1,411,800	4,243,759
Zinc lb.	296,667,033	46,639,024	275,590,749	44,111,055	305,451,243	49,745,789	268,347,996	47,172,894	302,874,331	62,564,751
Others	----	10,949,453	----	10,020,179	----	5,774,192	----	3,212,297	----	4,161,923
Totals	----	294,881,114	----	309,981,470	----	301,059,951	----	372,032,770	----	808,155,982
Industrial Minerals										
Asbestos tons	80,388	14,871,334	86,730	16,033,827	87,118	17,800,406	105,807	20,870,241	108,966	21,102,892
Fluxes (quartz, limestone) tons	22,342	81,917	31,626	106,533	26,740	98,426	31,600	59,246	46,228	106,371
Granules (quartz, limestone, granite) tons	34,746	654,701	22,349	526,491	29,238	519,192	37,158	757,924	34,321	857,643
Gypsum and gypsite tons	280,894	764,032	270,266	736,635	344,795	930,348	388,315	1,087,196	365,249	1,114,009
Jade lb.	26,332	42,635	262,602	250,256	167,760	196,332	243,725	235,218	154,251	306,808
Sulphur tons	349,122	3,824,593	336,420	3,957,542	288,467	2,147,778	297,707	2,306,933	316,035	4,187,387
Others	----	253,731	----	409,075	----	217,285	----	447,362	----	294,554
Totals	----	20,492,943	----	22,020,359	----	21,909,767	----	25,764,120	----	27,969,664
Structural Materials										
Cement tons	795,591	16,604,688	601,893	13,485,549	906,467	21,629,385	890,926	21,014,112	950,772	24,935,624
Clay products	----	4,550,546	----	4,714,368	----	5,981,785	----	5,263,749	----	5,590,290
Lime and limestone tons	1,911,881	3,237,032	1,867,586	3,204,076	1,819,549	3,037,222	2,026,309	3,357,927	2,153,936	3,633,870
Rubble, riprap, and crushed rock tons	3,756,559	4,456,211	2,692,282	3,018,242	3,668,244	3,670,583	3,321,764	4,032,548	2,843,010	4,160,009
Sand and gravel tons	29,132,560	26,553,699	23,155,989	21,679,387	29,320,104	25,612,396	34,826,518	33,076,196	33,898,934	35,119,590
Building-stone tons	2,177	39,352	175	2,449	2,267	8,962	194	1,166	204	7,648
Totals	----	55,441,528	----	46,104,071	----	59,940,333	----	66,745,698	----	73,447,031
Coal										
Sold and used tons	852,340	6,817,155	2,644,056	19,559,669	4,565,242	45,801,936	6,026,198	66,030,210	7,633,251	87,976,105
Petroleum and Natural Gas										
Crude oil bbl.	25,309,036	58,176,213	25,333,550	60,405,941	25,154,122	66,471,856	23,831,144	63,166,717	21,189,758	68,306,032
Field condensate bbl.	78,147	180,520	107,254	277,829	109,008	287,781	104,531	277,059	126,509	407,807
Plant condensate bbl.	944,111	263,278	1,003,138	253,009	1,144,139	293,287	1,018,012	327,820	1,132,701	222,463
Natural gas delivered to pipe-line MSCF	256,223,244	27,897,585	272,554,221	29,804,411	291,188,481	31,946,372	379,969,499	41,616,824	427,586,208	46,688,912
Butane bbl.	417,540	133,613	308,664	98,772	318,195	101,822	340,904	106,533	685,936	212,640
Propane bbl.	327,501	104,800	420,327	134,505	468,876	150 040	480,047	150,015	623,866	193 398
Totals	----	86,756,009	----	90,974,467	----	99,251,158	----	105,644,978	----	116,031,252
Grand totals	----	464,388,749	----	488,640,036	----	527,963,145	----	636,217,776	----	1,113,580,034

Table 4—Mineral Production, Graph of Value, 1887–1973

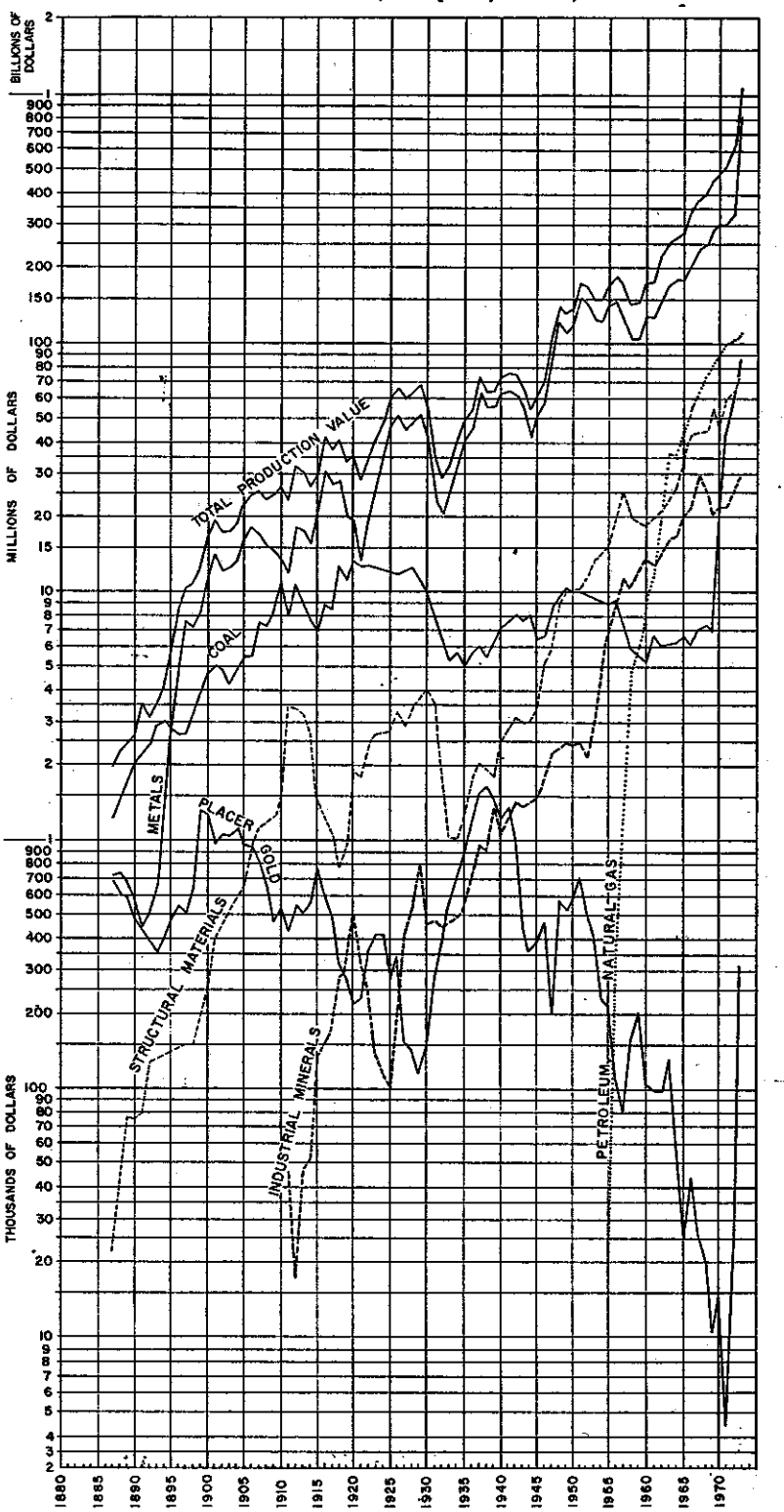

Table 5—Production of Gold, Silver, Copper, Lead, Zinc, and Molybdenum, Graph of Quantities, 1893–1973

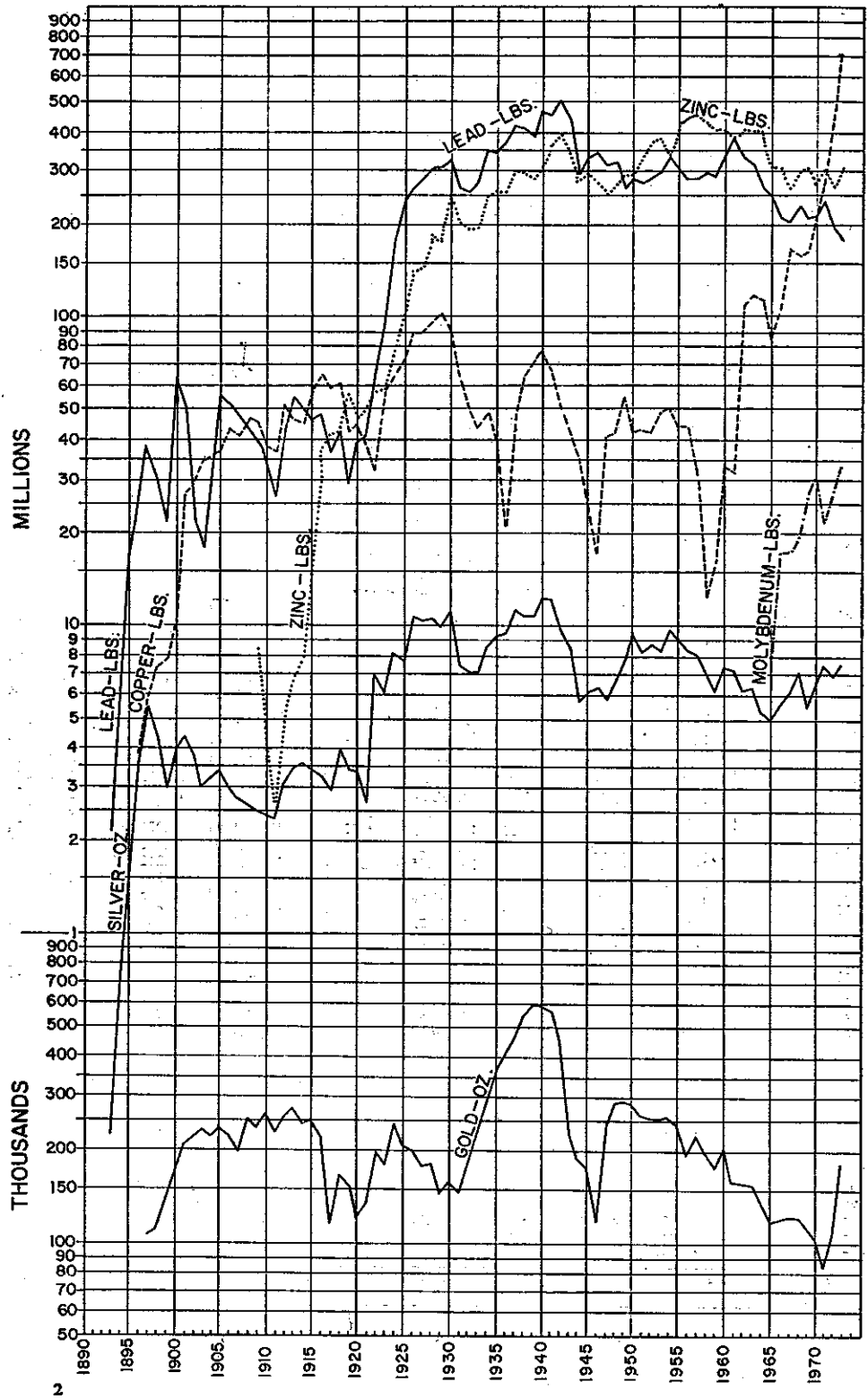

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Table 6—Production of Gold, Silver, Copper, Lead, Zinc, Molybdenum, and Iron Concentrates, 1858–1973

Year	Gold (Placer)		Gold (Fine)		Silver		Copper	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
	Oz.	$	Oz.	$	Oz.	$	Lb.	$
1858–90	3,246,585	55,192,163			221,089	214,152		
1891–1900	376,290	6,397,183	632,806	12,858,353	22,537,306	13,561,194	35,416,069	4,365,210
1901–10	507,580	8,628,660	2,322,118	47,998,179	31,222,548	16,973,507	379,957,091	56,384,783
1911	25,060	426,000	228,617	4,725,512	1,892,364	958,293	36,927,656	4,571,644
1912	32,680	555,500	257,496	5,322,442	3,132,108	1,810,045	51,456,537	8,408,513
1913	30,000	510,000	272,254	5,627,595	3,465,856	1,968,606	46,460,305	7,094,489
1914	33,240	565,000	247,170	5,109,008	3,602,180	1,876,736	45,009,699	6,121,319
1915	45,290	770,000	250,021	5,167,934	3,366,506	1,588,991	56,918,405	9,835,500
1916	34,150	580,500	221,932	4,587,333	3,301,923	2,059,739	65,379,364	17,784,494
1917	29,180	496,000	114,523	2,367,191	2,929,216	2,265,749	59,007,565	16,038,256
1918	18,820	320,000	164,674	3,403,811	3,498,172	3,215,870	61,483,754	15,143,449
1919	16,850	286,500	152,426	3,150,644	3,403,119	3,592,673	42,459,339	7,939,896
1920	13,040	221,600	120,048	2,481,392	3,377,849	3,235,980	44,887,676	7,832,899
1921	13,720	233,200	135,765	2,804,197	2,673,389	1,591,201	39,036,993	4,879,624
1922	21,690	368,800	197,856	4,089,684	7,101,311	4,554,781	32,359,896	4,329,754
1923	24,710	420,000	179,245	3,704,994	6,032,986	3,718,129	57,720,290	8,323,266
1924	24,750	420,750	247,716	5,120,535	8,341,768	5,292,184	64,845,393	8,442,870
1925	16,476	280,092	209,719	4,335,069	7,654,844	5,286,818	72,306,432	10,153,269
1926	20,912	355,503	201,427	4,163,859	10,748,556	6,675,606	89,339,768	12,324,421
1927	9,191	156,247	178,001	3,679,601	10,470,185	5,902,043	89,202,871	11,525,011
1928	8,424	143,208	180,662	3,734,609	10,627,167	6,182,461	97,908,316	14,265,242
1929	6,983	118,711	145,223	3,002,020	9,960,172	5,278,194	102,793,669	18,612,850
1930	8,955	152,235	160,836	3,324,975	11,328,263	4,322,185	92,362,240	11,990,466
1931	17,176	291,992	146,133	3,020,837	7,550,331	2,254,979	64,134,746	5,365,690
1932	20,400	395,542	181,651	4,263,389	7,150,655	2,264,729	50,608,036	3,228,892
1933	23,928	562,787	223,589	6,394,645	7,021,754	2,656,526	43,149,460	3,216,701
1934	25,181	714,431	297,216	10,253,952	8,613,977	4,088,280	49,651,733	3,683,662
1935	30,929	895,058	365,343	12,856,419	9,269,944	6,005,996	39,428,208	3,073,428
1936	43,389	1,249,940	404,578	14,172,367	9,547,124	4,308,330	21,671,711	2,053,828
1937	54,153	1,558,245	460,781	16,122,767	11,305,367	5,073,962	46,057,584	6,023,411
1938	57,759	1,671,015	557,522	19,613,624	10,861,578	4,722,288	65,769,906	6,558,575
1939	49,746	1,478,492	587,336	21,226,957	10,821,393	4,381,365	73,254,679	7,392,862
1940	39,067	1,236,928	583,524	22,461,516	12,327,944	4,715,315	77,980,223	7,865,085
1941	43,775	1,385,962	571,026	21,984,501	12,175,700	4,658,545	66,435,583	6,700,693
1942	32,904	1,041,772	444,518	17,113,943	9,677,881	4,080,775	50,097,716	5,052,856
1943	14,600	462,270	224,403	8,639,516	8,526,310	3,858,496	42,307,510	4,971,132
1944	11,433	361,977	186,632	7,185,332	5,705,334	2,453,293	36,300,589	4,356,070
1945	12,589	398,591	175,373	6,751,860	6,157,307	2,893,934	25,852,366	3,244,472
1946	15,729	475,361	117,612	4,322,241	6,365,761	5,324,959	17,500,538	2,240,070
1947	6,969	200,585	243,282	8,514,870	5,708,461	4,110,092	41,783,921	8,519,741
1948	20,332	585,200	286,230	10,018,050	6,720,134	5,040,101	43,025,388	9,616,174
1949	17,886	529,524	288,396	10,382,256	7,637,822	5,671,082	54,856,808	10,956,550
1950	19,134	598,717	283,983	10,805,553	9,509,456	7,667,950	42,212,133	9,889,458
1951	23,691	717,911	261,274	9,627,947	8,218,914	7,770,983	43,249,658	11,980,155
1952	17,554	494,756	255,789	8,765,889	8,810,807	7,326,803	42,005,512	13,054,893
1953	14,245	403,230	253,552	8,727,294	8,378,819	7,019,272	49,021,013	14,869,544
1954	8,684	238,967	258,388	8,803,279	9,826,403	8,154,145	50,150,087	14,599,693
1955	7,666	217,614	242,477	8,370,306	7,903,149	6,942,995	44,238,031	16,932,549
1956	3,865	109,450	191,743	6,603,628	8,405,074	7,511,866	43,360,575	17,251,872
1957	2,936	80,990	223,403	7,495,170	8,129,348	7,077,166	31,387,441	8,170,465
1958	5,650	157,871	194,354	6,604,149	7,041,058	6,086,854	12,658,649	2,964,529
1959	7,570	208,973	173,146	5,812,511	6,198,101	5,421,417	16,233,546	4,497,991
1960	3,847	107,418	205,580	6,979,441	7,446,643	6,600,183	33,064,429	9,583,724
1961	3,416	99,884	159,821	5,667,253	7,373,997	6,909,140	31,692,412	8,965,149
1962	3,315	96,697	158,850	5,942,101	6,189,804	7,181,907	108,979,144	33,209,215
1963	4,620	135,411	154,979	5,850,458	6,422,680	8,861,050	118,247,104	36,238,007
1964	1,842	55,191	138,487	5,227,884	5,269,642	7,348,938	115,554,700	38,609,136
1965	866	25,053	117,124	4,419,089	4,972,084	6,929,793	85,197,073	32,696,081
1966	1,535	44,632	119,508	4,506,646	5,549,131	7,729,939	105,800,568	56,438,255
1967	891	25,632	126,157	4,763,688	6,180,739	10,328,695	172,739,548	88,135,172
1968	670	19,571	123,896	4,672,242	7,130,866	16,475,795	160,993,338	87,284,148
1969	399	11,720	117,481	4,427,506	5,760,534	11,100,491	167,415,411	111,592,416
1970	491	14,185	100,809	3,685,476	6,511,316	12,041,181	212,371,731	124,657,958
1971	177	4,647	85,781	3,031,844	7,673,546	11,968,046	280,619,150	131,037,918
1972	691	26,905	121,624	6,995,448	6,926,036	11,519,660	467,012,694	209,403,822
1973	3,831	311,524	185,986	18,117,268	7,681,514	19,712,301	714,648,946	594,830,904
Totals	5,240,107	97,300,473	17,419,872	531,960,049	507,543,315	396,374,754	5,721,958,926	2,047,380,171

Table 6—Production of Gold, Silver, Copper, Lead, Zinc, Molybdenum, and Iron Concentrates, 1858–1973—Continued

Year	Lead		Zinc		Molybdenum		Iron Concentrates	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
	Lb.	$	Lb.	$	Lb.	$	Tons	$
1858–90	1,044,400	45,527					29,869	70,879
1891–1900	205,037,158	7,581,619					13,029	45,602
1901–10	407,833,262	17,033,102	12,684,192	894,169			19,553	68,436
1911	26,872,397	1,069,521	2,634,544	129,092				
1912	44,871,454	1,805,627	5,358,280	316,139				
1913	55,364,677	2,175,832	6,758,768	324,421				
1914	50,625,048	1,771,877	7,866,467	346,125	1,987	662		
1915	46,503,590	1,939,200	12,982,440	1,460,524	3,618	2,000		
1916	48,727,516	3,007,462	37,168,980	4,043,985	12,342	20,560		
1917	37,307,465	2,951,020	41,848,513	3,166,259	6,982	11,636		
1918	43,899,661	2,928,107	41,772,916	2,899,040	960	1,840	1,000	5,000
1919	29,475,968	1,526,855	56,737,651	3,540,429			1,230	6,150
1920	39,331,218	2,816,115	47,208,268	3,077,979			1,472	7,360
1921	41,402,288	1,693,354	49,419,372	1,952,065			1,010	5,050
1922	67,447,985	3,480,306	57,146,548	2,777,322			1,200	3,600
1923	96,663,152	6,321,770	58,344,462	3,278,903			243	1,337
1924	170,384,481	12,415,917	79,130,970	4,266,741				
1925	237,899,199	18,670,329	98,257,099	7,754,450				
1926	263,023,936	17,757,535	142,876,947	10,586,610				
1927	282,996,423	14,874,292	145,225,443	8,996,135				
1928	305,140,792	13,961,412	181,763,147	9,984,613			20	
1929	307,999,153	15,555,189	172,096,841	9,268,792				
1930	321,803,725	12,638,198	250,479,310	9,017,005				
1931	261,902,228	7,097,812	202,071,702	5,160,911				
1932	252,007,574	5,326,432	192,120,891	4,621,641				
1933	271,689,217	6,497,719	195,963,751	6,291,416				
1934	347,366,967	8,461,859	249,152,403	7,584,199				
1935	344,268,444	10,785,930	256,239,446	7,940,860				
1936	377,971,618	14,790,028	254,581,393	8,439,373				
1937	419,118,371	21,417,049	291,192,278	14,274,245				
1938	412,979,182	13,810,024	298,497,295	9,172,822				
1939	378,743,663	12,002,390	278,409,102	8,544,375				
1940	466,849,112	15,695,467	312,020,671	10,643,026				
1941	456,840,454	15,358,976	367,869,579	12,548,031				
1942	507,199,704	17,052,054	387,236,469	13,208,636				
1943	439,155,635	16,485,902	336,150,455	13,446,018				
1944	292,922,888	13,181,530	278,063,373	11,956,725				
1945	336,976,468	16,848,823	294,791,635	18,984,581				
1946	345,862,680	23,345,731	274,269,956	21,420,484				
1947	313,733,089	42,887,313	253,006,168	28,412,593				
1948	320,037,525	57,734,770	270,310,195	37,654,211			679	3,735
1949	265,378,899	41,929,866	288,225,368	38,181,214			5,472	27,579
1950	[illegible]	[illegible]	[illegible]	[illegible]				
1951	273,456,604	50,316,015	337,511,324	67,164,754			113,535	790,000
1952	284,949,206	45,936,692	372,871,717	59,189,656			900,481	5,474,924
1953	297,634,712	39,481,244	382,300,862	40,810,618			991,248	6,763,105
1954	332,474,456	45,482,505	334,124,560	34,805,755			535,746	3,733,891
1955	302,567,640	45,161,245	429,198,565	52,048,909			610,930	3,228,756
1956	283,718,073	44,702,619	443,853,004	58,934,801			369,955	2,190,847
1957	281,603,346	39,568,086	449,276,797	50,206,681			357,342	2,200,637
1958	294,573,159	34,627,075	432,002,790	43,234,839			630,271	4,193,442
1959	287,423,357	33,542,306	402,342,850	44,169,198			849,248	6,363,848
1960	333,608,699	38,661,912	403,399,319	50,656,726	5,414	9,500	1,160,355	10,292,847
1961	384,284,524	42,313,569	387,951,190	45,370,891			1,335,068	12,082,540
1962	335,282,537	34,537,454	413,430,817	51,356,376			1,793,847	18,326,911
1963	314,974,310	37,834,714	402,863,154	53,069,163			2,060,241	20,746,424
1964	268,737,503	39,402,293	400,796,562	58,648,561	28,245	47,063	2,002,562	20,419,487
1965	250,183,633	43,149,171	311,249,250	48,666,933	7,289,125	12,405,344	2,165,403	21,498,581
1966	211,490,107	34,436,934	305,124,440	47,666,540	17,094,927	27,606,061	2,151,804	20,778,934
1967	208,131,894	31,432,079	262,830,908	39,248,539	17,517,543	31,183,064	2,154,443	20,820,765
1968	231,627,618	32,782,257	299,396,264	43,550,181	19,799,793	32,552,722	2,094,745	21,437,569
1969	210,072,565	33,693,539	296,667,033	46,639,024	26,597,477	47,999,442	2,074,854	19,787,845
1970	214,838,525	35,096,021	275,590,749	44,111,055	31,276,497	52,561,796	1,879,065	17,391,883
1971	248,827,301	34,711,408	305,451,243	49,745,789	21,884,729	36,954,846	1,929,868	18,153,612
1972	194,249,571	28,896,566	268,347,996	47,172,894	28,041,603	43,260,349	1,256,308	11,642,379
1973	186,680,656	30,400,945	302,874,331	62,564,751	30,390,928	52,260,232	1,568,912	12,906,063
Totals	16,458,073,374	1,441,949,395	15,297,732,440	1,549,368,185	199,952,170	336,877,117	31,061,008	281,470,018

Table 7A—Mineral Production by Mining

Division	Period	Placer Gold		Metals	Industrial Minerals	Structural Materials
		Quantity	Value			
		Oz.	$	$	$	$
Alberni	1972			13,346,043		253,026
	1973			21,420,321		269,777
	To date	1,617	33,253	165,925,543	9,398	4,558,483
Atlin	1972	66	1,848	15		
	1973					
	To date	735,880	17,390,960	38,047,207	20,325	338,241
Cariboo	1972	505	21,066	33,965,284	52,073	3,511,618
	1973			102,783,546	9,520	3,257,752
	To date	2,611,006	54,187,492	208,747,445	444,801	26,968,816
Clinton	1972					773,614
	1973					265,564
	To date	10,171	248,089	848,377	162,427	3,841,050
Fort Steele	1972			65,467,594	676,489	610,689
	1973			81,813,392	1,335,105	549,098
	To date	20,531	468,450	2,872,419,075	20,813,789	9,716,081
Golden	1972				1,482,485	163,141
	1973			694,430	1,114,009	144,956
	To date	469	11,268	64,167,109	15,420,584	3,709,242
Greenwood	1972			6,605,815		250,704
	1973			11,485,995		140,114
	To date	5,074	115,662	206,299,338	2,327,897	2,326,772
Kamloops	1972			38,791,982		5,166,248
	1973			156,640,027		5,879,052
	To date	27,595	604,785	364,142,323	6,540,538	34,453,827
Liard	1972	112	3,732	15	21,182,310	1,289,689
	1973				21,464,462	1,356,571
	To date	50,296	1,251,883	11,236,439	255,519,816	13,120,767
Lillooet	1972				142,800	62,059
	1973				7,200	87,709
	To date	92,946	1,925,633	148,167,256	473,095	3,336,572
Nanaimo	1972			43,036,964	141,336	4,252,048
	1973			102,993,184	137,379	5,072,086
	To date	866	19,360	358,364,329	1,952,731	73,580,160
Nelson	1972			7,075,291	506,465	642,903
	1973			15,124,539	719,592	723,622
	To date	3,586	89,028	369,459,051	2,938,020	8,200,039
New Westminster	1972			5,752,173	80,000	14,849,901
	1973			5,222,764		18,729,144
	To date	31,355	595,910	60,678,684	1,611,625	193,669,556
Nicola	1972			21,296,539		266,451
	1973			32,257,587		130,386
	To date	234	4,764	257,217,089	10,050	2,044,800
Omineca	1972			34,330,377	88,729	1,096,719
	1973			96,240,750	295,101	311,027
	To date	56,481	1,503,680	384,286,322	744,008	13,632,995
Osoyoos	1972			33,895,891	89,159	718,952
	1973			48,486,539	73,878	402,232
	To date	240	5,466	189,656,377	6,586,660	4,220,830
Revelstoke	1972			1,029,821		153,939
	1973			489,380		308,698
	To date	7,582	164,477	15,450,737		3,217,015
Similkameen	1972			9,975,651		81,535
	1973			37,326,864		90,986
	To date	45,507	878,204	167,500,715	18,558	4,322,904
Skeena	1972			33,266,658		1,867,340
	1973			74,483,155		1,801,043
	To date	4,603	105,569	468,816,186	1,240,215	18,802,453
Slocan	1972			1,793,497		80,129
	1973			1,083,373		238,592
	To date	366	9,397	275,855,150		2,258,010
Trail Creek	1972			523,542		270,434
	1973			61,209		53,508
	To date	851	24,260	90,347,066		3,649,127
Vancouver	1972			8,838,521		10,010,701
	1973			12,495,830		11,658,387
	To date	182	5,306	288,950,493	7,066,964	145,441,193
Vernon	1972					1,140,765
	1973			4,046	32,584	955,658
	To date	2,732	72,885	339,159	88,062	8,816,643
Victoria	1972			381,993	210	14,477,864
	1973			3,701,997	495	17,184,268
	To date	628	15,680	20,771,523	190,366	231,770,067
Not assigned	1972	8	259	12,628,099	1,822,114	4,755,129
	1973	3,831	311,524	9,074,535	2,780,533	3,336,803
	To date	1,529,359	17,574,039	343,042,973	60,993,788	47,849,507
Totals	1972	691	26,905	872,006,865	25,764,120	66,745,698
	1973	3,831	311,524	807,644,458	27,969,664	73,447,031
	To date	5,240,107	97,300,473	6,870,935,916	385,173,217	863,845,150

Divisions, 1972 and 1973, and Total to Date

Coal		Petroleum and Natural Gas: Crude Oil and Condensates		Natural Gas Delivered to Pipe-line		Butane and Propane		Division Total
Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	
Tons	$	Bbl.	$	MSCF	$	Bbl.	$	$
								13,599,069
								21,690,098
								170,526,677
								1,863
								55,796,733
								37,550,041
								106,030,826
290	1,100							290,349,654
								773,614
								265,584
								5,094,923
6,014,035	65,909,040							132,663,762
7,632,983	87,972,689							171,670,984
80,812,437	500,010,387							2,903,427,782
								1,645,626
								1,953,395
								83,308,203
								6,856,019
								11,626,112
								211,169,669
								43,958,330
								156,519,079
15,087	59,765							405,801,238
11,687	116,870	24,953,687	63,771,606	379,969,499	41,616,824	820,951	256,548	128,237,594
		22,448,968	68,936,302	427,586,208	46,688,912	1,309,802	406,038	138,852,285
111,120	816,391	244,246,418	556,941,819	2,990,984,716	312,820,618	11,276,699	3,589,284	1,155,296,517
								204,859
								94,909
								153,902,611
								47,430,348
								108,202,649
74,324,471	301,144,744							735,161,264
								8,224,759
								16,567,753
								380,686,136
								20,682,074
								23,951,898
								256,555,775
								21,562,990
								32,387,973
2,929,584	11,080,836							270,357,539
476	4,300							35,520,125
268	3,216							97,350,094
502,204	3,419,724							403,586,729
								34,703,502
								48,962,449
1,122	5,008							200,474,341
								1,183,760
								798,078
								18,832,229
								10,057,186
								37,417,850
4,617,442	19,553,725							192,274,106
								35,133,998
								76,284,198
36	116							488,964,489
								1,878,626
								1,302,465
								278,122,557
								793,976
								114,715
								94,020,453
								18,849,222
								24,154,217
								441,463,956
								1,140,765
								992,288
								9,316,749
								14,860,067
								20,886,760
								252,747,636
								18,705,601
								15,503,395
								469,460,307
6,026,198	66,030,210	24,953,687	63,771,606	379,969,499	41,616,824	820,951	256,548	636,217,776
7,633,251	87,976,105	22,448,968	68,936,302	427,586,208	46,688,912	1,309,802	406,038	1,113,550,034
163,813,793	836,091,796	244,246,418	556,941,819	2,990,984,716	312,820,618	11,276,699	3,589,284	9,926,698,273

Table 7B—Production of Lode Gold, Silver, Copper, Lead, and Zinc by Mining Divisions, 1972 and 1973, and Total to Date

Division	Period	Lode Gold		Silver		Copper		Lead		Zinc		Division Total
		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	
		Oz.	$	Oz.	$	Lb.	$	Lb.	$	Lb.	$	$
Alberni	1972	12,175	700,269	515,692	857,720	13,271,070	5,950,615	3,143,057	467,561	29,046,100	5,106,014	13,082,179
	1973	22,326	2,174,820	1,303,361	3,344,685	5,294,044	4,406,445	7,074,269	1,152,045	47,235,160	9,757,367	20,835,362
	To date	401,737	16,591,143	4,254,738	8,545,395	76,249,146	41,584,359	16,231,596	2,590,788	265,267,288	44,195,533	113,417,218
Atlin	1972			9	15							15
	1973											
	To date	344,197	12,126,732	3,377,136	2,895,683	24,777,661	8,160,266	23,765,211	3,437,907	91,067,749	10,864,497	37,485,085
Cariboo	1972			62	103	73,184,560	32,815,225					32,815,328
	1973			139	357	122,519,440	101,977,831	1,358	221	3	1	101,978,410
	To date	1,202,251	43,847,296	147,114	109,726	195,706,352	134,793,976	26,213	3,993	508	20	178,255,011
Clinton	1972											
	1973											
	To date	23,390	827,328	31,586	14,237	57,548	5,905	193	7			847,477
Fort Steele	1972	1,200	69,020	3,153,902	5,245,695	4,269,661	1,914,473	183,121,753	27,241,192	165,704,460	29,129,187	63,599,567
	1973	2,270	221,125	3,175,239	8,148,298	7,069,838	5,884,509	173,174,162	28,201,413	181,498,373	37,492,118	79,947,463
	To date	11,171	531,786	246,532,655	185,373,587	11,368,091	7,805,175	13,816,109,774	1,171,516,300	10,426,288,538	965,515,799	2,330,742,647
Golden	1972											
	1973	49	4,773	94,183	241,692			1,319,922	214,950	1,028,619	212,482	673,897
	To date	360	14,698	4,418,892	4,108,795	1,171,455	367,261	257,421,116	25,828,198	832,850,211	32,666,809	62,985,761
Greenwood	1972	15,847	911,472	761,240	1,266,125	9,513,777	4,265,882	520,873	77,485	442,438	77,776	6,598,740
	1973	18,267	1,779,425	549,917	1,411,197	9,787,477	8,146,509	442,851	72,118	347,858	71,857	11,481,106
	To date	1,356,004	34,025,690	42,859,014	35,424,494	570,243,211	131,914,942	24,639,703	2,516,899	24,186,153	2,321,667	206,203,692
Kamloops	1972	1,776	102,150	309,449	514,688	85,136,686	38,174,439	2,968	442	736	129	38,791,848
	1973	763	74,325	595,571	1,528,354	172,787,350	143,817,823	17,104	2,785	10,908	2,253	145,425,540
	To date	67,264	2,418,198	2,436,391	4,339,615	596,083,092	351,849,299	558,169	48,257	449,667	32,208	358,687,577
Liard	1972			9	15							15
	1973											
	To date	114	4,120	1,087	1,416	21,835,659	11,227,802	16,375	2,736	1,773	286	11,236,360
Lillooet	1972											
	1973											
	To date	4,185,568	147,358,931	987,067	719,635	400	41	62,513	2,548	15	2	148,081,157
Nanaimo	1972	44,458	2,067,991	268,327	446,291	76,965,707	34,510,654					37,514,036
	1973	52,652	5,128,837	328,904	544,034	110,619,575	92,073,087					98,046,068
	To date	331,284	15,219,313	2,385,899	3,507,475	352,187,394	196,510,952					215,237,740
Nelson	1972			279,126	464,254			1,532,786	228,017	21,192,454	3,725,421	4,417,692
	1973	238	23,184	198,121	508,418			10,478,335	1,706,397	37,269,679	7,698,798	9,936,797
	To date	1,341,520	42,022,311	10,297,842	8,404,561	14,915,495	1,689,196	510,336,386	65,286,532	1,403,687,674	190,065,337	307,567,937
New Westminster	1972					2,218,935	994,948					994,948
	1973					1,598,048	1,330,119					1,330,119
	To date	4,472	114,376	15,119	7,729	23,874,799	10,831,390	28,425	1,119	12,755	481	10,955,095
Nicola	1972					46,064,025	20,654,649					20,654,649
	1973					37,954,633	31,591,159					31,591,159
	To date	9,931	285,391	276,458	135,632	547,721,236	254,762,002	2,241,499	91,282	323,889	10,977	255,285,284
Omineca	1972	17,118	984,576	262,542	436,070	31,154,210	13,960,236	279,042	41,510	2,352,634	413,570	15,845,562
	1973	43,500	4,237,422	483,283	1,240,227	76,801,735	63,925,156	156,686	25,516	7,854,926	1,622,592	71,050,913
	To date	151,052	8,423,233	11,113,622	10,744,167	282,424,141	144,854,282	29,861,040	3,832,527	43,089,803	6,144,950	173,999,159

		Oz.	$	Oz.	$	Lb.	$	Lb.	$	Lb.	$	$
Osoyoos	1972	4,270	245,598	280,779	467,003	32,742,731	14,681,513					15,394,114
	1973	3,791	369,289	260,073	667,399	33,466,245	27,855,294	14,181	2,309	3,799	785	28,895,076
	To date	1,677,166	51,417,099	3,805,269	6,818,433	130,554,061	74,709,223	553,992	69,415	242,769	35,582	133,049,752
Revelstoke	1972											
	1973	69	6,721	9,533	24,464			28,647	4,665	12,987	2,683	38,533
	To date	37,369	1,075,981	4,118,830	2,793,627	153,686	51,037	86,106,249	8,862,697	27,140,063	8,314,578	11,097,020
Similkameen	1972	14,482	832,961	64,274	106,903	20,151,625	9,036,787					9,975,651
	1973	29,055	2,830,306	121,925	338,546	41,038,168	34,157,709	1,535	250	257	53	37,326,864
	To date	227,554	9,990,715	4,416,308	3,028,940	662,387,431	154,331,479	393,637	15,137	80,455	5,258	167,371,529
Skeena	1972	9,166	527,201	505,476	840,728	52,025,093	23,327,531					24,695,460
	1973	14,014	1,365,132	746,841	1,916,543	75,609,249	62,932,602	2,342	381	619	123	66,214,786
	To date	2,477,605	64,352,700	71,425,779	49,200,181	912,424,849	235,263,208	60,003,590	5,488,734	17,198,939	2,541,781	356,796,554
Slocan	1972	21	1,208	452,929	753,330			3,099,790	461,125	3,071,882	540,006	1,755,669
	1973	18	1,753	209,018	536,882			1,537,493	250,381	1,215,407	251,067	1,039,583
	To date	17,216	510,021	78,098,536	56,349,959	13,662	1,861	1,128,518,785	107,197,585	951,819,358	106,030,165	270,089,541
Trail Creek	1972	13	748	752	1,251			2,882	429	8,618	1,515	3,943
	1973	290	28,249	7,428	19,062			21,283	3,466	50,502	10,432	61,209
	To date	2,985,246	63,383,378	3,681,497	2,123,385	122,561,732	18,245,404	172,952	16,523	193,546	28,318	83,797,003
Vancouver	1972	50	2,876	95,314	158,530	19,351,718	8,677,115					8,838,521
	1973			100,855	258,814	14,701,944	12,237,016					12,495,830
	To date	499,482	16,195,495	5,544,990	4,167,104	1,107,807,356	234,527,969	18,570,027	1,883,516	238,340,360	30,973,086	287,747,170
Vernon	1972											
	1973	21	2,046	673	1,727			1,304	212	293	61	4,046
	To date	5,304	180,309	65,011	114,727	654	100	164,186	24,557	66,421	9,434	329,127
Victoria	1972	92	5,292	2,175	3,618	832,050	373,083					381,993
	1973	943	91,860	10,015	25,700	4,306,458	3,584,437					3,701,997
	To date	43,155	1,077,685	935,397	604,882	61,105,053	18,749,748	210,097	19,848	3,568,709	283,923	20,736,086
Not assigned[1]	1972	956	54,986	(26,021)	(43,279)	130,851	58,672	2,546,420	378,805	46,528,674	8,179,276	8,628,460
	1973	(2,280)	(222,099)	(523,575)	(1,343,598)	1,094,742	911,198	(7,590,819)	(1,236,164)	26,344,941	5,442,074	3,551,411
	To date	19,460	406,120	6,316,183	6,751,419	56,834,852	15,143,294	532,081,646	48,352,340	1,471,855,797	154,327,499	225,040,672
Totals	1972	121,624	6,995,448	6,926,036	11,519,660	467,012,694	209,403,822	194,249,571	28,806,566	268,847,996	47,172,894	303,988,390
	1973	185,986	18,117,268	7,681,514	19,712,301	714,648,946	594,830,904	156,680,656	30,400,945	302,874,331	62,564,751	725,626,169
	To date	17,419,872	531,060,049	507,543,315	396,374,754	5,721,958,926	2,047,380,171	16,458,073,374	1,441,949,395	15,297,732,440	1,549,368,185	5,967,032,554

[1] Metals recovered from operations at the Trail smelter but not assigned to individual mines. The minus quantities for gold, silver, and lead are bookkeeping adjustments between the Trail smelter input and output.

Table 7C—Production of Miscellaneous Metals by Mining Divisions, 1972 and 1973, and Total to Date

Division	Period	Antimony		Bismuth		Cadmium		Chromite		Iron Concentrates		Manganese		Mercury[1]	
		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
		Lb.	$	Lb.	$	Lb.	$	Tons	$	Tons	$	Tons	$	Lb.	$
Alberni	1972					104,204	263,864								
	1973					160,703	584,959								
	To date					944,894	2,873,614			4,732,817	49,634,711				
Atlin	1972														
	1973														
	To date					319,212	561,762								
Cariboo	1972														
	1973														
	To date														
Clinton	1972														
	1973														
	To date							126	900						
Fort Steele	1972					349,707	884,759			44,408	509,860				
	1973					386,023	1,405,124			14,397	106,970				
	To date					3,399,595	10,064,486			1,365,280	14,075,196				
Golden	1972														
	1973					5,641	20,533								
	To date	40,062	14,906			561,476	1,166,442								
Greenwood	1972					2,599	6,575								
	1973					1,344	4,892								
	To date					76,492	164,251	670	31,395						
Kamloops	1972					53	134								
	1973					65	237								
	To date					118	871			21,167	95,851			10,987	5,795
Laird	1972														
	1973														
	To date														
Lillooet	1972														
	1973													9,231	41,804
	To date	13,466	4,821							532,202	5,140,879				
Nanaimo	1972									520,022	3,864,296				
	1973									16,421,326	141,761,720				
	To date					193,000	490,000								
Nelson	1972					259,336	943,983								
	1973					8,186,003	18,559,463								
	To date														
New Westminster	1972														
	1973														
	To date									89,000	641,800				
Nicola	1972									38,798	666,428				
	1973									119,240	1,031,805				
	To date														
Omineca	1972					11,118	28,116								
	1973					14,868	54,123								
	To date	118,382	21,882			297,724	627,016							4,150,892	10,400,259

		Lb.	$	Lb.	$	Lb.	$	Tons	$	Tons	$	Tons	$	Lb.	$
Osoyoos	1972														
	1973														
	To date											16			
Revelstoke	1972														
	1973														
	To date	9,394	3,455			103,612	176,102								
Similkameen	1972														
	1973														
	To date														
Skeena	1972									640,632	5,350,250				
	1973									995,694	8,268,369				
	To date					141,890	316,764			8,400,628	73,968,310				
Slocan	1972					16,928	42,828								
	1973					6,673	24,290								
	To date	31,865	8,133			2,694,940	5,749,316					541	8,160		
Trail Creek	1972														
	1973														
	To date					115	210			550	1,925				
Vancouver	1972														
	1973														
	To date					566,006	1,203,328								
Vernon	1972														
	1973														
	To date					190	532								
Victoria	1972														
	1973														
	To date					7,000	10,929					1,167	24,508		
Not assigned[2]	1972	679,601	419,042	93,820	324,617	17,266	43,683								
	1973	1,660,331	1,192,118	2,851	13,058	(23,875)	(86,905)								
	To date	55,016,670	18,683,290	6,925,647	14,476,457	24,365,386	37,576,842								
Totals	1972	679,601	419,042	93,820	324,617	695,650	1,759,995			1,256,308	11,642,379				
	1973	1,660,331	1,192,118	2,851	13,058	810,779	2,951,236			1,568,912	12,906,063				
	To date	55,229,839	18,735,987	6,925,647	14,476,457	41,964,653	79,049,923	796	32,295	31,061,008	281,470,018	1,724	32,668	4,171,110	10,447,358

[1] From 1968, excludes production which is confidential.
[2] Metals recovered from operations at Trail smelter but not assigned to individual mines.

Table 7C—*Production* of *Miscellaneous* Metals by Mining Divisions, 1972 *and* 1973, and *Total* to Dare-Continued

Division	Period	Molybdenum		Nickel		Palladium		Platinum		Tin		Tungsten (WO_3)		Other, Value	Division Total
		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value		
		Lb.	$	Lb.		$	Oz.	$	Oz.	$	Lb.	$	Lb.	$	$
Alberni	1972														262,864
	1973														534,959
	To date														52,508,325
Atlin	1972														
	1973														
	To date														
Cariboo	1972	665,350	1,149,956									292	360		562,122
	1973	493,535	785,138												1,149,956
	To date	18,026,525	30,468,704					59	2,209			27,698	21,431		785,138
Clinton	1972														30,492,484
	1973														
	To date														
Fort Steele	1972														900
	1973									351,043	473,008				1,868,027
	To date									180,783	354,335				1,366,429
Golden	1972									19,035,808	17,448,562			88,1841	41,676,428
	1973														
	To date														20,533
Greenwood	1972														1,181,348
	1973														6,575
	To date														4,892
Kamloops	1972														195,646
	1973	3,385,000	5,214,250												134
	To date	3,478,995	5,352,729												5,214,487
Liard	1972														5,454,746
	1973														
	To date							2	79						79
Lillooet	1972														
	1973														
	To date	1,469	2,440					8	118			32,353	37,921		86,000
Nanaimo	1972	345,334	382,040												5,522,028
	1973	970,500	1,082,329												4,647,119
	To date	11,315,834	1,464,869												148,226,589
Nelson	1972											1,273,196	2,167,663		2,857,699
	1973											1,411,800	4,243,759		5,187,742
	To date	15,035	18,378									17,760,743	43,324,273		61,001,114
New Westminster	1972			3,240,483	4,601,486									155,7302	4,757,225
	1973			2,467,472	3,775,232									117,4032	3,892,635
	To date			49,033,039	49,347,348									376,2412	49,723,589
Nicola	1972														641,890
	1973														666,428
	To date														1,931,805
Omineca	1972	10,950,264	18,456,699												18,484,815
	1973	14,134,510	25,135,714												25,189,837
	To date	112,047,622	194,539,722					8	154			2,210,892	4,607,710	4202	210,287,163

		Lb.	$	Lb.	$	Oz.	$	Oz.	$	Lb.	$	Lb.	$	$	$
Osoyoos	1972	13,399,770	18,501,277												18,501,277
	1973	11,105,912	19,591,463												19,591,463
	To date	35,707,414	56,606,625												56,606,625
Revelstoke	1972	698,268	1,029,821												1,029,821
	1973	301,471	450,847												450,847
	To date	2,625,088	4,167,573									7,784	5,687		4,852,817
Similkameen	1972														
	1973														
	To date							1,287	129,186						129,186
Skeena	1972	1,680,025	3,220,948												8,571,198
	1973														8,263,369
	To date	23,084,581	37,732,288									366	331	1,3898	112,019,582
Slocan	1972														42,828
	1973														24,290
	To date														5,765,609
Trail Creek	1972	302,592	519,599												519,599
	1973														
	To date	3,644,193	6,514,289			749	80,462	53	3,177						6,550,063
Vancouver	1972														
	1973														
	To date														1,208,828
Vernon	1972														
	1973														
	To date	5,414	9,500												10,032
Victoria	1972														
	1973														
	To date														35,487
Not assigned	1972													3,212,297	3,999,639
	1973									123,944	242,930			4,161,923	5,523,124
	To date									123,944	242,930			47,028,282	118,002,801
Totals	1972	28,041,603	43,260,349	3,240,483	4,601,486					351,043	473,908	1,278,196	2,167,603	3,368,036	88,017,475
	1973	30,390,928	52,260,232	2,467,472	3,775,232					804,727	597,265	1,411,300	4,243,759	4,279,326	82,218,289
	To date	199,952,170	336,877,117	49,933,039	49,347,348	749	80,462	1,407	135,008	19,159,752	17,691,492	20,040,128	48,087,713	47,489,516	903,903,362

[1] Magnesium, page A 21.
[2] Cobalt, page A 17.
[3] Selenium, page A 24.

Table 7D—Production of Industrial Minerals by

Division	Period	Asbestos		Barite[1]		Diatomite		Fluxes (Quartz and Limestone)		Granules (Quartz, Limestone, and Granite)	
		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
		Tons	$	Tons	$	Tons	$	Tons	$	Tons	$
Alberni	1972										
	1973										
	To date										
Atlin	1972										
	1973										
	To date										
Cariboo	1972					1,475	52,073				
	1973					565	9,526				
	To date					12,308	201,321			48	168
Clinton	1972										
	1973										
	To date										
Fort Steele	1972										
	1973										
	To date			8	80						
Golden	1972			44,237	395,289						
	1973										
	To date			439,150	4,489,227			3,259	12,612		
Greenwood	1972										
	1973										
	To date							1,790,502	1,540,319	200	4,000
Kamloops	1972										
	1973										
	To date									625	12,230
Liard	1972	105,807	20,870,241								
	1973	108,966	21,102,892								
	To date	1,227,098	239,205,584								
Lillooet	1972										
	1973										
	To date										
Nanaimo	1972							31,579	59,036	3,800	82,300
	1973							42,936	75,478	3,068	61,903
	To date							980,436	1,495,629	25,877	457,102
Nelson	1972									18,747	506,485
	1973									26,799	719,592
	To date							7,601	8,174	109,435	2,873,945
New Westminster	1972									3,706	80,000
	1973										
	To date									109,669	1,611,625
Nicola	1972										
	1973										
	To date										
Omineca	1972										
	1973									3	286
	To date									3	286
Osoyoos	1972									10,905	89,159
	1973									4,283	73,678
	To date							802,611	3,699,031	203,381	2,555,158
Similkameen	1972										
	1973										
	To date										
Skeena	1972										
	1973										
	To date							601,019	1,050,722		
Vancouver	1972										
	1973										
	To date									29,692	418,606
Vernon	1972										
	1973							3,200	30,400	168	2,184
	To date							3,200	30,400	1,800	53,684
Victoria	1972							21	210		
	1973							42	495		
	To date							271	3,060	9,605	157,080
Not assigned	1972										
	1973										
	To date										
Totals	1972	105,807	20,870,241	44,237	395,289	1,475	52,073	31,600	59,246	37,158	757,924
	1973	108,966	21,102,892			565	9,526	46,225	106,371	34,321	857,643
	To date	1,227,096	239,205,584	439,158	4,489,307	12,308	301,321	4,188,899	7,839,947	490,335	8,143,884

[1] From 1972, excludes production which is confidential.
Other: *See* notes of individual minerals listed alphabetically on pages A 16 to A 25.

[2] Natro-alunite.
[3] Hydromagnesite.
[4] Volcanic ash.
[5] Magnesium sulphate.
[6] Sodium carbonate.
[7] Phosphate rock.

Mining Divisions, 1972 and 1973, and Total to Date

Gypsum and Gypsite		Jade		Mica		Sulphur		Other, Value	Division Total
Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value		
Tons	$	Lb.	$	Lb.	$	Lb.	$	$	$
								9,3982	9,398
								20,3258	20,325
									52,073
									9,526
				10,013,800	143,012			3004	444,801
873	6,236							156,1913 5 6	162,427
						81,597	676,439		676,439
						89,007	1,335,105		1,335,105
112,878	298,824					1,238,139	20,497,991	16,8947	20,813,789
388,815	1,087,196								1,482,485
365,249	1,114,009								1,114,009
3,820,324	10,917,469							1,2768 9	15,420,584
								783,57810	2,327,897
1,246,918	6,323,178			424,700	2,075			203,0555 6	6,540,535
		2,934	3,689			56,627	805,550		21,162,516
		3,444	4,793			60,661	356,777		21,464,462
		48,741	69,800			872,768	16,243,932		255,519,316
		192,450	142,800						142,800
		28,050	7,200						7,200
		558,624	467,966					5,1299	473,095
									141,336
									137,379
									1,952,731
									506,465
									719,592
								55,9018	2,938,020
									80,000
									1,611,625
2,407	10,050								10,050
		48,341	88,729						88,729
		122,757	294,815						295,101
		554,755	732,262					11,46011 12	744,008
									89,159
									73,678
				1,588,800	25,938			306,5335 10 11	6,586,660
250	1,700							16,85813	18,558
				634,250	10,815	41,624	178,678		1,240,215
						687,596	6,550,969	97,3898	7,066,964
									32,584
				160,500	3,978				88,062
									210
									495
								30,2269	190,366
						159,483	1,322,114		1,322,114
						166,367	2,495,505	285,028	2,780,533
						5,357,542	60,703,847	289,941	60,933,788
388,815	1,087,196	243,725	235,218			297,707	2,306,933		25,764,120
365,249	1,114,009	154,251	306,803			916,035	4,137,387	285,028	27,969,664
5,183,650	17,557,457	1,162,130	1,270,028	12,822,050	185,818	8,197,669	104,175,417	2,004,454	385,173,217

8 Iron oxide and ochre.
9 Talc.
10 Fluorspar.
11 Arsenious oxide.
12 Perlite.
13 Bentonite.

Table 7E—Production of Structural Materials by Mining Divisions, 197.2 and 1973, and Total to Date

Division	Period	Cement	Lime and Limestone	Building-stone	Rubble, Riprap, and Crushed Rock	Sand and Gravel	Clay Products	Unclassified Material	Division Total
		$	$	$	$	$	$	$	$
lberni	1972				5,168	247,858			253,026
	1973				6,136	283,641			289,777
	To date				345,646	4,212,837			4,558,483
tlin	1972								
	1973								
	To date		1,108		102,453	234,680			338,241
ariboo	1972		224,853		382,149	2,836,516	68,100		3,511,618
	1973		235,229		350,433	2,672,090			3,257,752
	To date		1,249,023		3,306,828	22,080,508	332,457		26,968,816
linton	1972				530,614	243,000			773,614
	1973				70,124	195,440			265,564
	To date				1,853,909	1,987,141			3,841,050
ort Steele	1972				102,430	508,259			610,689
	1973				49,260	499,838			549,098
	To date		43,873	71,941	2,626,189	6,958,160	15,918		9,716,081
olden	1972				6,453	153,801	2,887		163,141
	1973				36,723	100,648	7,585		144,956
	To date		1,000	50,840	245,663	3,283,580	128,159		3,709,242
reenwood	1972			200		250,504			250,704
	1973					140,114			140,114
	To date		42,560	138,336	278,474	1,746,119	121,283		2,326,772
amloops	1972	2,617,842			872,572	1,675,934			5,166,348
	1973	3,823,520			602,509	1,453,023			5,879,052
	To date	9,822,024	25,067	19,800	9,992,158	14,522,399	72,379		34,453,827
ard	1972				152,380	1,137,309			1,289,689
	1973				256,097	1,100,474			1,356,571
	To date				1,711,601	11,409,166			13,120,767
looet	1972				29,558	32,501			62,059
	1973				33,495	54,214			87,709
	To date		100	2,000	1,100,403	2,234,069			3,336,572
naimo	1972		2,806,033		261,617	1,184,398			4,252,048
	1973		2,976,915		397,390	1,697,781			5,072,086
	To date		54,889,469	3,450,735	3,057,688	11,003,276	1,178,992		73,580,160
son	1972		203,549	966	1,418	436,970			642,903
	1973		293,802	2,448	3,172	424,200			723,622
	To date		1,021,639	434,012	549,291	6,173,123	21,974		8,200,039
v Westminster	1972		102,175		991,023	9,185,040	4,571,663		14,849,901
	1973		102,523		1,515,500	11,921,303	5,189,218		18,729,144
	To date		3,318,910	20,974	17,984,297	94,436,162	77,909,213		193,669,556
ola	1972					266,451			266,451
	1973					130,386			130,386
	To date			8,000	187,754	1,849,046			2,044,800
ineca	1972		8,119		154,253	939,347			1,096,719
	1973		8,575		119,450	688,002			811,027
	To date		16,042		2,410,274	11,201,405	5,274		13,632,995
yoos	1972				68,498	650,454			718,952
	1973				17,685	384,547			402,232
	To date		43,774	33,018	338,757	3,805,281			4,220,830
elstoke	1972				29,694	124,245			153,939
	1973			5,200	66,644	236,854			308,698
	To date		1,000	10,775	580,221	2,625,019			3,217,015
lkameen	1972				5,250	76,285			81,535
	1973					90,986			90,986
	To date	10,500	11,571	24,000	656,847	3,606,631	13,355		4,322,904
na	1972				126,948	1,740,392			1,867,340
	1973				59,615	1,741,428			1,801,043
	To date		1,645,300	144,000	3,318,726	13,681,178	13,249		18,802,453
un	1972				810	79,319			80,129
	1973				20,457	218,135			238,592
	To date		1,000	115,143	152,060	1,989,807			2,258,010
Creek	1972				150,000	120,434			270,434
	1973				2,400	51,106			53,506
	To date		82,500	85,520	381,393	3,149,714			3,649,127
ouver	1972	6,683,954			6,561	3,320,186			10,010,701
	1973	6,619,264			466,271	4,572,852			11,658,387
	To date	79,646,882	40,885	4,012,560	8,659,593	51,992,681	1,088,592		145,441,193
on	1972				59,430	1,081,335			1,140,765
	1973					955,658			955,658
	To date		46,499	97,852	394,404	8,116,634	161,254		8,816,643
ria	1972	11,712,316	18,108		17,526	2,108,725	621,099		14,477,864
	1973	14,492,840	21,828		8,200	2,267,915	393,487		17,184,268
	To date	191,908,028	988,511	55	528,243	28,060,750	10,284,480		231,770,067
ssigned	1972				78,196	4,676,933			4,755,129
	1973				78,448	3,258,355			3,336,803
	To date		315,498	505,018	1,011,570	36,864,422	2,180,828	5,972,171	47,849,507
Totals	1972	21,014,112	3,357,927	1,166	4,032,548	33,076,196	5,263,749		66,745,698
	1973	24,935,624	3,633,870	7,648	4,160,009	35,119,590	5,590,290		73,447,031
	To date	281,887,434	63,785,329	9,224,579	61,774,442	347,223,788	94,527,407	5,972,171	863,845,150

Table 8A—Production of Coal, 18364973

Year	Quantity[1] (Short Tons)	Value	Year	Quantity[1] (Short Tons)	Value
		$			$
1836–59	41,871	149,548	1918	2,575,275	12,833,994
1860	15,956	56,988	1919	2,433,540	11,975,671
1861	15,427	55,096	1920	2,852,535	13,450,169
1862	20,292	72,472	1921	2,670,314	12,836,013
1863	23,906	85,380	1922	2,726,793	12,880,060
1864	32,068	115,528	1923	2,636,740	12,678,548
1865	36,757	131,276	1924	2,027,843	9,911,935
1866	28,129	100,460	1925	2,541,212	12,168,905
1867	34,988	124,956	1926	2,406,094	11,650,180
1868	49,286	176,020	1927	2,553,416	12,269,135
1869	40,098	143,208	1928	2,680,608	12,633,510
1870	33,424	119,372	1929	2,375,060	11,256,260
1871	55,458	164,612	1930	1,994,493	9,435,650
1872	55,458	164,612	1931	1,765,471	7,684,155
1873	55,459	164,612	1932	1,614,629	6,523,644
1874	91,334	244,641	1933	1,377,177	5,375,171
1875	123,362	330,435	1934	1,430,042	5,725,133
1876	155,895	417,576	1935	1,278,380	5,048,864
1877	172,540	462,156	1936	1,352,301	5,722,502
1878	191,348	522,538	1937	1,446,243	6,139,920
1879	270,257	723,903	1938	1,388,507	5,565,069
1880	299,708	802,785	1939	1,561,084	6,280,956
1881	255,760	685,171	1940	1,662,027	7,088,265
1882	315,997	846,417	1941	1,844,745	7,660,000
1883	238,895	639,897	1942	1,996,000	8,237,172
1884	441,358	1,182,210	1943	1,854,749	7,742,030
1885	409,468	1,096,788	1944	1,931,950	8,217,966
1886	365,832	979,908	1945	1,523,021	6,454,360
1887	462,964	1,240,080	1946	1,439,092	6,732,470
1888	548,017	1,467,903	1947	1,696,350	8,680,440
1889	649,411	1,739,490	1948	1,604,480	9,765,395
1890	759,518	2,034,420	1949	1,621,268	10,549,924
1891	1,152,590	3,087,291	1950	1,574,006	10,119,303
1892	925,495	2,479,005	1951	1,573,572	10,169,617
1893	1,095,690	2,934,882	1952	1,402,313	9,729,739
1894	1,134,509	3,038,859	1953	1,384,138	9,528,279
1895	1,052,412	2,824,687	1954	1,308,284	9,154,544
1896	1,002,268	2,693,961	1955	1,332,874	8,986,501
1897	999,372	2,734,522	1956	1,417,209	9,346,518
1898	1,263,272	3,582,595	1957	1,085,657	7,340,339
1899	1,435,314	4,126,803	1958	796,413	5,937,860
1900	1,781,000	4,744,530	1959	690,011	5,472,064
1901	1,894,544	5,016,398	1960	788,658	5,242,223
1902	1,838,621	4,832,257	1961	919,142	6,802,134
1903	1,624,742	4,332,297	1962	825,339	6,133,986
1904	1,887,981	4,953,024	1963	850,541	6,237,997
1905	2,044,931	5,511,861	1964	911,326	6,327,678
1906	2,126,965	5,548,044	1965	950,763	6,713,590
1907	2,485,961	7,637,713	1966	850,821	6,196,219
1908	2,362,514	7,356,866	1967	908,790	7,045,341
1909	2,688,672	8,574,884	1968	959,214	7,588,989
1910	3,314,749	11,108,335	1969	852,340	6,817,155
1911	2,541,698	8,071,747	1970	2,644,056	19,559,669
1912	3,211,907	10,786,812	1971	4,565,242	45,801,936
1913	2,713,535	9,197,460	1972	6,026,198	66,030,210
1914	2,237,042	7,745,847	1973	7,633,251	87,976,105
1915	2,076,601	7,114,178			
1916	2,583,469	8,900,675	Totals	163,313,793	836,091,796
1917	2,436,101	8,484,343			

[1] Quantity from 1836 to 1909 is gross mine output and includes material lost in picking and washing. For 1910 and subsequent years the quantity is that sold and used.

Table 8B—Coal Production and Distribution by Collieries and by Mining Divisions, 1973

Mine	Raw Coal Production	Clean Coal Production	Coal Used		Sales						Total Coal Sold and Used	
			Under ompanies' Boilers, Etc.	Making Coke	Canada		United States	Japan	Others	Total Sales	Amount	Value
					British Columbia	Other Provinces						
Fort Steele Mining Division	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	$
Coleman Collieries Ltd.—												
Tent Mountain Colliery	65,735	51,016	.....	.....	.....	.....	.....	51,016	.....	51,016	51,016	602,849
Fording Coal Ltd.	3,793,571	2,390,206	-	-	.....	.....	224	2,295,998	.....	2,296,222	2,296,222	22,962,217
Kaiser Resources Ltd.—												
Michel Colliery	7,002,659	5,330,848	4,200	247,542	74,690	.....	.....	4,959,313	.....	5,034,003	5,285,745	64,407,823
Liard Mining Division												
Coalition Mining Ltd.	32,674[1]	.....	-	-	.....	.....	.....	.....	.....	.....	.....	.....
Omineca Mining Division												
Bulkley Valley Colliery Ltd.	300	268	.....	.....	268	.....	.....			268	268	3,216
Totals	10,894,939	7,772,338	4,200	247,542	74,958	.....	224	7,306,327	.....	7,381,509	7,633,251	87,976,105

[1] Total production stockpiled.

Table 9—Principal Items of Expenditure, Reported for Operations of All Classes

Class	Salaries and Wages	Fuel and Electricity	Process Supplies
	$	$	$
Metal-mining	129,861,201	24,571,180	89,177,645
Exploration and development	40,310,892		
Coal	25,921,971	4,891,996	5,824,199
Petroleum and natural gas (exploration and production)	6,079,535		
Industrial minerals	7,734,832	2,175,990	2,497,991
Structural-materials industry	11,969,164	5,111,545	6,340,814
Totals, 1973	221,877,595	36,750,711	103,840,649
Totals, 1972	199,351,449	31,115,621	77,092,955
1971	179,175,692	23,166,904	68,314,944
1970	172,958,282	19,116,672	59,846,370
1969	123,450,327	14,554,123	43,089,559
1968	113,459,219	13,818,326	38,760,203
1967	94,523,495	13,590,759	34,368,856
1966	93,409,528	12,283,477	28,120,179
1965	74,938,736	11,504,343	30,590,631
1964	63,624,559	10,205,861	27,629,953
1963	57,939,294	10,546,806	12,923,325
1962	55,522,171	9,505,559	14,024,799
1961	50,887,275	8,907,034	17,787,127
1960	52,694,818	7,834,728	21,496,912
1959	49,961,996	7,677,321	17,371,638
1958	48,933,560	8,080,989	15,053,036
1957	56,409,036	8,937,567	24,257,177
1956	57,266,026	9,766,777	22,036,839
1955	51,890,246	9,144,054	21,131,572
1954	48,702,746	7,128,669	19,654,724
1953	55,543,490	8,668,099	20,979,411
1952	62,256,631	8,557,845	27,024,500
1951	52,607,171	7,283,051	24,724,101
1950	42,738,035	6,775,998	17,500,663
1949	41,023,786	7,206,637	17,884,408
1948	38,813,506	6,139,470	11,532,121
1947	32,160,338	5,319,470	13,068,948
1946	26,190,200	5,427,458	8,367,705
1945	22,620,975	7,239,726	5,756,628
1944	23,131,874	5,788,671	6,138,084
1943	26,051,467	7,432,585	6,572,317
1942	26,913,160	7,066,109	6,863,398
1941	26,050,491	3,776,747	7,260,441
1940	23,391,330	3,474,721	6,962,162
1939	22,357,035	3,266,000	6,714,347
1938	22,765,711	3,396,106	6,544,500
1937	21,349,690	3,066,311	6,845,330
1936	17,887,619	2,724,144	4,434,501
1935	16,753,367	2,619,639	4,552,730

NOTE—This table has changed somewhat through the years, so that the items are not everywhere directly comparable. Prior to 1962 lode-mining referred only to gold, silver, copper, lead, and zinc. Prior to 1964 some expenditures for fuel and electricity were included with process supplies. Process supplies (except fuel) were broadened in 1964 to include "process, operating, maintenance, and repair supplies . . . used in the mine/mill operations; that is, explosives, chemicals, drill steel, bits, lubricants, electrical, etc. . . . not charged to Fixed Assets Account . . . provisions and supplies sold in any company operated cafeteria or commissary." Exploration and development other than in the field of petroleum and natural gas is given, starting in 1966.

Table 10—Employment in the Mineral Industry, 1901–1973

Year	Metals							Coal Mines			Structural Materials		Industrial Materials	Petroleum and Natural-gas Exploration and Development	Total
	Placer	Mines: Under	Mines: Above	Exploration and Development	Concentrators	Smelters	Total	Under	Above[1]	Total	Quarries and Pits	Plants			
1901	.....	2,736	1,212	.....	.....	.....	3,948	3,041	933	3,974	.....	.....	.....	.....	7,922
1902	.....	2,219	1,126	.....	.....	.....	3,345	3,101	910	4,011	.....	.....	.....	.....	7,356
1903	.....	1,662	1,088	.....	.....	.....	2,750	3,187	1,127	4,264	.....	.....	.....	.....	7,014
1904	.....	2,143	1,163	.....	.....	.....	3,306	3,278	1,175	4,453	.....	.....	.....	.....	7,759
1905	.....	2,470	1,240	.....	.....	.....	3,710	3,127	1,280	4,407	.....	.....	.....	.....	8,117
1906	.....	2,680	1,303	.....	.....	.....	3,983	3,415	1,390	4,805	.....	.....	.....	.....	8,788
1907	.....	2,704	1,239	.....	.....	.....	3,943	2,862	907	3,769	.....	.....	.....	.....	7,712
1908	.....	2,567	1,127	.....	.....	.....	3,694	4,482	1,641	6,078	.....	.....	.....	.....	9,767
1909	.....	2,184	1,070	.....	.....	.....	3,254	4,713	1,705	6,418	.....	.....	.....	.....	9,672
1910	.....	2,472	1,287	.....	.....	.....	3,709	5,903	1,855	7,758	.....	.....	.....	.....	11,467
1911	.....	2,435	1,159	.....	.....	.....	3,594	5,212	1,661	6,873	.....	.....	.....	.....	10,467
1912	.....	2,472	1,364	.....	.....	.....	3,836	5,275	1,855	7,130	.....	.....	.....	.....	10,966
1913	.....	2,773	1,505	.....	.....	.....	4,278	4,950	1,721	6,671	.....	.....	.....	.....	10,949
1914	.....	2,741	1,433	.....	.....	.....	4,174	4,267	1,465	5,732	.....	.....	.....	.....	9,906
1915	.....	2,709	1,435	.....	.....	.....	4,144	3,708	1,283	4,991	.....	.....	.....	.....	9,135
1916	.....	3,357	2,036	.....	.....	.....	5,393	3,694	1,366	5,060	.....	.....	.....	.....	10,453
1917	.....	3,290	2,198	.....	.....	.....	5,488	3,760	1,410	5,170	.....	.....	.....	.....	10,658
1918	.....	2,626	1,764	.....	.....	.....	4,390	3,658	1,769	5,427	.....	.....	.....	.....	9,817
1919	.....	2,513	1,746	.....	.....	.....	4,259	4,145	1,821	5,966	.....	.....	.....	.....	10,225
1920	.....	2,074	1,605	.....	.....	.....	3,679	4,191	2,158	6,349	.....	.....	.....	.....	10,028
1921	.....	1,355	975	.....	.....	.....	2,330	4,722	2,163	6,885	.....	.....	.....	.....	9,215
1922	.....	1,510	1,289	.....	.....	.....	2,749	4,712	1,932	6,644	.....	.....	.....	.....	9,393
1923	.....	2,102	1,516	.....	.....	.....	3,618	4,842	1,807	6,140	.....	.....	.....	.....	9,767
1924	.....	2,358	1,680	.....	.....	.....	4,033	3,894	1,524	5,418	.....	.....	.....	.....	9,451
1925	.....	2,298	2,840	.....	.....	.....	5,138	3,828	1,615	5,443	.....	.....	.....	.....	10,581
1926	299	2,606	1,735	.....	808	2,461	7,610	3,757	1,565	5,322	493	324	124	.....	14,172
1927	415	2,671	1,916	.....	854	2,842	8,283	3,646	1,579	5,225	647	138	122	.....	14,830
1928	355	2,707	2,469	.....	911	2,748	8,835	3,814	1,520	5,334	412	368	120	.....	15,424
1929	341	2,926	2,052	.....	968	2,948	8,892	3,675	1,358	5,028	492	544	268	.....	15,565
1930	425	2,318	1,260	.....	852	2,197	7,605	3,389	1,256	4,645	843	344	170	.....	14,082
1931	638	1,463	884	.....	881	3,157	6,035	2,957	1,125	4,082	460	526	380	.....	12,171
1932	874	1,855	900	.....	542	2,036	4,833	2,628	980	3,608	536	329	344	.....	10,524
1933	1,134	1,786	1,335	.....	531	2,436	6,088	2,241	853	3,094	376	269	408	.....	11,369
1934	1,122	2,726	1,729	.....	631	2,890	8,046	2,050	843	2,893	377	187	360	.....	12,985
1935	1,291	2,740	1,497	.....	907	2,771	7,915	2,145	826	2,971	536	270	754	.....	13,737
1936	1,124	2,952	1,840	.....	720	2,678	8,197	2,015	799	2,814	931	288	825	.....	14,179
1937	1,371	3,663	1,818	.....	1,168	3,027	9,616	2,286	867	3,153	724	327	938	.....	16,129
1938	1,303	3,549	2,266	.....	919	3,158	10,192	2,088	874	2,962	900	295	369	.....	16,021
1939	1,252	3,905	2,050	.....	996	3,187	10,138	2,167	809	2,976	652	311	561	.....	15,890
1940	1,004	3,928	2,104	.....	1,048	2,944	10,019	2,175	699	2,874	827	334	647	.....	15,705
1941	939	3,901	1,823	.....	1,025	3,072	9,821	2,229	494	2,723	766	413	422	.....	15,084
1942	489	2,920	1,504	.....	960	3,555	8,939	1,892	468	2,360	842	378	262	.....	13,270
1943	212	2,394	1,699	.....	891	2,835	7,819	2,240	611	2,851	673	326	567	.....	12,448
1944	255	1,896	1,825	.....	849	2,981	7,551	2,150	689	2,839	690	351	628	.....	12,314
1945	209	1,933	1,750	.....	822	2,834	7,389	1,927	503	2,430	921	335	586	.....	11,820
1946	347	1,918	1,817	.....	672	2,813	7,220	1,773	532	2,305	827	555	679	.....	11,933
1947	360	3,024	2,238	.....	960	3,461	9,683	1,694	731	2,425	977	585	869	.....	14,899
1948	348	3,143	2,429	.....	1,126	3,884	10,582	1,594	872	2,466	1,591	656	754	.....	16,397
1949	308	3,034	2,724	.....	1,203	3,763	10,724	1,761	545	2,306	2,120	542	626	.....	16,621
1950	327	3,399	2,415	.....	1,259	3,759	10,832	1,745	516	2,261	1,916	616	660	.....	16,612
1951	205	3,785	3,695	.....	1,307	4,044	12,831	1,462	463	1,925	1,783	628	491	.....	17,868
1952	230	4,171	3,923	.....	1,516	4,120	15,780	1,280	401	1,681	1,530	557	529	.....	18,257
1953	182	3,145	2,589	.....	1,371	3,901	11,006	1,154	396	1,550	1,909	559	634	.....	15,790
1954	199	2,644	2,526	.....	1,120	3,119	9,412	1,078	356	1,434	1,861	688	584	.....	14,128
1955	103	2,564	2,558	.....	1,091	3,304	9,512	1,100	378	1,478	1,646	641	722	.....	14,102
1956	105	2,637	2,827	.....	1,043	3,339	9,846	968	398	1,366	1,598	770	854	.....	14,539
1957	67	2,393	2,447	.....	838	3,328	9,008	1,020	360	1,380	1,705	625	474	.....	13,257
1958	75	1,919	1,809	.....	625	3,061	7,484	826	260	1,086	1,483	677	446	.....	11,201
1959	99	1,937	1,761	.....	618	3,008	7,324	765	291	1,056	1,357	484	459	.....	10,779
1960	86	1,782	1,959	.....	648	3,034	7,423	894	288	1,182	1,704	557	589	.....	11,541
1961	74	1,785	1,582	.....	626	3,118	7,111	705	237	942	1,828	508	571	.....	11,034
1962	85	1,877	1,976	270	949	3,856	8,228	548	228	776	1,523	481	517	.....	11,560
1963	45	1,713	2,012	450	850	3,239	8,264	501	247	748	900	460	528	.....	10,952
1964	5	1,839	1,967	772	822	3,281	8,681	446	267	713	1,293	444	509	.....	11,645
1965	2	1,752	2,019	786	965	3,529	9,051	405	244	649	1,079	422	639	441	12,283
1966	2	2,006	2,296	1,894	1,014	3,654	10,864	347	267	614	1,269	393	582	478	14,202
1967	.....	1,928	2,532	1,264	992	3,435	10,151	260	197	457	1,309	372	584	507	13,380
1968	.....	1,823	2,369	3,990	1,072	3,283	12,537	195	358	553	1,207	380	582	400	15,659
1969	7	1,794	2,470	4,270	1,099	3,468	13,101	245	455	700	1,097	549	567	416	16,437
1970	.....	2,160	3,167	4,964	1,331	3,738	15,860	242	1,033	1,275	740	647	627	437	19,086
1971	.....	2,073	3,058	4,040	1,513	3,481	14,165	444	1,013	1,457	846	794	666	495	18,423
1972	.....	1,883	3,463	4,201	1,784	3,353	14,584	214	1,771	1,985	1,116	800	527	458	19,470
1973	.....	1,704	4,005	3,392	2,394	3,390	14,885	265	1,951	2,216	898	802	667	454	19,922

[1] Commencing with 1967, does not include employment in by-product plants.

NOTE—These figures refer only to company employees and do not include the many employees of contracting firms.

Table 11-Employment at Major Metal and Coal Mines, 1973

	Tons		Days Operating Mill	Average Number Employed[1]					
	Mined	Milled		Administrative, Etc.	Mine		Mill	Others	Total
					Surface	Underground			
Metal Mines									
Anaconda Canada Ltd. (Britannia)	547,193	548,801	249	77	50	151	25	—	303
Bethlehem Copper Corp. Ltd. (Bethlehem)	6,233,986	6,339,122	365	52	192	—	142	7	393
Bradina Joint Venture (Silver Queen)	58,976	98,278	263	8	3	41	8	—	60
Brenda Mines Ltd. (Brenda)	8,969,900	8,867,805	324	91	128	—	170	—	389
Canex Placer Ltd. (Endako)	10,279,000	8,446,000	313	119	81	—	250	—	450
Canex Placer Ltd. (Invincible)	106,266	106,763	271	28	10	32	13	—	83
Coast Copper Co. Ltd. (Old Sport)[2]	—	—	—	2	2	—	—	—	4
Cominco Ltd. (H.B.)	351,682	351,682	319	22	23	61	11	—	117
Cominco Ltd. (Sullivan)	2,214,415	2,214,415	233	192	73	453	175	—	893
Consolidated Churchill Copper Corp. Ltd. (Magnum)	13,471	—	—	7	—	17	—	—	24
Consolidated Columbia River Mines Ltd. (Ruth Vermont)	26,957	26,957	84	4	(3)	—	10	—	14
Craigmont Mines Ltd. (Craigmont)	1,405,612	1,429,556	257	102	101	152	36	5	396
Giant Mascot Mines Ltd. (Pride of Emory)	352,758	352,758	254	42	31	99	24	2	198
Gibraltar Mines Ltd. (Gibraltar)	15,225,000	15,082,233	365	120	161	—	268	—	549
Granduc Operating Co. Ltd. (Granduc)	2,797,948	2,797,948	365	201	221	263	54	—	739
The Granby Mining Co. Ltd. (Phoenix)	187,947	1,003,815	365	26	68	—	46	2	142
Granisle Copper Ltd. (Granisle)	4,614,664	4,545,105	365	58	94	—	142	—	294
Jordan River Mines Ltd. (Sunro)	273,628	273,628	334	21	—	73	36	—	130[4]
Kam-Kotia-Burkam Joint Venture (Silomac)	14,066	14,157	229	2	4	16	7	6	35
King Resources Co. (Mount Copeland)	21,761	21,761	120	8	—	8	3	7	26
Lornex Mining Corp. Ltd. (Lornex)	13,987,000	13,987,000	365	181	116	—	326	22	645
Noranda Mines Ltd. (Bell)	4,191,931	4,114,324	365	75	41	—	131	—	247
Placid Oil Co. (Bull River)	262,395	206,812	305	14	25	—	10	—	49
Reeves MacDonald Mines Ltd. (Annex)	191,438	191,438	252	18	18	71	12	—	119
Similkameen Mining Co. Ltd. (Similkameen)	5,356,829	5,356,829	365	72	167	—	53	—	292
Teck Corporation Ltd. (Highland Bell)	38,467	37,202	350	6	7	17	9	—	39
Texada Mines Ltd. (Texada)	1,072,623	1,029,189	365	21	71	76	32	—	200
Utah Mines Ltd. (Island Copper)	12,041,332	12,071,446	365	38	435	—	243	—	716
Wesfrob Mines Ltd. (Tasu)	1,781,379	1,781,379	365	50	19	1	95	—	165
Western Mines Ltd. (Lynx and Myra)	354,240	354,240	363	53	53	152	38	—	296
Other mines	—	—	—	33	10	21	25	7	96
Total metal mines	—	—	—	—	—	—	—	—	8,103
Coal Mines									
Coalition Mining Ltd. (Sukunka)	32,674	—	—	—	10	26	—	—	36
Fording Coal Ltd.	3,793,571	—	365	122	420	—	118	—	660
Kaiser Resources Ltd. (Michel Collieries)	7,002,659	—	326	162	933	239	186	—	1,520
Total coal mines	—	—	—	—	—	—	—	—	2,216

[1] The average number employed includes wage-earners and salaried employees. The average is obtained by adding the monthly figures and dividing by 12, irrespective of the number of months worked.

[2] Ceased production in November 1972, shipped from stockpile.

[3] Mine employment under contract, no details available.

[4] Estimated.

Table 12—Metal Production, 1973

Property or Mine	Location of Mine	Owner or Agent	Ore Shipped or Treated	Product Shipped	Gross Metal Content					
					Gold	Silver	Copper	Lead	Zinc	Cadmium
			Tons		Oz.	Oz.	Lb.	Lb.	Lb.	Lb.
Alberni Mining Division										
Lynx and Myra mines	Buttle Lake	Western Mines Ltd.	354,240	Copper concentrates, 10,191 tons; lead concentrates, 8,334 tons; zinc concentrates, 47,790 tons	22,326	1,329,960	7,506,797	8,389,066	55,971,577	229,576
Atlin Mining Division										
Nil										
Cariboo Mining Division										
Providence	Blackbear Creek	Walt. Pederson Enterprise, St. Cloud, Minn.	3	Crude ore		142		1,386	6	
Gibraltar mine	McLeese Lake	Gibraltar Mines Ltd.	15,082,233	Copper concentrates, 217,464 tons; molybdenite concentrates, 412 tons, containing 493,535 lb. of molybdenum			124,694,080			
Clinton Mining Division										
Nil										
Fort Steele Mining Division										
Bull River mine	Wardner	Placid Oil Co.	206,812	Copper concentrates, 14,423 tons	1,766	88,692	7,214,068			
Sullivan mine	Kimberley	Cominco Ltd.	2,214,415	Lead concentrates, 126,684 tons; zinc concentrates, 201,656 tons; tin concentrates, 161 tons containing 180,783 lb. of tin; iron sinter, 14,397 tons	152	3,151,073	618,200	187,884,000	207,250,000	551,462
Rice (Quartz Mountain)	Sawmill Creek	Peter Lane, Cranbrook	1,373	Crude ore	352	275	2,363	5,738	2,746	
Golden Mining Division										
Ruth Vermont	Parson	Consolidated Columbia River Mines Ltd.	26,957	Lead concentrates, 1,161 tons; zinc concentrates, 1,134 tons	49	96,105	21,850	1,440,928	1,216,042	8,059
Greenwood Mining Division										
Burnt Basin	Paulson	Donna Mines Ltd.	164	Crude ore	34	42		563	328	
Fur, Flo (Doorn)	Beaverdell	Argentia Mines Ltd.	60	Crude ore	27	119		238	119	
Highland Bell mine	Beaverdell	Teck Corp. Ltd.	37,202	Lead concentrates, 1,020 tons; zinc concentrates, 318 tons; jig concentrates, 112 tons	417	459,883	1,157	457,724	453,047	1,920
Phoenix mine	Phoenix	The Granby Mining Co Ltd., Phoenix Copper Division	1,003,815	Copper concentrates, 18,786 tons	17,781	100,502	9,975,337			
Providence	Greenwood	W. E. MacArthur, Greenwood	53	Siliceous ore from dump	8	593	64	534	321	

Kamloops Mining Division										
Bethlehem	Highland Valley	Bethlehem Copper Corp. Ltd.	,339,122	Copper concentrates, 114,951 tons		176,000	73,301,000			
Lornex mine	Highland Valley	Lornex Mining Corp. Ltd.	,987,000	Copper concentrates, 154,414 tons, molybdenite concentrates, 6,315 tons containing 3,385,000 lb. of molybdenum	763	431,000	102,180,000			
Mosquito King, Ex.	Adams Plateau	Consolidated Giant Metallics Ltd.	220	Lead concentrates, 16 tons; zinc concentrates 11 tons		726		17,453	13,386	93
Liard Mining Division										
Magnum mine	Delano Creek	Consolidated Churchill Copper Corp. Ltd.		Ore stockpiled, 13,471 tons						
Lillooet Mining Division										
Nil										
Nanaimo Mining Division										
Island Copper mine	Port Hardy	Utah Mines Ltd.	,071,446	Copper concentrates, 228,104 tons; molybdenite concentrates, 1,105 tons containing 970,500 lb. of molybdenum; rhenium shipments are confidential	49,729	269,331	106,724,851			
Old Sport mine	Benson Lake	Coast Copper Co. Ltd.		Copper concentrates shipped from stockpile, 3,665 tons; mine ceased production in 1972	1,026	7,696	1,776,680			
Texada mine	Texada Island	Texada Mines Ltd.	,029,189	Iron concentrates, 520,022 tons; copper concentrates 9,716 tons	1,897	58,590	4,532,896			
Nelson Mining Division										
Annex	Nelway	Reeves MacDonald Mines Ltd.	191,438	Lead concentrates, 4,207 tons; zinc concentrates, 14,127 tons		159,543		5,641,590	15,748,032	161,477
Golden Age, Euphrates	Nelson	Robert Mines Ltd.	88	Test shipment	7	101	236	241	241	
Goodenough	Ymir	E. B. Carlson, L. Masura, P. Marchinck, Trail	44	Test shipment of siliceous ore	2	110		2,284	2,020	
H.B.	Salmo	Cominco Ltd.	351,682	Lead concentrates, 4,416 tons; zinc concentrates 24,250 tons	28	42,195		6,185,800	26,525,600	209,003
Invincible, East Dodger	Salmo, Iron Mountain	Canex Placer Ltd., Tungsten Division	106,763	Tungsten concentrates, 1,086 tons; containing 1,411,800 lb. of tungsten (WO_3)						
Nugget	Salmo	S. A. Endersby, White Rock	649	Siliceous ore from tailings	161	144		1,457	1,298	
Reno	Salmo	S. A. Endersby, White Rock	138	Siliceous ore from dump	39	14		275	275	
Ymir	Ymir	A. M. Gerun, Nelson (lessee)	49	Crude ore from dump	1	59	20	489	489	

Table 12—Metal Production, 1973—Continued

Property or Mine	Location of Mine	Owner or Agent	Ore Shipped or Treated	Product Shipped	Gross Metal Content					
					Gold	Silver	Copper	Lead	Zinc	Cadmium
New Westminster Mining Division					Oz.	Oz.	Lb.	Lb.	Lb.	Lb.
Pride of Emory mine	Hope	Giant Mascot Mines Ltd.	352,758	Nickel-copper concentrates, 14,746 tons containing 2,803,945 lb. nickel and 40,907 lb. of cobalt			1,880,057			
Nicola Mining Division										
Craigmont mine	Merritt	Craigmont Mines Ltd.	1,429,556	Copper concentrates, 65,103 tons; iron concentrates, 38,799 tons			38,605,663			
Omineca Mining Division										
Bell mine (Newman)	Babine Lake	Noranda Mines Ltd. (Bell Copper Division)	4,114,324	Copper concentrates, 75,200 tons	24,888		38,026,499			
Cronin mine	Smithers	Hallmark Resources Ltd.	2,000	Lead concentrates, 86 tons; zinc concentrates, 80 tons	11	8,125	2,967	92,732	109,195	1,122
Endako mine	Endako	Canex Placer Ltd. (Endako Mines Division)	8,446,000	Molybdenite concentrates, 3,098 tons; molybdenum trioxide, 7,905 tons; ferro-molybdenum, 1,015 tons; total content, 14,134,510 lb. of molybdenum						
Granisle mine	Babine Lake	Granisle Copper Ltd.	4,545,105	Copper concentrates, 56,844 tons	16,676	176,448	39,565,757			
Pinchi Lake mine	Pinchi Lake	Cominco Ltd.	(1)	Mercury						
Silver Queen	Houston	Bradina Joint Venture	98,278	Copper concentrates, 1,386 tons; zinc concentrates, 10,759 tons	1,913	301,573	543,780	1,181,214	8,617,475	20,120
Silver Standard mine	Hazelton	George Braum, New Hazelton	130	Lead-zinc concentrates 7 tons; crude ore, 80 tons	12	7,009		15,548	23,463	
Osoyoos Mining Division										
Brenda mine	Brenda Lake	Brenda Mines Ltd.	8,867,805	Copper concentrates, 62,985 tons; molybdenite concentrate, 9,837 tons containing 11,105,912 lb. of molybdenum	3,497	259,628	34,096,095			
Smuggler	Fairview	K. G. Ewers, Okanagan Falls	20	Crude ore	8	24		40	79	
Susie	Oliver	Hem Mines Ltd.	2,788	Crude ore	284	5,704		14,274	7,368	
Torres	Oliver	Topper Mining Ltd.	44	Siliceous ore	2	26		176	88	

Revelstoke Mining Division										
Mike	Ferguson	H. A. McGowan, Ferguson	2	Crude ore		25		430	1,448	
Mount Copeland mine	Revelstoke	King Resources Co.	21,761	Molybdenite concentrates, 271 tons containing 301,471 lb. of molybdenum						
Silver Cup, Towser	Ferguson	Pandora Management Ltd.	440	Crude ore	69	9,696		29,012	23,368	
Similkameen Mining Division										
Goldrop	Whipsaw Creek	Robert Dealy, Oliver	257	Crude ore	113	1,090		1,569	513	
Similkameen mine (Ingebelle)	Princeton	Similkameen Mining Co. Ltd.	5,356,829	Copper concentrates, 76,446 tons	28,942	133,528	41,802,628			
Skeena Mining Division										
Blue Grouse	Stewart	John Lehto, Stewart	4	Crude ore		582		2,390	1,237	
Granduc mine	Stewart	Granduc Operating Co.	2,797,948	Copper concentrates, 124,809 tons	11,004	651,373	69,553,559			
Red Cliff mine	Stewart	Adam Milling Ltd.	4,154[2]							
Tasu mine	Tasu Harbour	Wesfrob Mines Ltd.	1,781,379	Iron concentrates, 995,694 tons; copper concentrates, 18,308 tons	3,010	110,128	7,486,860			
Slocan Mining Division										
Best	New Denver	Thomas Eccles, Trail	10	Crude ore		145		416	250	
Bluebell	Riondell	D. Pearce, Nelson		Lead concentrates, 65 tons; salvage from Kootenay Bay		489		41,432	5,632	
Dublin Queen	New Denver	Fostall Mines Ltd.	8	Crude ore		407		6,562	2,540	
Enterprise	Slocan City	L. M. Fried, New Denver	67	Crude ore		1,917		17,836	24,165	
Freddy	Silverton	V. Hansen, New Denver	33	Crude ore	2	1,038		264	132	
Little Tim (V-Day)	Slocan City	Wayne Turley, Kaslo	2	Crude ore		369	31	450	320	
Marmion, Maryland	Slocan City	M. R. Maze, Castlegar	7	Crude ore	4	14		56	28	
Mary	Enterprise Creek	S. Berisoff, Silverton	14	Crude ore	5	143		1,833	291	
Nor	Ainsworth	H. McGowan, Ainsworth	74	Crude ore		522		863	1,554	
Ottawa	Springer Creek	Mike Poznikoff, Slocan City	28	Crude ore		8,620		307	128	
Silmonac (Minniehaha)	Sandon	Kam-Kotia and Burkam Joint Venture	13,949	Lead concentrates, 1,172 tons; zinc concentrates, 1,133 tons		190,133		1,436,333	1,386,171	9,533
Silver Hoard, Dellie, Little May	Ainsworth	R. B. Savage, Taghum	891	Crude ore	1	3,855		9,265	20,223	
Victor (Violamac)	Sandon	E. Peterson, New Denver	30	Crude ore	6	3,479		41,127	1,068	
Washington	Retallack, Three Forks	J. O. H. Nesbitt	17	Crude ore		2,152		25,824	1,007	
Trail Creek Mining Division										
Blue Bird	Rossland	Standonray Mines Ltd.	487	Crude ore	87	7,472		40,742	55,609	
I.X.L.	Rossland	J. A. Ruelle, Rossland	26	High-grade ore	131	31		52	52	
Midnight	Rossland	Consolidated Cinola Mines Ltd.	219	Crude ore		77		879	855	

[1] Details confidential.

[2] Produced 146 tons of copper concentrates, 8 tons of silver concentrates, and 4,000 tons of broken ore.

Table 12—Metal Production, 1973—Continued

Property or Mine	Location of Mine	Owner or Agent	Ore Shipped or Treated	Product Shipped	Gross Metal Content					
					Gold	Silver	Copper	Lead	Zinc	Cadmium
			Tons		Oz.	Oz.	Lb.	Lb.	Lb.	Lb.
Vancouver Mining Division										
Britannia mine	Howe Sound	Anaconda Canada Ltd.	548,801	Copper concentrates, 25,216 tons		102,913	14,954,100			
Vernon Mining Division										
Chaput	Lumby	Alberta Gypsum Ltd.	6	Mill salvage		262		477	432	
St. Paul	Monashee Mountain	W. Miller, Vernon	19	Silver concentrates, 5 tons; crude ore, 14 tons	21	424		854	153	
Victoria Mining Division										
Sunro mine	River Jordan	Jordan River Mines Ltd.	273,628	Copper concentrates, 9,137 tons	943	10,220	4,397,828			

Departmental Work

CHAPTER 3

APPOINTMENTS

John E. McMynn was appointed Deputy Minister of the Department of Mines and Petroleum Resources on May 1, 1973.

Dr. J. T. Fyles was appointed Associate Deputy Mister, Mineral Resources Branch, Department of Mines and Petroleum Resources, on September 1, 1973.

John D. Lineham was appointed Associate Deputy Minister, Petroleum Resources Branch, Department of Mines and Petroleum Resources, on September 1, 1973.

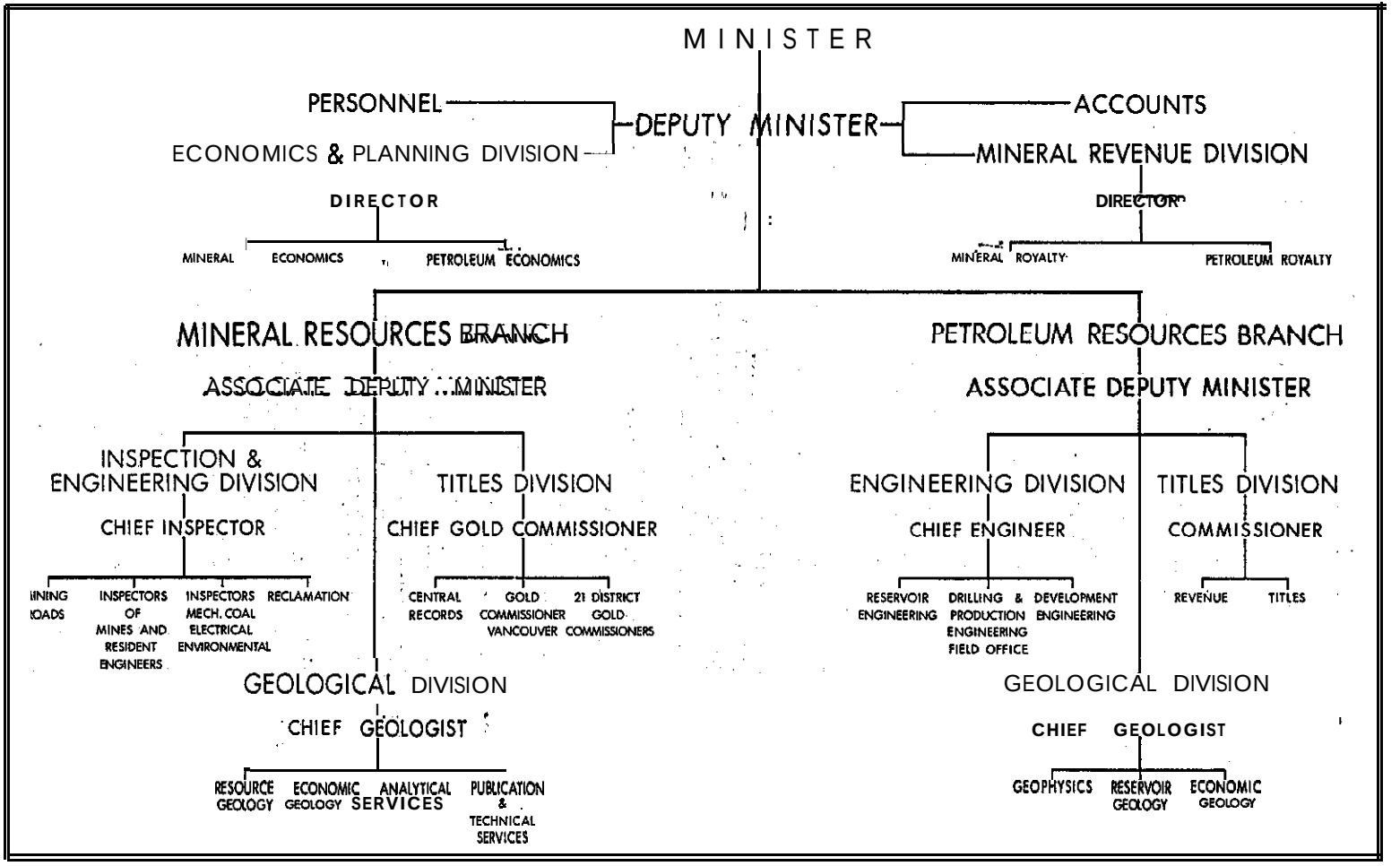
RETIREMENT

Stanley W. Metcalfe retired as Chief Analyst and Assayer on May 17, 1973, after serving 29 years with the Analytical Branch. Mr. Metcalfe was born in Nelson, where he received his early schooling. He attended the University of British Columbia and graduated with a master's degree in chemistry. While at university he did research work on explosives for the National Research Council. Prior to graduation he worked for the Department as an apprentice assayer and holds a certificate of efficiency in the practice of assaying. He was mine assayer at Zeballos and at Bayonne Consolidated Mines Ltd. He was employed as an assistant chemist by the British Columbia Cement Co. Ltd. He joined the Analytical Branch on May 15, 1944, as Senior Analyst and was promoted to Chief Analyst in 1958, a position he held until his early retirement. He is a member Of the Chemical Institute of Canada and the American Chemical Society.

ORGANIZATION

The organization of the Department of Mines and Petroleum Resources is displayed in the chart on page A 59. A major reorganization of the Department took place in 1973 and the establishment of new staff positions continued into 1974. The Department was divided into two branches, the Petroleum Resources Branch and the Mineral Resources Branch, with an Associate Deputy Minister in charge of each. The Petroleum Resources Branch assumed the work of the former Petroleum and Natural Gas Branch and Petrol&m and Natural Gas Titles of the office of the Chief Commissioner. The Mineral Resources Branch became responsible for the former Inspection Branch, the Mineralogical Branch, and the office of the Chief Gold Commissioner, which were renamed Inspection and Engineering Division, Geological Division, and Titles Division, each directed by a Division Chief. Similar divisions were established in the Petroleum Resources Branch as indicated in tbe accompanying chart. Sections within these divisions, which had been informally recognized previously, were formally established under a Senior Geologist, Inspector, or Engineer.

Two new divisions created at the time of reorganization of the Department in the latter part of the year are the Mineral Revenue Division and the Economics and Planning Division, to become fully operative in 1974. The Director of Mineral Revenue is H. Horn and the Director of Economics and Planning is J. S. Poyen. The function of the Mineral Revenue Division is to collect royalties under the *Petroleum and Natural Gas Act,* and *Mineral Royalties Act* to be introduced in 1974, and to collect taxes under the Mineral *Land Tax Act. The* purpose of the Economics and Planning Division is to be responsible for the collection, compilation, and analysis of statistical data for the mineral industry. This function, related to solid minerals, was formerly carried out by the Bureau of Economics and Statistics of the Department of Industrial Development, Trade, and Commerce. The Economics and Planning Division will also compile data on mineral commodities,


MINISTER
PERSONNEL
ECONOMICS & PLANNING DIVISION
DEPUTY MINISTER
ACCOUNTS
MINERAL REVENUE DIVISION
DIRECTOR
MINERAL ECONOMICS
PETROLEUM ECONOMICS
DIRECTOR
MINERAL ROYALTY
PETROLEUM ROYALTY
MINERAL RESOURCES BRANCH
ASSOCIATE DEPUTY MINISTER
PETROLEUM RESOURCES BRANCH
ASSOCIATE DEPUTY MINISTER
INSPECTION & ENGINEERING DIVISION
CHIEF INSPECTOR
TITLES DIVISION
CHIEF GOLD COMMISSIONER
ENGINEERING DIVISION
CHIEF ENGINEER
TITLES DIVISION
COMMISSIONER
MINING ROADS
INSPECTORS OF MINES AND RESIDENT ENGINEERS
INSPECTORS MECH. COAL ELECTRICAL ENVIRONMENTAL
RECLAMATION
CENTRAL RECORDS
GOLD COMMISSIONER VANCOUVER
21 DISTRICT GOLD COMMISSIONERS
RESERVOIR ENGINEERING
DRILLING & PRODUCTION ENGINEERING FIELD OFFICE
DEVELOPMENT ENGINEERING
REVENUE
TITLES
GEOLOGICAL DIVISION
CHIEF GEOLOGIST
GEOLOGICAL DIVISION
CHIEF GEOLOGIST
RESOURCE GEOLOGY
ECONOMIC GEOLOGY
ANALYTICAL SERVICES
PUBLICATION & TECHNICAL SERVICES
GEOPHYSICS
RESERVOIR GEOLOGY
ECONOMIC GEOLOGY

corporate structure and financing, and the marketing of minerals. It will initiate a variety of economic studies in both the solid mineral and petroleum and natural gas fields.

It is expected that a third new division under the Deputy Minister, called the Administrative Services Division, will be formed in 1974 and will complete the reorganization.

The reorganization was introduced to place greater emphasis on the technical aspects of petroleum and natural gas administration, to consolidate the collection of direct revenue from mineral development in one division of this Department, and to change the role of the Department.

NEW LEGISLATION

Iron Bounty Act and Copper Bounty Act—Both of these Acts were repealed at the Spring Session Of the Legislature.

Mineral Land Tax Act—This Act, introduced at *the* Spring Session of the Legislature, came into effect in January 1974. It provides for the taxation of land, the mineral rights to which are held by owners other than the Crown. Primarily this land consists of Crown-granted mineral claims and the railway land grants in which minerals are held by the grantee.

Three levels of taxation are imposed, one on nondesignated land, another on designated production areas, and a third on designated production tracts. On nondesignated land, owners will pay from 25 cents to $1 per acre, depending on the size of their holdings. On production areas, a tax of $2 per acre is levied, and on production tracts the tax is assessed at a mill rate specified by Order in Council but not exceeding 25 mills. This assessed value is related to value of production from within the tract. Provision is made for the surrender of mineral lands to the Crown.

Geothermal Resources Act--This Act, introduced at the Fall Session of the Legislature, reserves to the Crown the right to all geothermal resources within the Province.

PETROLEUM RESOURCES, BRANCH

The Petroleum Resources Branch *Was* established pursuant to the *Department of Mines and Petroleum Resources Act, as* amended during the Fall Session of the 1973 Legislative Assembly. In effect, the former Petroleum and Natural Gas Branch and the Petroleum and Natural Gas Titles Section of the former Administration Branch were combined to bring all matters concerning petroleum and natural gas under a single branch- The one exception is the administration of the royalty regulations, which was assumed by the Mineral Revenue Division of the Department.

The Petroleum Resources Branch, under the direction of the Associate Deputy Minister of Petroleum Resources, is responsible for the administration of the *Petroleum and Natural Gas Act, 1965* and the regulations made thereunder, including the Drilling and Production Regulations, the Geophysical Regulations, the Drilling Reservation Regulations, and the Development Road Regulations. It also administers the *Underground Storage Act, 1964. In general, the* Branch is responsible for all matters related to the disposition of Crown-owned petroleum and natural gas rights, and for the regulation, of exploration, development, and production activities conducted by the oil and gas industry.

The Branch is organized into three divisions, the Engineering Division, the Geological Division, and the Titles Division, which are supervised on an interim basis by A. J. Dingley, W. M. Young, and R. E. Moss respectively.

STAFF

On December 31, 1973, the professional and technical staff included the following:

HEADQUARTERS STAFF

J. D. Lineham, P.Eng.—Associate Deputy Minister and Chief of Branch
A. J. Dmgley, P.Eng.—Chief Engineer
w. L. Ingram, P.Eng.—Senior Development Engineer
B. T. Barber, P.Eng.—Senior Reservoir Engineer
P. S. Attariwala, P.Eng.—Reservoir Engineer
P. K. Huus—Reservoir Technician (Engineering)
M. B. Hamersley, C.E.T.—Development Technician (Engineering)
W. M. Young, P.Eng.—Chief Geologist
s. s. Cosburn, P.Eng.—Economic Geologist
T. B. Ramsay, P.Eng.—Economic Geologist
J. Y. Smith, P.Eng.—Economic Geologist
R. Stewart, P.Eng.—Reservoir Geologist
R. E. Moss—Chief commissioner
W. W. Ross—Assistant Commissioner

FIELD OFFICE, CHARLIE LAKE

D. L. Johnson, P.Eng.—District Engineer
T. B. Smith, P.Eng. (until Sept. 19)—Field Engineer
D. A. Selby—Field Technician (Engineering)
G. T. Mohler—Field Technician (Engineering)
W. B. Holland, C.E.T.—Field Technician (Engineering)
J. W. D. Kielo—Field Technician (Engineering)
G. L. Holland—Field Technician (Engineering)
J. L. Withers—Geophysical Technician (Engineering)

STAFF CHANGES

G. L. Holland, Field Technician (Engineering), joined the staff on January 22. T. B. Smith, Field Engineer; resigned effective September 19. J. L. Withers, Geophysical Technician (Engineering), joined the staff on October 15, W. W. Ross, Deputy Chief Petroleum and Natural Gas Commissioner, transferred to the Mineral Revenue Division as Assistant Director on December 5.

ENGINEERING DIVISION

The Engineering Division, under the direction of A. J. Diiey, Chief Engineer, consists of a Reservoir Engineering Section supervised by B. T. Barber and a Development Engineering Section supervised by W. L. Ingram.

The Reservoir Engineering Section is responsible for determination of reservoir and production characteristics of oil and gas pools in the Province. This involves interpretation of reservoir pressure; rock and fluid properties, and production data. These parameters are used to forecast ultimate recoveries obtainable from oil and gas accumulations in the Province, and the rates at which these volumes will be produced. The Section maintains files of reservoir data, obtained from both industry and Branch sources, and reviews such data for quality. Gil and gas allowable rates are set by the Section, and recommendations concerning proposed

improved recovery and produced fluid disposition schemes are made. The Section is concerned with technical aspects of matters affecting conservation and correlative rights.

The Development Engineering Section is responsible for all matters related to the location, drilling, completion, and abandonment of wells in the Province. This involves the assurance that operators of all wells drilled conform to the requirements of the Drilling and Production Regulations, which includes the submission c&prescribed forms and information.

GEOLOGICAL DIVISION

The Geological Division, under the direction of W. M. Young, is responsible for the preservation and evaluation of certain well data and the administration of the Branch well evaluation requirements. Data resulting from the drilling of wells, geophysical surveys, and other related sources in the Province in search for and development of accumulations of oil and gas are supplied to the Branch. These data are made use. of by staff geologists as a basis for reports on, and maps and cross-sections of, the economically important sedimentary rocks of the Province. The Division is responsible for providing data and opinion to attract and encourage the exploration and development of the petroleum resources of the Province.

All geological and geophysical reports submitted to the Branch in support of work requirements are assessed to ensure that the Department receives full value for credits or other benefits granted.

TITLES DIVISION

Petroleum and Natural Gas Titles Division, under the direction Of, R. E. Moss, Chief Commissioner, is responsible for the administration of the Petroleum and *Natural* Gas Act, 1965, which includes all matters related to and affecting title to Crown petroleum and natural gas rights and includes the collection of revenue from fees, rents, disposition, and royalties. Regulations governing geophysical operations and petroleum-development roads are also administered by the Chief Commissioner.

Information concerning all forms of title issued under the *Petroleum and Natural Gas* Act, *1965* may be obtained upon application to the office of the Chief Commissioner, Department of Mines and Petroleum Resources, Victoria. Maps showing the locations of all forms of title issued under the *Petroleum* and *Natural* Gas Act are available, and copies may be. obtained upon application to the office of the 'Department of Mines and Petroleum Resources, Victoria. Monthly land reports and monthly reports, listing additions and revisions to permit-location maps and listing changes in title to permits; licences, and leases, and related matters are available from the office of the Chief Commissioner upon application and payment of the require&fee.

BOARD OF ARBITRATION

Chairman: A. W. Hobbs, Q.C.
Vice-Chairman: S. G. Preston, P.Ag.
Member: J. D. Lineham, P.Eng.

The Board of Arbitration, established under the authority of the Petroleum *and Natural Gas Act, 1965,* grants right-of-entry to oil and gas companies Upon alienated land and determines condition of entry and compensation therefor. It also terminates the right-of-entry when a company has ceased to use the land.

In 1973, three applications for right-of-entry were submitted to the Board.

Two right-of-entry orders were issued and three were terminated after the parties reached agreement.

A hearing was held on December 11 at Fort St. John. The six cases scheduled to be heard were disposed in 1973 as follows: One compensation award order was issued; one award order was issued but the compensation quantum was set aside until both parties are heard in 1974; one compensation award order was pending at the end of the year awaiting inspection of the site; one compensation award order was pending awaiting establishment by the Board of the compensation; and two cases were set aside until 1974, one by request of the land-owner involved and the other due to the absence at the hearing of the land-owner.

Six cases were outstanding at the end of the year. These involve one where the award will be determined after weather conditions permit inspection of the site; one where the award will be determined after both parties have been heard again in 1974; one where both parties have been heard but the award has not been established; two where the cases were set aside to be heard in 1974; and one application received late in the year.

CONSERVATION COMMITTEE

The Conservation Committee, established on October 11, 1957, under the *Petroleum and Natural Gas Act, 1965*, is responsible to the Minister of Mines and Petroleum Resources. Its duties are as follows:

(1) To act as an advisory committee to the Minister on such questions of conservation that the Minister, in writing, shall refer to the Committee for consideration and recommendation.

(2) To deal with such questions of conservation and production in the various fields of British Columbia as may arise between two or more operators in the same field or between operators and the Branch when appeals on such questions are made to the Minister and referred by him to the Committee.

No officers are currently named for the Committee and it did not meet in 1973.

MINERAL RESOURCES BRANCH

GEOLOGICAL DIVISION

The function of the Geological Division is to provide information on the quantity and distribution of the coal and mineral resources of the Province and to assist in the orderly discovery, exploration, development, and use of these resources. To achieve these objectives the Division conducts the following major programmes:

(1) Produces and publishes geological maps and related laboratory studies of regions of high and moderate mineral potential.

(2) Examines and studies mineral and coal deposits.

(3) Collects, collates, stores, and disseminates geological and statistical data recording the activities of the industry in exploration and production.

(4) Makes mineral evaluation assessments of land and produces maps showing these evaluations for land use and planning purposes.

(5) Provides chemical analyses for Departmental studies and for bona fide prospectors.

(6) Supplies both general and specific information regarding mineral deposits, mineral resources, and the mineral industry to government, the general public, and to the industry.

Information produced or gathered by the Division is made available through a series of publications and also through public access to open files. The most important publications produced include the following:

(1) *Geology, Exploration and Mining in British Columbia*, an annual publication, includes summaries of all known exploration activities in the Province, developments at mines, and reports by departmental geologists on projects investigated by them. It includes chapters on metal mines, placer deposits, industrial minerals and structural materials, and coal.

(2) Bulletins produced at irregular intervals are authoritative reports by Division geologists prepared after completion of a mapping project and its related laboratory and office studies.

(3) Preliminary maps are issued to show significant progress on geological projects that are of current interest for exploration.

(4) Mineral Inventory maps showing the location of all known mineral deposits and commodities present.

(5) Mineral Deposit-Land Use maps which show an interpretation of the relative exploration potential of regions.

(6) Aeromagnetic maps, produced co-operatively with the Geological Survey of Canada which are useful as a guide to prospecting and to interpreting geology.

Staff

The professional staff are highly qualified academically, are experienced in the industry, and many are widely acknowledged experts in their fields. On December 31, 1973, the professional and technical staff included the following:

Stuart S. Holland, Ph.D., P.Eng.	Chief Geologist
A. Sutherland Brown, Ph.D., P.Eng.	Deputy Chief Geologist
N. C. Carter, M.Sc., P.Eng.	Senior Geologist
E. W. Grove, Ph.D., P.Eng.	Senior Geologist
W. M. Johnson, Ph.D.	Chief Analyst
P. F. Ralph, L.R.I.C.	Deputy Chief Analyst
B. N. Church, Ph.D., P.Eng.	Geologist
G. E. P. Eastwood, Ph.D., P.Eng.	Geologist
J. A. Garnett, Ph.D., P.Eng.	Geologist
E. V. Jackson, B.Sc., P.Eng.	Geologist
J. W. McCammon, M.A.Sc., P.Eng.	Geologist
W. J. McMillan, Ph.D., P.Eng.	Geologist
K. E. Northcote, Ph.D., P.Eng.	Geologist
A. Panteleyev, M.Sc., P.Eng.	Geologist
D. E. Pearson, Ph.D., P.Eng.	Geologist
V. A. Preto, Ph.D., P.Eng.	Geologist
A. F. Shepherd, B.A.Sc., P.Eng.	Geologist
R. I. Thompson, Ph.D., P.Eng.	Geologist
G. P. E. White, B.Sc., P.Eng.	District Geologist, Kamloops
T. G. Schroeter, M.Sc., P.Eng.	District Geologist, Smithers
G. L. James	Research Officer (Geology)
Miss Judith Winsby, B.Sc.	Research Officer (Geology)

N. G. Colvin.....Laboratory scientist
R. J. Hibberson, B.Sc.....Laboratory Scientist
B. Bhagwanani, B.Sc.....Laboratory Technician
M. A. Chaudhry.....Laboratory Technician
F. F. Karpick.....Assayer
L. E. Shepherd.....Laboratory Technician
Mrs. v. v. Vilkos, Ph.D.....Laboratory Technician

In addition to the staff, the Division has contracted for the services of G. L. Bell, M.Sc., P.Eng., as Coal Consultant, and of W. D. McCartney, Ph.D., P.Eng., and A, H. Matheson, B.Sc., to prepare the Mineral Deposit-Lana Use maps.

Staff Changes

Dr. E. W. Grove, a graduate of the University of British Columbia and McGill University, was appointed Senior Geologist, Economic Geology Section, in October 1973.

Dr. D. E. Pearson, a, graduate of the University of Wales and University College, Swansea, a former member of the Geological Survey of Saskatchewan, joined the staff in April 1973.

G. P. E. White, a graduate of the University of New Brunswick, joined the *staff* as *District* Geologist, Kamloops, *in* September 1973.

T. G. Schroeter, a graduate of the University of Western Ontario, joined the staff as District Geologist, Smithers, in October 1973.

Miss Judith Winsby, a graduate of the University of British Columbia, joined the staff as Research Officer (Geology) in May 1973.

George James joined the staff as Research Officer (Geology)' in May 1973.

The Analytical Laboratory had a large turnover of staff in 1973. Stanley Metcalfe retired from his position' as Chief Analyst, his secretary, Mrs. Lillian Collins, also retired, and Mrs. Elizabeth Juhasz transferred to the Engineering Division within the Forest Service.

Dr. Wesley M. Johnson took over as Chief Analyst and Paul Ralph joined the staff in May as Deputy Chief Analyst. Three new technicians were hired, one as a replacement for Mrs. Juhasz, and two to fill new positions created to cope with the expanding work load of the laboratory.: The new personnel are Dr. Verna Vilkos, B. Bhagwanani, and M. .A. Chaudhry.

ORGANIZATION

The Geological Division, Mineral Resources Branch, was called the Mineralogical Branch prior to the reorganization of the Department in 1973. The present name more closely defines its role. The Division consists of four sections, two operational and two service sections. These are the Economic Geology and Resource Geology Sections, supported by the Analytical Services and Publication and Technical Services Sections.

Resource Geology Section

The Resource Geology Section, under the direction of N. C. Carter,. undertakes office and field studies concerned with resource appraisal. The importance. of this section is that it provides an inventory of the mineral resource, monitors its activity, and appraises its potential. Adequate planning and administration of the

resource are impossible if these functions are not adequately performed. To fulfil these functions, in 1973 the Section conducted the following major programmes:

(1) Documentation of c-t exploration and mining activity and preparation of short reports for Geology, ***Exploration and Mining in British Columbia*** (by E. V. Jackson, Judith Winsby, and G. L. James).

(2) Compilation and updating the inventory of mineral deposits of the Province. The inventory now consists of approximately 6,500 deposits plotted on 1:250,000, or 1 'inch equals 2 miles maps with data concerning individual deposits entered on 8½ by 1 l-inch cards. The inventory is considered to be about 70 per cent complete.

(3) Preparation of Mineral Deposit-Land Use maps. These maps are based on the British Columbia Mineral Inventory plus interpretative appraisal of regional geology so as to produce maps at a scale of 1:250,000 of the varying mineral potential of the 'land, They are useful for planning purposes and as guides for exploration. Maps are finished for that part of British Columbia north of latitude 54 degrees and west of the Rocky Mountain Trench and for selected parts of the south (Dr. McCartney and A. H. Matheson).

(4) District Geologists assist in documenting current exploration activity in their districts, carry out selected field studies, provide liaison with Government intersector committees and with industry, as well as provide information and advice to prospectors (G. P. E. White and T. G. S&meter). These' District Geologists were only appointed in the autumn of 1973, but already have proved to be very effective in their roles.

(5) Appraisals of coal and nonmetallic mineral deposits are made by G. L. Bell and J. W. McCammon respectively. Field work for coal appraisal, was carried out by, Bell at all active coal properties and by McCammon at all sand and gravel pits on the Lower Mainland.

(6) Appraisals of 715 reports on mineral deposits submitted for assessment credits were carried out by Dr. G. E. P. Eastwood.

(7) Appraisals of proposed Park and Ecological Reserves were carried out by office and field studies by N. C. Carter with the aid of geologists familiar with specific areas. About 25 park proposals and 35 ecological reserves were dealt with. Two potential parks, Schoen Lake-Tsitika on Vancouver Island and Fish Egg Inlet on the central Mainland coast, required extensive field appraisals by Dr. Northcote and Dr. Pearson respectively.

Economic Geology Section

The Economic Geology Section, under the direction of Dr. E. W. Grove, is concerned with geological mapping and related laboratory and office studies of areas of moderate and high mineral potential. With nonrenewable resources such as mineral deposits, discovery must equal exploitation if the resource is not to be depleted. Most of the obvious outcropping ore deposits probably have been found, consequently, the discovery of the many additional covered, buried, or obscure ones will require sound geological deductions and 'advanced exploration techniques.

The importance of the studies of this Section is to provide maps and ideas necessary for intelligent and successful prospecting and exploration.

The Section consists of nine geologists who worked on the following major projects in 1973:

B. N. Church started mapping the volcanic rocks and the stratiform copper deposits of the Sustut area.

J. A. Garnett completed mapping of the southern Omineca intrusions and their copper and molybdenum deposits.

E. W. Grove continued a comparative study of massive sulphide deposits, with mapping at Granduc mine.

W. J. McMillan completed mapping of the Guichon Creek batholith and the porphyry copper and molybdenum deposits of the Highland Valley. On the same project, E. W. Grove completed the detailed sampling of this, the most copper-rich intrusive body known in the Province, to study the chemistry in relation to the origin of the known ore deposits and discovery of others.

K. E. Northcote continued his detailed study of the mineral deposits of Vancouver Island.

A. Panteleyev continued mapping the volcanic rocks, syenitic intrusions, and copper deposits of the Stikine area.

D. E. Pearson took over from R. I. Thompson in mapping of the volcanic rocks west of Harrison Lake and their copper deposits

V. A. Preto continued mapping volcanic and intrusive rocks between Princeton and Merritt that are noted for their abundant copper prospects.

R. I. Thompson completed mapping of the area and zinc deposits near Robb Lake in the northern Rocky Mountains.

In addition, N. C. Carter complete&his studies of the age and nature of porphyry copper and molybdenum deposits of west central British Columbia and A. Sutherland Brown mapped the Gibraltar mine. A number of smaller projects and preliminary work on future major projects were also conducted.

Analytical Services Section

The Analytical Services Section has functioned under the direction of the Chief of the Mineralogical Branch since January 1970, but was not folly integrated into the Geological Division until the reorganization of 1973. The laboratory, under the direction of Dr. W. M. Johnson, underwent considerable change in 1973, it being the culmination of three years of modernization, reorganization, and modest expansion. Chemical analyses for metals, major oxides, and trace elements for a most important part of information used by geologists of the Economic Geology Section and the capability of the new laboratory enables that Section to carry on an effective programme. The laboratory also performs analyses for other Government agencies and a limited number of analyses for prospectors.

The laboratory is equipped with an X-ray diffraction spectrometer, an emission spectrograph, two absorption spectrophotometers, and other analytical instruments. It also has the facilities to do both classical wet chemical analyses and noble metal analyses, using fire assaying techniques.

The laboratory, in its primary role of providing chemical data for the Economic Geology Section, is involved in two silt geochemical surveys and several large rock geochemical surveys, including the Guichon Creek batholith project. Other services for the geologists include X-ray mineral identification, mineral separations for age dating by K-Ar analysis, arc fusion for refractive index determinations, quantitative quartz and other mineral analyses, quantitative and semiquantitative

spectrochemical analyses, as well as the normal functions of total silicate, major oxide trace element, base and noble metal analyses.

Other work of the laboratory includes free assays for prospectors under the *Prospectors' Grub-stake Act* and up to five free analyses for any bona fide prospector.

The work load of the laboratory increased dramatically over the previous year, as can be seen in the following tabular summary.

WET AND FIRE ASSAY LABORATORIES

	Prospectors				Departmental Geologists	
	Nongrantees		Grantees			
	Number of Samples	Number of Determinations	Number of Samples	Number of Determinations	Number of Samples	Number of Determinations
1973	137	311	88	203	916	10,293
1972	156	295	62	125	301	1,677
1971	267	575	19	40	287	2,287

EMISSION SPECTROGRAPHIC LABORATORY

	Semiquantitative Prospectors (not reported)		Departmental Geologists		Quantitative Departmental Geologists	
	Nongrantees	Grantees	Reported	Not Reported	Number of Samples	Number of Determinations
1973	137	88	237	347	312	3,080
1972	150	62	47	78	98	680
1971	262	19	113	98	—	—

X-RAY LABORATORY
(Departmental Geologists)

	Per Cent Quartz	Mineral Indentification
1973	1,284	310
1972	460	165
1971		172

In addition, three samples of barite were analysed in the emission spectrographic and the wet chemical laboratories for the Treasury Department. Several miscellaneous samples were identified for members of the general public who brought samples into the laboratory. There were 543 samples crushed and arc-fused in preparation for refractive index measurements.

The increase in productivity of the laboratory during the year has been very large. This has been effected by new instrumentation, new methods and direction, and a modest increase in staff. Increased production occurred in every category and over all ranged from a 160-per-cent increase in output of determinations in prospectors' samples to 565 per cent for Departmental geologists. The laboratory is still very poorly housed, but were it to be accommodated in an efficient laboratory, increased productivity and even better accuracy could be expected. During the year many alternative plans for a new laboratory were considered without a final decision being reached by the Department of Public Works.

The laboratory also began participation in the Canadian Standard Reference Materials Project, which is co-ordinated by the Mineral Science Division of the Department of Energy, Mines, and Resources, Ottawa. The project involves the distribution of samples of chosen reference materials to participating laboratories for the analysis of specified elements. This is a continuing programme with new reference materials being established as tbe need arises. The laboratory is also participating in a similar project sponsored by the Institute of Geological Sciences of the United Kingdom.

Examinations for Assayers

Board of Examiners

W. M. Johnson - - - - - - - secretary
N. G. Colv... Member
F. F. Karpick Member

Examinations were held in June and December. In June, 12 candidates Were examined, of whom four passed and eight failed. In the December examination there were four candidates, two of whom were passed, one was failed, and one was granted a supplemental examination.

Publication and Technical Services Section

The Publication and Technical Services Section, under Dr. A. Sutherland Brown, carried out a variety of tasks to service the operation sections and laboratory; its main function nevertheless is to produce and publish maps and reports from manuscripts prepared by geologists whose labour is wasted unless put in permanent and reproducible form.

The following material was produced in 1973: Geology, *Exploration and Mining in British Columbia, 1972***; Bulletin 61, *Geology of the White Luke Basin,* by B. N. Church; Preliminary Map, No. 10, Preliminary *Geological Map of Aspen Grove Area,* by P. A. Christopher; Preliminary Map No. 11, *Preliminary Geological Map of the Buck Creek* Area, by B. N. Church; Preliminary Map. No. 12, *Preliminary Geological Map of the Northern Babine Lake Area,* by N. C. Carter; Preliminary Maps No. 13, *Geological Map of Own Lake-Goosly Lake Area,* by B. N. Church, and Petrochemical overlay maps "a" to "g" for the same area, by J. Barakso and B. N. Church.

Manuscript and map preparation for the above and other publications produced outside the Department were under the direction of Mrs. R. J. Moir and K. S. Crabtree respectively.

Technical services under the direction of A. F. Shepherd included the Departmental library, equipment, and lapidary service. Lapidary and photographic work is done by R. E. Player.

AEROMAGNETIC SURVEYS

The programme of airborne magnetometer mapping, jointly financed by the Geological Survey of Canada and the British Columbia Department of Mines and Petroleum Resources, continued in 1973. Twenty-eight map sheets lying between latitudes 49 degrees and 50 degrees 45 minutes north and longitudes 116 degrees and 1.20 degrees west were released during the year.

Maps released in former years as well as index maps showing the coverage by aeromagnetic mapping in British Columbia may be obtained from the British

* Delayed in publication.

Colombia Department of Mines and Petroleum Resources, Room 418, Douglas Building, Victoria, or the Geological Survey of Canada, 100 West Pender Street, Vancouver.

The basic data used in compiling the maps are on open file at the Geological Survey of Canada in Ottawa; where interested parties may arrange to obtain them for special processing.

INSPECTION AND ENGINEERING DIVISION

Inspectors stationed at the places listed below inspect coal mines, metal mines, and quarries in the districts shown on Figure 2. They also may examine prospects, mining properties, roads and trails, and carry out special investigations under the Mineral Act. The Environmental Control Inspectors conduct dust, ventilation, and noise surveys at all mines and quarries and, where necessary, make recommendations to improve environmental conditions. H. Bapty supervises the roads and trails programme and prospectors' grub-stakes. J. D. McDonald administers the reclamation sections of the *Coal Mines Regulation Act* and *Mines Regulation Act*. A. R. C. James is Senior Inspector, Coal, and has additional duties as mining adviser to the Securities Commission.

STAFF

Inspectors and Resident Engineers

J. W. Peck, Chief Inspector ..... Victoria
J. E. Merrett, Deputy Chief Inspector of Mines ..... Victoria
V. E. Dawson, Senior Inspector, Electrical-Mechanical ..... Victoria
A. R. C. James, Senior Inspector, Coal; Aid to Securities ..... Victoria
Harry Bapty, Senior Inspector,, Mining-roads ..... Victoria
J.. Cartwright, Inspector, Electrical ..... Victoria
J. D. McDonald, Senior Inspector, Reclamation ..... Victoria
John Dick, Reclamation Inspector ..... Victoria
S. Elias, Senior Inspector, Environmental Control ..... Vancouver
J. .W. Robinson, Inspector and Resident Engineer ..... Vancouver
W. C. Robinson, Inspector and Resident Engineer -- ..... Nanaimo
R. W. Lewis, Inspector and Resident Engineer --- ..... Fernie
David Smith, Inspector and Resident Engineer ..... Kamloops
E. *S&r, Inspector* and Resident Engineer ..... Kamloops
R. Heistad, Inspector-Technician, Mechanical ..... Kamloops
B. M. Dudas, Inspector and Resident Engineer ..... Prince Rupert
P. E. Olson, Inspector and Resident Engineer . ..... Nelson
D. I. R. Henderson, Inspector and Resident Engineer ..... Prince George
A. D. Tidsbury, Inspector and Resident Engineer ..... Prince George
J. F. Hotter, Inspector and Resident Engineer ..... Smithers
W. H. Childress, Technician, Noise Surveys ..... Vancouver

Co-ordinators, Mine-rescue Stations

E. C. Ingham, Co-ordiiator, Rescue Training ..... Prince George
G. J. Lee, Co-ordinator, Rescue Training ..... Nelson
A. Littler, Co-ordiiator, Rescue Training ..... Fernie
T. H. Robertson, Co-ordinator, Rescue Training ..... Nanaimo
J. A. Thomson, Co-ordiiator, Rescue Training ..... Kamloops

INSPECTORS

1 Mr. B. M. Dudas,
Court House,
Prince Rupert, B.C.

2 Mr. J. F. Hutter,
Box 877,
Smithers, B.C.

3 Mr. E. Sadar,
Fulton Field R.R. 1,
Kamloops, B.C.

4 Mr. D. Smith,
Fulton Field R.R. 1,
Kamloops, B.C.

5 Mr. P. E. Olson,
701 Front Street,
Nelson, B.C.

6 Mr. R. W. Lewis,
Box 1290,
Fernie, B.C.

7 Mr. J. W. Robinson,
2747 East Hastings Street,
Vancouver, B.C.

8 Mr. W. C. Robinson,
2226 Brotherstone Road,
Nanaimo, B.C.

9 Mr. D.I.R. Henderson,
1652 Quinn Street,
Prince George, B.C.

10 Mr. A. D. Tidsbury,
1652 Quinn Street,
Prince George, B.C.

11 Mr. T. M. Waterland,
Fulton Field R.R. 1,
Kamloops, B.C.

Staff changes

In March, John Dick, Reclamation Inspector, joined the headquarters staff, and in April, J. D. McDonald, Senior Reclamation Inspector, rejoined the staff to replace W. B. Montgomery on his retirement. In August, J. F. Hatter replaced W. G. Clarke as Inspector and Resident Engineer in Smithers. In October, R. Heistad joined the staff as Inspector of Mines-Technician, Mechanical, and resident at Kamloops.

T. M. Waterland was transferred to the Kamloops office to organize a survival rescue course and to revise other mine-rescue training course details.

BOARD OF EXAMINERS

Board of Examiners (Coal Mines Regulation Act)

J. W. Peck, Chairman ---------- Victoria
A. R. C. James, member ---------- Victoria
R. W. Lewis, member ---------- Fernie

The Board conducts written and practical examinations for the various certificates of competency under the provisions of sections 25 and 26 of the Coal *Mines Regulation Act, and advises the Minister on the granting* of interchange certificates under this Act. Under the new Act the Board is no longer responsible for issuing coal miners' certificates; these are now issued after examination by the District Inspector.

Board of Examiners (Mines Regulation Act)

J. E. Merrett, Chairman ---------- Victoria
A. R. C. James, member ---------- Victoria
W. C. Robinson, member ---------- Nanaimo

The Board conducts written examinations in various mining centres for applicants for underground and surface shiftboss certificates. The Board is also empowered to grant provisional certificates without examination and under such conditions as the Board considers necessary.

MINING ROADS AND TRAILS

Provision is made *in the Department of Mines and Petroleum Resources Act* whereby the Minister may, with the approval of the Lieutenant-Governor in Council, authorize the expenditure of public funds for the construction or repair of roads and trails into mining areas. Assistance on a half-cost basis may, also be provided on roads and trails to individual properties.

Requests for road and trail assistance must be made to the Department before the commencement of work. The type of access upon which assistance may be given depends upon the value of the property, the stage of development, and the amount of work to be done. A trail is sometimes sufficient for initial exploration, and a tractor-road may be adequate for preliminary work. Subsequent development might warrant assistance on the construction of a truck road; A carefully drawn sketch or plan of the location of the road is required to be submitted and, where warranted by the amount of assistance requested, a report on the property by a professional geological or mining engineer may be required. An engineer from the Department may be required to report on the property before a grant is made and to inspect the road after the work has been done.

The total mileages and expenditures under "Grants in Aid of Mining Roads and Trails" during the 1973/74 fiscal year were as follows:

	Miles	Cost $
Roads—		
Construction	27	269,549.94
Maintenance	281	174,485.03
Bridges—		
Construction		38,503.11
Maintenance		36,094.95
Total		518,633.03

Construction was completed under Project 763 (Barnett-McQueen Ltd.)—Stikine River bridge. This completes the Department of Mines and Petroleum Resources' participation in tbe Stewart–Cassiar Road built under the "Road to Resources" agreement between the Government of Canada and the Government of British Columbia. The construction was done by contract under the supervision of the Department of Highways on behalf of the Department of Mines and Petroleum Resources. All future responsibility for the road has been transferred to the Department of Highways.

Total expenditure on the road to this date is $31,665,296.82. The Federal Government's' commitment of $7,500,000 was expended by the end of September 1967, and since then the whole cost of construction has been borne by the Provincial Government. The financing of the Stewart–Cassiar Road has been a remarkable achievement for our Department.

Project 763 for $323,223.29 completes 400 miles of north-south road connecting our most northerly saltwater port of Stewart on the Alaska-British Colombia boundary to Mile 648 on the Alaska Highway. Tbis road opens a whole new part of northwest British Columbia to water and road transportation.

The Omineca Road, extending 240 miles northwest of Fort St. James, was advanced an additional 22 miles to Moosevale airstrip. This portion of new road will be completed and further construction will be undertaken to Thorne Lake. Logging interests improved 31 miles 'of road to Sylvester Creek, and logs are being hauled over the road 60 miles to Fort St; James.

During the year the British Columbia Parks Board designated four new park areas along the Omineca Road. The road is becoming a popular area for recreation, fishing, and hunting. Consequently, many requests are received to upgrade the road above the standard required for mine exploration and development. The cost of road maintenance has increased as the road receives greater use and heavier traffic.

For the purpose of encouraging the development of the petroleum and natural gas resources in the northeastern part of the Province, an additional grant of $17,000 was provided to maintain vehicle approaches to and over the British Columbia railway bridge across the Fort Nelson River.

GRUB-STAKING PROSPECTORS

Under the authority of the *Prospectors' Grub-stake Act* the Department has provided grub-stakes each year since 1943 to a limited number of applicants able to qualify. Grub-stakes up to $500 for food, shelter, and clothing, plus a reasonable travelling allowance, are available to a limited number of qualified prospectors who undertake to prospect in British Columbia in areas considered favourable by

the Department in accordance with a long-range plan for the development of the Province. Experienced prospectors may be granted a maximum of $300 for travelling expenses if prospecting is to be done in remote areas where air transportation is necessary.

Application forms and terms and conditions under which g&-stakes are granted may be obtained from H. Bapty, Senior Inspector, Department of Mines and Petroleum Resources, Victoria.

Samples received from grub-staked prospectors are assayed free of charge and mineralogical identifications may be made on request.

Grub-stake St&tics

Field Season	Approximate Expenditure	Men Grub-staked	Samples and Specimens Received at Department Laboratory	Mineral Claims Recorded
	$			
1943	18,500	90	773	87
1944	27,215	105	606	135
1945	27,310	84	448	181
1946	35,200	95	419	162
1947	36,230	91	469	142
1948	35,975	92	443	138
1949	31,175	98	567	103
1950	26,800	78	226	95
1951	19,385	63	255	137
1952	19,083	50	251	95
1953	17,850	41	201	141
1954	19,989	48	336	123
1955	21,169	47	288	183
1956	20,270	47	163	217
1957	22,000	46	174	101
1958	24,850	47	287	211
1959	21,575	38	195	202
1960	28,115	50	358	241
1961	29,175	47	309	325
1962	26,730	52	233	189
1963	29,000	50	150	843
1964	31,751	53	213	351
1965	24,717	42	241	219
1966	26,787	43	224	239
1967	29,891	47	148	432
1968	31,224	47	234	402
1969	21,758	27	151	221
1970	30,614	39	84	423
1971	21,081	23	29	348
1972	20,838	27	64	190
1973	21,146	22	89	47
Totals	845,372	1,729	8,628	6,923

Thirty-one applications were received, and 22 grub-stakes were authorized. Grantees unable to complete the terms and conditions of the grant received only partial payment. Four prospectors were given grants for the first time. Two grantees proved to be unsatisfactory.

E. R. Hughes interviewed applicants and contacted grantees in the field, giving advice and direction to those. requiring additional instruction and field guidance.

Personnel in -Government Agents' offices and local Mine Inspectors throughout the Province generously assisted in administering the programme. The following notes comprise summaries by Mr. Hughes of prospecting activities in the various mining districts. These summaries are from field observations and from information contained in diaries submitted by grantees.

Alberni Mining Division—An intrusive north of the west side of Saunders Creek, near Gold River, contains pyrite, arsenopyrite, and minor amounts of copper. Rocks teen in the area are limestone-and granite.

In the Donner Lake area, west of Strathcona Pack, creeks were mapped and 56 samples of water were collected for analysis. A grid was laid out for soil sampling and 171 soil samples were taken: The rocks in the area arc granite, porphyry, limestone, and dolomite. Copper was seen in porphyry. Pyrite and minor amounts of zinc were also found in the area. Two mineral claims were staked, and 101 feet 6 inches of diamond drilling was done. One sample taken in the area assayed gold, 0.01 ounce per ton; silver, 0.2 ounce per ton; copper, 0.19 per cent; lead, 0.005 per cent; zinc, 0.03 per cent. A grab sample assayed a trace of gold and a trace of silver.

A two-man team spent the season on Brooks Peninsula. On Gold Creek, which flows into Amos Creek, tiny specks of gold were recovered by panning. Several quartz veins were observed in granodiorite, but no mineralization was seen. A calcite vein, 6 feet wide, contains massive pyrite. Eight samples taken in the area assayed a trace in gold and silver.

On Amos Creek, above Gold Creek; iron boulders were seen and a substantial deposit of iron was found. It is reported to be 400 feet wide and was traced on the 'surface for a length of 800 feet. A semiquantitative spectrochemical analysis on a sample indicated in excess of 20 per cent iron.

Clinton Mining Division—From a base camp near Mosley Creek, south of Bluff Lake, some prospecting was done westward along Clay Creek and through the steeply walled Clay Creek canyon. The sedimentary rocks, including siltstone, sandstone, shale, and conglomerate, were reported to be underlain by igneous intrusions. Large amounts of fragmental porphyritic andesite and basalt, as well as greywacke and quartz diorite, were found in the bed of tlie 'creek. Two water samples were taken for analysis.

On Deer Creek, near its confluence with Mosley Creek, fossil leaf impressions were seen in siltstone. Approximately 5 miles easterly from Mosely Creek the channel of Deer Creek deepens and cuts through shale and sandstone. The waters of the small creeks feeding into Deer Creek arc high in iron. Quartz and basalt fragments are abundant on the north and south slopes of the valley. Some fragments contain minor pyrite, chalcopyrite, and arsenopyrite. Narrow quartz veins were seen in the lower cliffs and large gneiss boulders were found near a dried-up drainage channel. Folded beds of sedimentary and metamorphic rocks are exposed at higher elevations, but no mineralization was seen. Veins and pockets of pyrrhotite and pyrite were found on Butler Creek, east from Bluff Lake.

On Blackhorn Mountain, about 15 miles southwesterly from Bluff Lake, some prospecting was done in the area adjacent to the site of the abandoned Homathko gold mine where some development took place during 1937, 1938, and 1939. Chalcopyrite and bomite are abundant in float and some gold is present in quartz boulders. Samples from narrow quartz veins, from large boulders, and from the old mine adit gave encouraging assay results in gold and silver.

Some prospecting was done south of Tatlayoko Lake and adjacent to the former Morris gold mine where there was some activity during 1935 to 1938. No mineral claims were recorded and no new discoveries were reported.

Kamloops Mining Division—The creeks draining into Eakin Creek,' west of Little Fort, were panned and total heavy metals tested for over a distance of approximately 5 miles with negative results. No mineralization Was observed. In the Lac des Roches, Birch Lake, and Thuya Lake area, the rock types encountered were

granite, diorite, and porphyry. Panning and testing for total heavy metals gave negative results. South of Thuya Lake, minor amounts of chalcopyrite and malachite were found in float. The walls of some creeks exposed massive unaltered granite.

On a newly constructed logging-road, about 8 miles northwest of Avola, excavation for the right-of-way exposed rocks previously covered by heavy overburden. In 1 mile of construction, three rock cuts were examined. In the centre cut was a narrow discontinuous vein containing a minor amount of chalcopyrite. Numerous samples were submitted for assay from this area. Three samples assayed 0.95 per cent, 0.79 per cent, and 0.39 per cent copper. Thirty other samples assayed traces of gold and silver.

Liard Mining Division—A search was made for the extension of a gold-bearing quartz vein on Table Mountain, east of Cassiar. Quartz veins up to 6 feet wide were seen, but they contained no mineralization. On the west side of Blackfox Mountain, in an area underlain by rocks of the Sylvester Group, samples containing minor amounts of native silver, lead, and zinc were taken from a narrow quartz vein. Blowpipe tests of samples taken in this area show minor amounts of lead and copper and appreciable amounts of silver.

On Needlepoint Mountain, southeast of Cassiar and east of the Stewart-Cassiar road, several narrow veins were seen containing minor amounts of bornite, chalcopyrite, pyrrhotite, and silver. On the southwest side of Needlepoint Mountain, two granodiorite stocks were seen intruding the sediments. Samples collected near the stocks contained pyrite and pyrrhotite in dolomite. East of the British Columbia Railway right-of-way, south of Dease Lake, a camp was made near the Tanzilla River bridge. A sedimentary-granite contact was examined, but no significant mineralization was found.

Nanaimo Mining Division—In the Upper Quinsam Lake-Iron River area, some prospecting was done along a metamorphic-volcanic intrusive contact. Some trenching and searching for rock exposures was done in and adjacent to old open-cuts on abandoned logging-roads and on the hillsides. Minor amounts of pyrite, arsenopyrite, and chalcopyrite were seen in several places.

Nelson Mining Division—Some work was done in the Blazed, Summit, and Jersey Creek areas where the Aldridge, Creston, Kitchener, Mount Nelson, Irene, Toby, Dutch, and Horsethief Formations were examined. Quartz lenses were observed, but these were found to be barren. Minor amounts of sulphides were seen in stained boulders. Some brown-stained outcrops of argillaceous quartzite were seen about 1 mile north of the confluence of Blazed and Summit Creeks. Blowpipe tests on samples collected in this prospecting work did not indicate any significant mineralization.

New Westminster Mining Division—Negative results were reported in soil sampling in the 13, 17, and 30-mile areas near the Skagit River road, south of Hope. Minor sphalerite was found on the west side of Shawatum Mountain. Minor amounts of arsenopyrite were seen near Ten Mile Creek.

North of the abandoned Coquihalla branch of the Canadian Pacific Railway right-of-way, 13 to 17 miles east of Hope and in the higher elevations between Ladner Creek and Boston Bar Creek, some conventional prospecting was done. The rocks encountered were diorite, granite, argillite, slate, and conglomerate. The mineralization seen included minute flakes of molybdenite and minor amounts of pyrite.

Omineca Mining Division—Some prospecting was done in the Mount Greer-Hallett Lake area. Three samples were sent for assay and some soil and silt sampling was done. A wide variety of rock was encountered near the contact of the Takla Group volcanic rocks and the Topley intrusions, with some younger rhyolitic dykes. Much pyrite was seen in coarse-grained diorite north of Hallett Lake. Four mineral claims were located north of Hallett Lake.

North of Germansen Lake, much pyrite was seen in dacitic rocks. South of Germansen Lake, some detailed sampling was done.. Some pyrite was found in fine-grained sedimentary rocks. A small amount of float containing chalcopyrite was seen.

Some chalcopyrite and molybdenite were reported and six 'mineral claims were located north of Chuchi Lake. Trail work was done to provide. access to the Claims.

An area of gossans was prospected south of Germansen Lake near a batholith and volcanic contact. Several small quartz veins were found and small amounts of pyrite and sphalerite was seen. Sii mineral claims were located near a breccia pipe on Nation Mountain. A long traverse was made west of Ahdatay Lake and an occurrence of chalcopyrite in limestone near an instrusive contact was examined. An insignificant amount of sulphide was found in diorite.

North of Woodcock and west of Kitwanga, the tailings dump from an old adit was found to be well mineralized with galena, pyrite, and sphalerite. Two mineral claims were staked over fhe old workings, All the creeks running into the east side of Kitwanga River were tested with negative results. Shales and dolomites were encountered adjacent to Moonlit Creek. Results of panning in the creek and testing for total heavy metals were negative.

A two-man team-was flown to Spinel Lake adjacent to the northern boundary of the Omineca Mining Division. On the east side of Spinel Lake, large mica-rich granite float was seen and at higher elevations mica schist was found overlain with a skarn zone Carrying massive pyrrhotite. In the Flat Top Mountain area, garnets were plentiful in creek pannings. In tributaries of Kechika River, mica schist, quartzite, skarn, and many quartz veins and stringers were seen.

South of Spinel Lake, quartz-calcite veins were seen containing chalcopyrite and malachite. Eighteen mineral claims were located in the vicinity of a vein approximately 300 feet long and from 4 inches to 4 feet wide. The over-all copper mineralization is approximately 1,000 feet in strike length, but is not 'continuous and in parts is up to 6 feet wide, A narrow quartz stringer in shale, well mineralized with galena and sphalerite, was found between Spinel Lake and Obo River. Two mineral claims were located to cover the exposure.

Osoyoos Mining Division—Near Mile 4 on the Ashnola River forest access road, black sand concentrate containing some small red garnets and minor amounts of scheelite was panned. Small garnets and minor scheelite were also found near Mile *30.* Pegmatite, skarn, and small red garnets were seen in float near Easygoing Creek that flows easterly into the Ashnola River. Limestone and sandstone float was also found on Easygoing Creek. Minor pyrite, quartz, chert, and argillite float were seen on Ewart Creek.

Similkameen Mining Division-&&t mineral claims were located on the east side of Pasayten River, about 3 miles south of Similkameen Falls, in an area underlain by rocks of the Nicola group. More thah 1 mile of tractor road was constructed and some surface trenching was done. A D-8 tractor was used in this work. The rocks seen were argillite and arkose. A few specks of pyrite were seen in surface exposures. Eight samples submitted for assay gave negligible results.

Ten mineral claims were located south 'of Lorne Lake, about 7 miles southeast of Princeton, and preparations were being made to cut grid lines for a dip-needle survey.

Trail Creek Mining Division-On the western slope of Lookout Mountain, south of the city of Trail, a bulldozer was used to clear the debris from the front of an old portal. On the old Ural property the short adit was cleaned out and retimbered to the face where a quartz vein 4 to 5 inches wide was seen. Work done in 1935 and 1936 yielded 4 tons, of ore containing 5 ounces of gold and 9 ounces of silver. Further bulldozing and hand-stripping were done in an effort to find an extension of the vein, but this work was inconclusive.

Vancouver Mining ***Division—***The area in and adjacent to the old Ashloo mine, on Ashlu Creek, 26 miles north of Squamish, was prospected and 100 feet of diamond drilling was done. Three samples were taken and assayed: (1) gold, 12.76 ounces per ton; silver, 21.8 ounces per ton; and copper; 2.70 per cent: (2) gold, 35.51 ounces per ton; and silver, '18.3 ounces per ton: (3) gold, 11.53 ounces per ton; silver, 3.9 ounces per ton; and copper, 1.84 per cent. Newly constructed logging-roads provide improved access into, the area.

TITLES DIVISION

STAFF

E. J. Bowles ---------- -.-Chief Gold Commissioner
R. Rutherford ---------- Deputy Chief Gold Commissioner
J. G. B. Egdell ---------- Gold Commissioner, Vancouver

Gold Commissioners,, Mining Recorders, and Sub-Mining Recorders, whose duties are laid down in the ***Mineral Act*** and ***Placer-mining Act, administer these*** Acts and other Acts relating to mining. M&g Recorders, in addition to their 'own functions, may also exercise the powers conferred upon Gold Commissioners with regard to mineral claims within the mining division for which they have been appointed.

Recording of location and of work upon a mineral claim as required by the Mineral ***Act*** and upon a placer-mining lease as required by the ***Placer-mining Act*** must be made at the office of the Mining Recorder for the mining division in which the claim or lease is located. Information concerning claims and leases and concerning the ownership and standing of claims and leases in any mining division may be obtained from the Mining Recorder for the mining division in which the property is situated or from the Department's offices at Victoria, and Room 320, 890 West Pender Street, Vancouver. Officials in the offices of the Gold Commissioner at Victoria and the Gold Commissioner in Vancouver act as Sub-Mining Recorders for all mining divisions. Sub-Mining Recorders, who act as forwarding agents, are appointed at various places throughout the Province. They are authorized to accept documents and fees, and forward them to the office of the Mining Recorder for the correct mining division. Officials and their offices in various parts of the Province are listed in the following table.

LIST OF GOLD COMMISSIONERS AND MINING RECORDERS

Mining Division	Location of Office	Gold Commissioner	Mining Recorder
Alberni	Port Alberni	T. S. Dobson	T. S. Dobson.
Atlin	Atlin	P. J. Newall	P. J. Newall.
Cariboo	Quesnel	H. S. Tatchell	H. S. Tatchell.
Clinton	Clinton	W. R. Anderson	W. R. Anderson.
Fort Steele	Cranbrook	W. L. Draper	W. L. Draper.
Golden	Golden	W. G. Mundell	W. G. Mundell.
Greenwood	Grand Forks	G. A. Broomfield	G. A. Broomfield.
Kamloops	Kamloops	N. R. Blake	N. R. Blake.
Liard	Victoria	E. A. H. Mitchell	E. A. H. Mitchell.
Lillooet	Lillooet	K. J. Weir	K. J. Weir.
Nanaimo	Nanaimo	R. H. Archibald	R. H. Archibald.
Nelson	Nelson	G. L. Brodie	G. L. Brodie.
New Westminster	New Westminster	F. E. Hughes	J. Hoem.
Nicola	Merritt	L. P. Lean	L. P. Lean.
Omineca	Smithers	A. W. Milton	A. W. Milton.
Osoyoos	Penticton	T. S. Dalby	T. S. Dalby.
Revelstoke	Revelstoke	D. G. B. Roberts	D. G. B. Roberts.
Similkameen	Princeton	W. L. Marshall	W. L. Marshall.
Skeena	Prince Rupert	T. H. W. Harding	T. H. W. Harding.
Slocan	Kaslo	T. P. McKinnon	T. P. McKinnon.
Trail Creek	Rossland	A. Sherwood	A. Sherwood.
Vancouver	Vancouver	J. Egdell	Mrs. S. Jeannotte (Deputy).
Vernon	Vernon	N. A. Nelson	N. A. Nelson.
Victoria	Victoria	E. A. H. Mitchell	E. A. H. Mitchell.

CENTRAL RECORDS OFFICES (VICTORIA AND VANCOUVER)

Transcripts of all recordings in Mining Recorders' offices throughout the Province are sent to the office of the Chief Gold Commissioner in Victoria twice each month. The records and maps showing the approximate positions of mineral claims held by record and of placer-mining leases may be consulted by the public during office hoers at Victoria and at the office of the Gold Commissioner at Vancouver, Room 320, 890 West Pender Street., The approximate position of mineral claims held by record and of placer-mining leases is plotted from details supplied by locators.

During 1973, five investigations were carried out pursuant to section 80 of *the Mineral Act.* One investigation *with* regard to certificates of work being wrongfolly or improperly obtained resulted in two certificates of work being cancelled. Four investigations were made with regard to mineral claims' having been located or recorded otherwise than in accordance with the *Mineral Act, two* of which resulted in 77 mineral claims being cancelled.

MAPS SHOWING MINERAL CLAIMS AND PLACER LEASES

Maps showing the approximate locations of placer-mining leases, mineral leases, and mineral claims held by record may be seen at the Central Records Offices at Victoria and at Room 320, 890 West Pender Street, Vancouver. Prints are obtainable on request made to the Chief Gold Commissioner at Victoria, and accompanied by the proper sum. The charges are $1.25, per sheet. The maps conform to the reference maps issued by the Legal Surveys Branch, Department of Lands, Forests, and Water Resources, in size and geographical detail.

The Department of Mines and Petroleum Resources is now engaged in replacing the above-mentioned maps with maps based on the National Topographic System of mapping. The new sheets cover 15 minutes of longitude and 15 minutes of latitude, and are available from this Department at 50 cents per sheet at a scale approximately 1¼ inches to I mile, or $1 per sheet at a scale of 2 inches to 1 mile (including tax).

GOLD COMMISSIONERS AND MINING RECORDERS

Office Statistics, 1973

Mining Division	Free Miners' Certificates		Lode-mining							Placer-mining					Revenue		
	Individual	Company	Mineral Claims	Rental on Recording of Mineral Claims	Certificates of Work	Cash in Lieu	Certificates of Improvements	Bills of Sales, Etc.	Leases	Placer Claims	Leases	Certificates of Work	Cash in Lieu	Bills of Sale, Etc.	Free Miners' Certificates	Mining Receipts	Total
				$		$							$		$	$	$
Alberni	61	4	644	1,380.00	1,904	3,700.00	—	108	—	—	1	—	—	—	1,705.00	26,915.75	28,620.75
Atlin	145	—	314	950.00	1,246	10,300.00	—	41	—	—	113	105	3,250.00	118	725.00	35,245.75	35,970.75
Cariboo	882	11	2,718	9,390.00	6,257	15,908.00	25	133	4	—	135	356	5,000.00	106	6,190.00	122,018.75	128,208.75
Clinton	30	2	1,484	6,370.00	3,965	1,800.00	—	84	—	—	3	57	—	14	746.00	61,331.00	62,077.00
Fort Steele	213	2	568	840.00	5,510	7,724.00	—	55	—	—	51	92	1,250.00	54	1,623.00	45,012.53	46,635.53
Golden	88	4	187	620.00	1,248	5,600.00	—	36	—	—	1	—	250.00	14	1,616.00	16,910.25	18,526.25
Greenwood	136	1	546	2,380.00	2,832	6,684.00	—	75	—	—	4	16	250.00	5	699.00	32,185.00	32,884.00
Kamloops	427	15	3,711	290.00	26,067	33,700.00	18	360	1	—	2	22	750.00	1	5,985.00	60,894.45	66,879.45
Liard	228	1	1,969	11,450.00	14,879	71,600.00	—	276	—	—	51	148	2,000.00	32	1,312.00	202,444.25	203,756.25
Lillooet	61	1	738	3,140.00	1,397	17,606.00	—	36	—	—	9	40	—	1	380.00	37,562.00	37,942.00
Nanaimo	174	3	1,353	620.00	6,522	9,396.00	94	96	7	—	2	—	—	—	1,637.00	66,651.25	68,288.25
Nelson	227	5	419	1,770.00	776	4,672.00	—	57	—	—	8	9	250.00	—	2,639.00	16,777.50	19,416.50
New Westminster	509	8	738	2,740.00	2,774	6,380.00	—	86	—	3	6	93	—	13	4,249.00	32,634.00	36,883.00
Nicola	59	1	1,773	4,110.00	6,915	7,300.00	—	197	—	—	—	—	—	—	449.00	59,316.50	59,765.50
Omineca	266	3	12,414	28,530.00	7,795	53,328.00	80	529	1	—	56	112	2,750.00	48	2,090.00	326,279.50	328,369.50
Osoyoos	136	1	951	4,260.00	2,153	29,624.00	—	38	—	—	—	—	—	—	1,061.00	47,599.25	48,660.25
Revelstoke	55	1	120	700.00	179	4,304.00	—	16	—	—	12	26	—	2	675.00	8,462.75	9,137.75
Similkameen	108	2	2,279	2,820.00	5,725	18,100.00	—	422	—	—	32	151	7,812.50	58	1,110.00	88,110.50	89,220.50
Skeena	195	5	538	1,020.00	1,979	26,000.00	—	122	—	—	5	14	—	—	2,154.00	16,057.25	18,111.25
Slocan	80	2	254	1,330.00	1,486	9,104.00	—	52	—	—	2	3	—	—	780.00	24,617.25	25,397.25
Trail Creek	40	3	102	780.00	75	1,184.00	—	19	—	—	—	—	—	—	1,375.00	4,359.75	5,734.75
Vancouver	2,251	418	780	3,600.00	4,223	9,100.00	—	114	—	—	27	3	500.00	37	133,265.00	59,823.97	193,088.97
Vernon	226	4	681	269.00	639	3,160.00	—	46	—	—	7	29	—	2	2,280.00	14,409.00	16,689.00
Victoria	487	66	378	240.00	2,095	800.00	—	28	—	—	20	18	—	27	31,155.00	52,341.09	83,496.09
Totals for 1973	7,084	563	35,659	89,599.00	128,641	357,134.00	217	3,026	14	3	547	1,294	24,062.50	532	205,900.00	1,457,959.29	1,663,859.29
Totals for 1972	9,032	927	78,901	—	97,573	371,606.00	24	3,665	155	5	284	1,168	12,875.00	502	212,700.00	1,545,826.99	1,758,526.49

It is advisable to order claim maps from an index, which will be supplied on request.

COAL

Information concerning the ownership and standing of coal licences and coal leases may be obtained upon application to the Chief Gold Commissioner, Department of Mines and Petroleum Resources, Victoria, Maps showing location of coal licences and coal leases are also available upon application and payment of the required fee.

Coal Revenue, *1973*

Licences—	$
Fees	46,798.00
Rental	406,296.31*
Total	453,094.31

* Includes $51,300.86 performance bond which forfeited to the Crown.

During 1973, no coal licences were issued. As of December 31, 1973, a total of 1,562 coal licences, amounting to 899,387 acres, was held in good standing.

PUBLICATIONS

A list of publications of the Department of Mines and Petroleum Resources is available free on request to the Petroleum Resources Branch or the Chief Geologist, Miieral Resources Branch, Douglas Build@, Victoria.

Publications that are in print may be obtained from the Department of Mimes and Petroleum Resources, Douglas Building, Victoria, and from the Geological Survey of Canada, 100 West Pender Street, Vancouver. Current publications may also be obtained from the Gold Commissioner's Office, Room 320,890 West Pender street, Vancouver.

Publications are available for 'reference use in the Departmental Library, Room 430, Douglas Building, Victoria, in the reading-room of the Geological Survey of Canada, 100 West Pender Street, Vancouver, in the offices of the Inspectors of Mines in Nelson and Prince Rupert, as well as in some public libraries.

ROCK AND MINERAL SETS

Sets of rocks and minerals are available for sale to prospectors, schools, and residents of British Colombia. Information regarding them may be obtained from the Chief Geologist, Miieral Resources Branch, Douglas Building, Victoria.

Petroleum and Natural Gas

CHAPTER 4

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PETROLEUM AND NATURAL GAS—*Continued*

LIST OF ILLUSTRATIONS

DRAWINGS

PETROLEUM AND NATURAL GAS—*Continued*

DRAWINGS—*Continued*

TITLES DMSION

The Titles Division, under the direction of the Commissioner, is responsible for the administration of the *Petroleum* and Natural *Gas* Act, *1965,* which includes all matters related to and affecting title to Crown petroleum and natural gas rights and includes the Collection of revenue from fees, rents, disposition, and royalties. Regulations governing geophysical operations and petroleum-development roads are also administered by the Commissioner.

Information concerning' all for&& title issued under the *Petroleum and Natural Gas* Act may be obtained upon application to the office of the Commissioner, Department of Mines and Petroleum Resources, Victoria.. Maps showing the locations of all forms of title issued under the Petroleum *and Natural Gas Act* are available, and copies may be obtained upon application to the office of the Department of Mimes and Petroleum Resources, Victoria. Monthly land reports and monthly reports listing additions and revisions to permit-location maps, and listing changes in title to permits, licences, and leases, and related matters are available from the office of the Commissioner upon application and payment of the required fee.

During the year; there were four dispositions of Crown reserve petroleum and natural gas rights resulting in tender bonus biis amounting to $17,776,441, a decrease of $2,719,221 from the previous year. A total of 468 parcels was offered and bids were accepted on 276 parcels covering 1,780,206 acres. The average price per acre was $9.99, which is an increase of $2.87 per acre over the previous year. Average bonus price. per acre was respectively—permits, $5.42; leases, $60.50; and drilling reservations, $14.40.

During the year, 10 geophysical licences were renewed or issued.

During the year, two petroleum-development road applications were received and processed for approval.

A total of 118 notices of commencement of exploratory work was recorded during the year. These notices are required prior to the commencement of any geological or geophysical exploration for petroleum or natural gas.

During the year, one unit agreement was approved.

As of December 31, 1973, 24,528,742 acres or approximately 38,326 square miles, a decrease of 2,780,460 acres under the 1972 total, of Crown petroleum and natural gas rights, issued under the *Petroleum and Natural Gas Act*,, were held in good standing by operators ranging from small independent companies to major international ones. The form of title held, total number issued, and acreage in each case were as follows:

Form of Title	Number	Acreage
Permits	4.52	17,410,475
Natural gas licences	2	20,751
Drilling reservations	37	419,878
Leases (all types)	3,642	6,677,608
Total		24,528,742

Title Transaction Statistics, 1973

	Permits		Leases		Drilling Reservations		Natural Gas Licences	
	No.	Acres	No.	Acres	No.	Acres	No.	Acres
Issued	54	1,999,988	542	1,111,819	23	215,809	2	20,781
Cancelled or surrendered	84	4,349,446	550	1,292,760	29	218,134	—	—
Renewed or extended	379	—	3,066	—	8	—	—	—
Assigned	42	—	458	—	11	—	—	—
Acreage amendments	6	96,759	65	110,083	—	—	—	—
Crown reserve dispositions	47	1,452,144	206	112,253	23	215,809	—	—

Petroleum and Natural Gas Revenue, 1973

	$	$
Rentals and fees—		
Permits	1,524,431	
Drilling reservations	77,344	
Natural gas licences	803	
Petroleum, natural gas, and petroleum and natural gas leases	6,500,830	
Total rentals and fees		8,103,408
Disposal of Crown reserves—		
Permits	7,877,134	
Drilling reservations	3,108,092	
Leases	6,791,215	
Total Crown reserves disposal		17,776,441
Royalties—		
Gas	6,061,250	
Oil	14,543,621	
Processed products	42,675	
Total royalties		20,647,546
Miscellaneous fees		27,028
Total petroleum and natural gas revenues		46,554,423

Acreage of Crown Petroleum and Natural Gas Rights Held, 1964–73

	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres
Petroleum and natural gas permits	22,417,836	23,517,709	29,716,610	23,214,363	32,622,739	31,893,990	21,379,461	18,726,137	19,891,946	17,410,475
Petroleum and natural gas leases	11,289,962	10,642,259	10,439,595	10,596,352	10,029,674	8,837,265	7,765,668	7,226,320	6,493,633	6,196,570
Natural gas licences	9,669	———	27,815	———	———	———	———	———	———	20,781
Natural gas leases	555,829	540,088	524,612	549,218	518,826	475,419	472,964	471,919	470,260	479,754
Petroleum leases	2,568	2,568	2,568	644	644	———	———	1,284	1,284	1,284
Drilling reservations	451,998	534,868	503,603	462,138	384,925	350,546	292,402	337,656	452,079	419,878
Totals	34,727,862	35,237,492	41,214,803	34,822,715	43,556,808	41,557,220	29,910,495	26,763,316	27,309,202	24,528,742

Petroleum and Natural Gas Revenue, 1947–73

	Cumulative, 1947–64	1965	1966	1967	1968	1969	1970	1971	1972	1973	Cumulative, 1947–73
Rentals and Fees	$	$	$	$	$	$	$	$	$	$	$
Permits	37,155,979	1,176,501	1,661,591	1,369,232	1,184,457	1,772,064	1,426,448	1,615,619	1,729,829	1,524,431	50,616,151
Drilling reservations	590,777	114,483	113,496	86,303	87,759	79,796	48,156	79,120	107,537	77,344	1,384,771
Natural gas licences	63,788	———	1,466	———	———	———	———	———	———	803	66,057
Leases (all)	28,225,210	7,013,187	8,432,386	8,901,196	9,349,480	8,488,114	7,699,844	7,733,584	6,976,517	6,500,830	99,320,348
Total rentals	66,035,754	8,304,171	10,208,939	10,356,731	10,621,696	10,339,974	9,174,448	9,428,323	8,813,883	8,103,408	151,387,327
Crown Reserve Disposition Bonuses											
Permits	16,376,841	1,825,322	6,982,439	8,428,409	9,554,004	16,516,392	9,506,074	14,688,570	13,818,020	7,877,134	105,573,205
Drilling reservations	12,491,302	3,278,641	4,657,510	3,013,979	1,785,527	1,394,215	1,825,404	2,486,763	3,011,025	3,108,092	37,052,458
Leases	35,605,257	13,057,470	4,199,528	2,855,428	3,737,489	3,735,845	5,008,323	5,010,918	3,666,617	6,791,215	83,668,090
Crown reserve disposition total	64,473,400	18,161,433	15,839,477	14,297,816	15,077,020	21,646,452	16,339,801	22,186,251	20,495,662	17,776,441	226,293,753
Crown Royalties											
Gas	7,379,248	1,682,444	2,256,725	2,870,656	3,217,227	3,730,634	3,948,356	4,209,793	5,580,434	6,061,250	40,936,767
Oil	10,566,265	3,697,668	5,449,663	6,678,245	7,677,405	9,017,352	9,483,937	10,415,656	9,845,125	14,543,621	87,374,937
Processed products	656,336	93,226	61,568	58,536	50,762	48,847	42,314	42,517	44,379	42,675	1,141,160
Crown royalties total	18,601,849	5,473,338	7,767,956	9,607,437	10,945,394	12,796,833	13,474,607	14,667,966	15,469,938	20,647,546	129,452,863
Miscellaneous fees	191,257	17,790	18,073	17,917	17,955	19,025	21,843	35,604	42,775	27,028	409,867
Total petroleum and natural gas revenue	149,302,260	31,956,732	33,834,445	34,279,901	36,662,065	44,802,884	39,010,699	46,318,144	44,822,258	46,554,423	507,543,811

PETBOLBUM RESOURCES BRANCH

GENERAL

The Petroleum Resources Branch was established pursuant to the *Department of Mines and Petroleum Resources Act, as amended,* during the Second Session of the 1973 Legislative Assembly, and assented to on November 7, 1973. In effect, the former Petroleum and Natural Gas Branch and the Petroleum and Natural Gas Tides Section of the former Administration Branch were combined to bring all matters concerning petroleum and natural gas under a single branch. The one exception is the administration of the royalty regulations, which was assumed by the Mineral Revenue Division of the Department.

The Petroleum Resources Branch, under the direction of the Associate Deputy Minister of Petroleum Resources, is responsible for the administration of the *Petroleum and Natural Gas Act,* 1965 and the regulations made thereunder, including the Drilling and, Production Regulations, the Geophysical Regulations, the Drilling Reservation Regulations, and the Development Road Regulations. It also administers the *Underground* Storage Act, *1964.* In general, the Branch is responsible for all matters related to the disposition of Crown-owned petroleum and natural gas rights; and for the regulation of exploration, development, and production activities conducted by the oil and gas industry.

The Branch is organized into three divisions, namely; the Engineering Division, the Geological Division, and the Tides Division, which are supervised, on an interim basis, by A. J. Dingley, W. M. Young, and R E. Moss respectively, pending approval of the organization and the required new positions by the Public Service Commission.

STAFF

On December 31, 1973, the professional and technical staff included the following :

Headquarters Staff

J. D. Lineham, P.Eng.—Associate Deputy Minister and Chief of Branch
A. J. Dingley, P.Eng.—Chief Engineer
W. L. Ingram, P.Eng.—Senior Development Engineer
B. T. Barber, P.Eng.—Senior Reservoir Engineer
P. S. Attariwala, P.Eng.—Reservoir Engineer
P. K. Huus—Reservoir Technician (Engineering)
M. B. Hamersley, C.E.T.—Development Technician (Engineering)
W. M. Young, P.Eng.—Chief Geologist
S. S. Cosburn, P.Eng.—Economic Geologist
T. B. Ramsay, P.Eng.—Economic Geologist
J. Y. Smith, P.Eng.—Economic Geologist
R. Stewart, P.Eng.—Reservoir Geologist
R. E. Moss—Commissioner
W. W. Ross—Assistant Commissioner

Field Office, Charlie Lake

D. L. Johnson, P.Eng.—District Engineer
T. B. Smith, P.Eng. (until September 19).—Field Engineer
D. A. Selby—Field Technician (Engineering)
G. T. Mohler—Field Technican (Engineering)

W. B. Holland, C.E.T. ..... Field Technician (Engineering)
J. W. D. Kielo ..... Field Technician (Engineering)
G. L. Holland ..... Field Technician (Engineering)
J. L. Withers ..... Geophysical Technician (Engineering)

Staff Changes

G. L. Holland, Field Technician (Engineering), joined the staff on January 22.
T. B. Smith, Field Engineer, resigned effective September 19.
J. L. Withers, Geophysical Technician (Engineering), joined the staff on October 15.
W. W. Ross, Deputy Chief Petroleum and, Natural Gas Commission, transferred to the Mineral Revenue Division as' Assistant Director on December 5.

BOARD OF ARBITRATION

Chairman: A. W. Hobbs, Q.C.
Vice-Chairman: S. G. Preston, P.Ag.
Member: J. D. Lineham, P.Eng.

The Board of Arbitration, established under the authority of the *Petroleum and Natural Gas Act, 1965,* grants right of entry to oil and gas companies upon alienated land and determines condition of, entry and compensation therefor. It also terminates the right of entry when a company has ceased to use the land.

'In 1973, three applications for right of entry were submitted to the Board.

Two right of entry orders were issued and three were terminated after the parties reached agreement.

A hearing was held on December 11 at Fort St. John. The six cases scheduled to be heard were disposed in 1973 as follows:

One compensation award order was issued:
One award order was issued, but the compensation quantum was set aside until both parties are heard in 1974:
One compensation award order was pending at the end of the year awaiting inspection of the site:
One compensation award order was pending awaiting establishment by the Board of the Compensation; and
Two cases were' set aside until 1974, one by request of the, land-owner involved and the other due to the absence, at the hearing, of the land-owner.

Six cases were outstanding at the end of the year. These involve one where the award will be determined after weather conditions permit inspection of the site; one where the award will be determined after both parties have been heard again in 1974; one where both parties have been heard but the award has not yet been established; two where the cases were set aside to be heard in 1974; and one application received late in the year.

CONSERVATION COMMITTEE

The Conservation Committee, established on October 11, 1957; under the *Petroleum and Natural* Gas Act, *1965,* is responsible to the Minister of Mines and Petroleum Resources. Its duties are as follows:

(1) To act as an advisory committee to the Minister on such questions of conservation that the Minister, in writing, shall refer to the Committee for consideration and recommendation.

(2) To deal with such questions of conservation and production in the various fields of British Colombia as may arise between two or more operators in the same field or between operators and the Branch when appeals on such questions are made to the Minister and referred by him to the Committee.

No officers are currently named for the Committee, and it did not meet in 1973.

FIELD OPERATIONS

GENERAL

The field office of the Petroleum Resources Branch is located at Charlie Lake, B.C., near Mile 52 on the, Alaska Highway. This office is responsible for the enforcement of all sections of the Drilling and Production Regulations, and of the Geophysical Regulations, which pertain to field operations throughout the entire Province.

During 1973, 10 vehicles were driven 181,993 miles to conduct inspections and (or) perform surveys pertaining to the drilling and production phases of the oil and gas industry.

LABORATORIES

Core and sample storage and examination facilities are located at the field office. All cores from British Columbia wells must be placed in labelled boxes and delivered by the operator to the Geological Laboratory for permanent storage. Cores received during 1973 numbered 584 boxes from 54 wells, bringing the total stored at the end of the year to 31,802 boxes from 1,951 wells. In 1973, 1,853 boxes of core from 133 wells were studied by oil company personnel and other interested individuals. Core from five wells was temporarily removed from the laboratory by operators for more detailed study. Since the core-examination equipment at Charlie Lake was made' available in February, 1961, 90,304 boxes of core have been removed from the racks for examination.

Unless Otherwise directed, any operator who drills a well is required to sample the drilled rock (bit cuttings) at least every 10 feet of depth. Each sample is placed in a small bag at the well, identified, and submitted to the Geological Laboratory, where it is washed and bottled. Each 10-foot sample is divided, resulting in three complete sets of samples for each well. One set is retained in the sample library at the field office, one is sent to headquarters in Victoria, and the other is forwarded to the Institute of Sedimentary and Petroleum Geology, Geological Survey of Canada, in Calgary. Tlie remainder of the IO-foot sample is retained for a period of one year should further samples be required.

The main sample-examination equipment made available by the Branch is at the field office, with limited facilities at Victoria. Complete sample libraries of all samples from British Columbia wells drilled since 1948 tie retained at the Charlie Lake and Calgary locations. The Victoria library has samples from wells drilled since September 1957. At the end of 1973, the Charlie Lake storage contained 869,267 samples, while 863,290 samples were retained 'in the Victoria library. During 1973, samples from 155 wells were delivered to the field office and a total of 47,965 10-foot samples was washed and bottled. Industry and personnel from other government agencies studied samples from 31 wells during the year.

The Provincial calibration standard for selective oilfield pressure measurement equipment is located at the Charlie Lake field office. During 1973,852 calibrations were performed on subsurface pressure gauges.' Thirty field dead-weight gauges were

calibrated and numerous spring gauges were checked for accuracy. All calibrations and typed results were furnished without charge to the industry.

A specialized wireline truck was employed to conduct pressure and temperature surveys of 72 potential or producing wells. These surveys were conducted to check and supplement pressure data submitted by operating companies.

INSPECTIONS

Inspections on many production and sales meters were performed in 1973. Complete meter calibrations were done on 574 gas meters, while 440 were given a fast meter check. In total, 1,014 meter checks, were made to ensure that proper production practices were being employed. Complete meter calibrations were witnessed on 15 positive displacement meters.

Crude oil production facilities were inspected on 311 occasions, while 2,731 routine inspections were made at producing, potential, or abandoned well locations, and 466 sites were visited during active drilling operations.

Tests on 40 natural gas wells were witnessed and four tests were conducted on producing oil wells:' These tests were performed to verify production characteristics of the wells and to ensure that data received by the Engineering Section are accurate.

SPILLAGES, ACCIDENTS, AND FIRES

One of the important functions of the field office staff is to investigate and report any spillages of petroleum products that occur. The British Columbia Gil Spill Contingency Plan, initiated by the industry in 1971; continued to provide an organization to deal with any emergency in the field. Equipment was located at strategic places in the producing area of the Province to assist company personnel in the containment and rapid clean-up of any spilled products. The Department co-operated with the. contingency organization by providing liaison and communication with the various governmental agencies that became involved.

During 1973 there were21 spillages, three fires, and one fatal accident reported 'to the Branch. Three of the incidents, one of them resulting in fire, involved more than 1,000 barrels of oil. Seventeen of the 21 splllages were concerned with pollution by petroleum, two by water, and one each by condensate and diesel fuel. Spills involving battery locations numbered 13, while four occurred at pipe-line installations, three at well locations, and one at a tank farm. Corrosion. was considered responsible for nine of the splllages, while faulty equipment and human error were concluded to be the cause in six cases each.

One of the major incidents occurred at the Wildmint oil battery. Its cause is 'speculative but the result was a loss of au estimated 1,770 barrels of oil and a serious tire. The other two cases of major proportion were due to failures in pips line facilities.

A fatal accident happened on July 13 when au employee unloading pipe from a truck was struck by the handle of a boomer. Upon releasing the handle of the boomer the man was hit on the side of the head and neck and killed almost instantly.

GEOLOGICAL DIVISION

GENERAL

The Geological Division is responsible for the preservation and evaluation of certain well data and the administration of the Branch well-evaluation requirements. Data resulting 'from the drilling of wells, geophysical surveys, and other related sources in the Province in the search for and development of accumulation of oil

and gas are supplied to the Branch. These data are made use of by staff geologists as a basis for report on, and maps and cross-sections of, the economically important sedimentary rocks of the Province. Tbe Division is responsible for providing data and opinion to attract and encourage the exploration and development of the petroleum resources Of the Province.

In the administration of the Branch well-evaluation requirements, the Division stipulates the sampling and coring requirements for each well location approved and assigns a classification to the well based on the Lahee System as defined by the American Association of Petroleum Geologists. A summary of the wells classified by the Lahee System is shown in Table 13. Six classifications are used that are based upon geological interpretation, which are described as follows: (1) New field wildcat—drilled in a geological environment where hydrocarbons have not yet been discovered; (2) new pool wildcat—drilled in a geological horizon where other pools have been found but the geological conditions are such that searching for a new pool is very hazardous; (3) outpost—drilled with the intent of extending an already partly developed pool by a considerable distance; (4) and (5) deep-pool and shallow-pool tests—drilled within the known limits of a pool with the intent of searching for hydrocarbons below or above respectively the pool of producible horizon; and (6) development-drilled with the intent of further exploiting the pay horizon or pool within the area which has already been essentially proved for production.

All geological and geophysical reports submitted to the Branch in support of work requirements arc assessed to ensure that the Department receives full value for credits or other benefits granted.

Reservoir Geology and Regional Subsurface Mapping

During the year, members of the geological staff worked in selected geographical areas of the Western Canadian sedimentary basin on reservoir geological and regional subsurface mapping assignments. In general, the purpose of carrying forth both reservoir and regional studies is to provide the Department and industry with continuing geologic evaluations of rock-stratigraphic units which have attained a position of economic importance in tbe development of the Province's hydrocarbon-resources.

Reservoir geologists working in co-ordinated studies with the Reservoir Engineering Section completed the annual updating and inclusion of new well data for the yearly Hydrocarbon *and By-products Reserves* publication. In addition, subsurface pool-mapping projects were completed on new gas pools and (or) extensions established at Kotcho East and Grizzly; associated gas pools at Cecil and Oak, and one associated oil pool at Eagle.

A minor amount of reservoir work covered the geological appraisal of, submission, studies involving the control of remedial work, cycling, repressuring, and secondary recovery projects. In this respect the responsibility of the reservoir geologist is to continue the economic geological work during the productive period of the field. Production data supplement and complete the previously accumulated subsurface information, and the geological interpretations of reservoirs are revised accordingly in the production stage of oil and gas fields.

A number of regional subsurface mapping projects were continued from the 'previous year within that portion of the Western Canadian Sedimentary Basin underlying northeastern British Columbia. The discovery of Mississippian and Cretaceous shallow. gas north of Fort Nelson has induced a considerable amount of exploratory drilling activity during the past year. Basal Cretaceous sandstone

'developments have a considerable amount of area distribution within the general Kotcho Lake region. Porous sand deposits which are in part discontinuous, range in thickness from zero to 80 feet, with reasonably good reservoir characteristics. Hydrocarbon entrapment is partly stratigraphic and partly structural in nature..

The Mississippian Shunda-Pekisko and Debolt subcrop sequences to the north of the latter Cretaceous clastic depositional edge is another area of potential shallow gas entrapment. Reservoir development and hydrocarbon accumulation are directly associated with the Pre-Cretaceous erosional unconformity.

Regional studies of the Cretaceous Bullhead Group were extended from Fort St. John south to the Grizzly Valley area Isopach and structural maps of the Bullhead Group were projected into the latter area, which is currently undergoing an active exploratory drilling programme.

Mapping of the Halfway Formation has been updated with a concentrated study on the continuous or blanket phase of the Formation within the general Port St. John area. Several commercial discoveries have been made during the past year along the depositional edge of the continuous Halfway phase.

DRILLING HIGHLIGHTS

In relation to the previous year, the 1973 drilling programme registered a 26-per-cent reduction or' a decline of 44 to 167 in the number of wells completed. The independent segment of 'the industry, as has been the case in the past few years, predominated in exploratory drilling and in the, development drilling of established fields.

New Field, New Pool, mid Outpost drilling was down 22. per cent over last year with the completion of 28 new pool discoveries out of a total of 96 wells drilled. Of the latter discoveries, '25 were completed as gas wells and three were completed as potential oil producers; None of the 25 completions were given major discovery status.

With the exception of one unsuccessful well drilled in the Bowser basin, all exploratory completions took place in the Western Canadian sedimentary basin of northeastern British Columbia. Wildcat drilling extended from the southeastern portion of the basin within the Lone Mountain-Grimly Valley area to the Windflower-Tattoo area south of Maxhamish Lake near the Yukon-British Columbia border.

An undetermined amount of gas was recovered from the Triassic in the drilling of Quasar Grizzly a-85-G/93-I-15. Production testing of gas-bearing intervals will be required to confirm deliverability and reserve potential of the apparent new field gas discovery. In addition to the Quasar Grizzly well, two other gas discoveries worthy of mention were made in shallow sands and carbonates of Mississippian age north of the town of Fort Nelson. The first discovery area wherein shallow gas was recovered from Mattson Formation sandstones lies to the south of Maxhamish Lake. The second area, also noted for its discovery of shallow gas, lies to the north of Kotcho Lake and is associated with carbonates of the Mississippian erosional subcrop. The development of major reserves in the shallow gas area is considered much less probable than gas reserves associated with the deeper Triassic horizons in the Grizzly Valley area.

Reserves allocated to new pool discoveries within the general Fort St. John and Fort Nelson areas are considered to be minimal, with the possible exception of the Bluesky and Slave Point east of Kotcho.

Development drilling activity was down 31 per cent from last year, with 39 wells completed out of a total of 71 drilled. Most of the latter drilling took place within the limits of established reserves.

Oil Discoveries, 1973

Well Authorization No.	Well Name	Location	Total Depth (Ft.)	Productive Horizon
3239	Scurry CanPlac Eagle 6-27-84-18	6-27-84-18 W6M	6,070	Belloy.
3364	Scurry CanPlac Eagle 6-22-84-18	6-22-84-18 W6M	6,120	Belloy.
3370	Scurry CanPlac Eagle 6-34-84-18	6-34-84-18 W6M	6,051	Belloy.

Gas Discoveries, 1973

3181	Quasar N Grizzly a-85-G	a-85-G/93-I-15	17,243	Confidential.
3268	Penzl Mesa Fontas d-77-H	d-77-H/94-J-8	8,250	Pine Point.
3291	Aquit et al Tattoo a-78-L	a-78-L/94-0-10	3,750	Mattson.
3319	KM AEG Mast d-80-A	d-80-A/93-P-3	11,718	Dunlevy.
3330	Aquit AmMin et al Windflower d-87-A	d-87-A/94-0-11	2,700	Mattson.
3117	Pacific et al Caribou d-27-H	d-27-H/94-A-16	3,970	Gething.
3174	HB et al Moberly 16-20-79-25	16-20-79-25 W6M	11,003	Halfway.
3180	Quasar et al N Grizzly b-62-G	b-62-G/93-I-15	9,297	Dunlevy.
3240	Fina Bearberry d-95-L	d-95-L/94-A-11	5,400	Dunlevy.
3241	Atapco et al Klua b-19-G	b-19-G/94-J-9	7,724	Slave Point.
3297	HB Union Bogbean b-6-B	b-6-B/94-H-8	3,420	Halfway.
3308	Cdn Res Quintana Pac E Kotcho d-71-G	d-71-G/94-I-14	6,642	Confidential.
3322	Amoco et al Thetlaandoa c-34-L	c-34-L/94-P-6	2,250	Debolt.
3345	CanDel et al LL&E Trutch b-2-K	b-2-K/94-G-10	6,912	Confidential.
3416	AmMin Thetlaandoa d-37-C	d-37-C/94-P-11	1,890	Confidential.
3413	Amoco et al Thetlaandoa d-89-G	d-89-G/94-P-6	2,280	Confidential.
3107	Cdn Res Quintana E Kotcho b-43-J	b-43-J/94-I-14	6,552	Slave Point.
3235	Penzl Mesa Clarke a-36-C	a-36-C/94-J-9	7,050	Slave Point.
3269	Woods Wainoco Oak 11-24-86-18	11-24-86-18 W6M	4,192	Halfway.
3321	Ipex et al Currant d-73-K	d 73-K/94-A-9	4,089	Halfway.
3342	Pacific Tepee d-31-K	d-31-K/94-G-8	4,858	Halfway.
3350	Amoco et al Thetlaandoa c-30-K	c-30-K/94-P-6	3,400	Shunda.
3392	SOC et al W Jeans d-11-F	d-11-F/94-A-13	4,495	Dunlevy.
3273	Anadarko Cdn-Sup Buick b-44-J	b-44-J/94-A-11	3,780	Dunlevy.
3393	Chevron Birch b-47-I	b-47-I/94-A-13	6,245	Confidential.

GEOPHYSICAL AND GEOLOGICAL COVERAGE

All the geological exploration was in northeastern British Columbia. During *the year, 143* crew weeks of, seismic work were completed, with February the most active month. Several companies had surface geologists in the field in July.

During *the year, 79* work-requirement assessment reports on petroleum and natural gas leases and permits. were submitted to the Department by operating companies. These reports, which covered exploration expenditures of over $7 million, were mainly based on geophysical surveys completed in northeastern British Colombia.

ENGINEERING DIVISION

RESERVOIR ENGINEERING SECTION

GENERAL

The Reservoir Engineering Section is responsible for determination of reservoir and production characteristics of oil and gas pools in the Province. This involves interpretation of reservoir pressure, rock and fluid properties, and, production data. These parameters are used to forecast ultimate recoveries obtainable from oil and gas accumulations in the Province, and the rates at which these volumes will be produced. The Section maintains files of reservoir data, obtained from both industry and Branch sources, and reviews such data for quality. 'Oil and gas allowable rates are set by the Section, and recommendations concerning proposed improved recovery and produced fluid disposition schemes are made. The Section is concerned with technical aspects of matters affecting conservation and correlative rights.

OIL ALLOWABLES, MPRS, AND IMPROVED RECOVERY SCHEMES

Maximum permissive rates (MPRs) are assigned to all oil wells in tbe Province, either as individual wells or as groups of wells in the form of project or unit MPRs. Single-well MPRs are based on well-bore net-pay properties, while project MPRs are derived from mapped pore volume data and the estimated recovery factor for the production scheme in effect.

Monthly oil allowables are established from MPR values, and periodic checks are made to ensure that wells and projects are being produced in accordance with regulations governing over-production. Table 16 presents the individual well and project MPRs in effect at December 31, 1973. The areas included in projects or units are shown on the maps following Table 15.

During 1973, in addition to tiie individual well MPRs assigned or revised, modifications were made to the MPRs or operating schemes for a numb& of projects. Additional injection wells were approved for use in Inga Unit 1, Wildmint Halfway project, Inga Unit '2, and Peejay Unit 3. Approval was granted to inject water into the gas cap area in Boundary Lake Unit 1; this proposal had been under review at year-end 1972.' Also at the end of 1972, review and discussion with the Alberta Energy Resources Conservation Board was under way concerning an application to that Board to waterflood the portion of the Boundary Lake zone pool, Boundary Lake field, that' extends into Alberta: The Board approved the scheme subject to conditions respecting voidage in the area of the leaseline formed by the Provincial border.

The Beatton River West Unit 1 was granted a waterflood MPR iu October 1973, when it became apparent that reservoir withdrawals could be adequately balanced by injection. The waterflood scheme in Inga Unit 4 was granted a primary MPR in March. Waterflooding did not start until November, however, and a waterflood allowable was not in effect at the end of 1973 pending demonstration of ability to balance withdrawals.

An application to install a waterflood scheme in Inga Unit 5 had been under review at year-end 1972. In January 1973 the scheme was approved, contingent on the filing of acceptable plans for installation of an associated-gas conservation scheme. Water injection started in August 1973, although the previously approved waterflood allowable was still not in effect at year-end due to inability to balance reservoir withdrawals. A waterflood scheme was also approved for Milligan Creek Unit 2, again subject to submission of acceptable plans for associated-gas conservation. Water injection was started in August 1973, but the primary MPR was still

in effect at year-end Because of the geometry of this project, the waterflood MPR will not apply until performance demonstrates that waterflooding is an effective improved recovery mechanism in the unit.

Daring 1973, off-target penalty factors were waived with respect to the MPR of a well in the. Cecil Lake field and another in the Wolf field. Relief from gas-oil ratio penalty, applied to daily oil allowable, was granted for a. 60-day period to two wells in the Flatrock field. This was to enable special testing to be carried out. The results indicated that the Halfway pool in which the Wells were completed was in fact a condensate reservoir and the wells were subsequently reclassified as gas wells. An application seeking relief from gas-oil ratio penalties on production from Fort St. John Unit 1 was under review at the end of 1973.

An application was received in October 1973 for a Halfway pool primary MPR for the Weasel West field. No action had, been taken on thii at year-end, pending submission of additional data by the applicant.

ASSOCIATED AND SOLUTION GAS CONSERVATION SCHEMES

Solution gas is always produced as a by-product of oil production. This gas is dissolved in the oil at reservoir pressure and temperature conditions, but due to decreases in these as the oil is brought to the surface much of the dissolved gas is evolved. In addition, many oil pools are discovered in which the oil is originally overlain with a gas cap. In these it is often impossible to produce the oil with&t also producing some gas-cap gas, together with the solution gas. This could adversely affect ultimate oil recovery, since production of the gas cap reduces the reservoir energy available to produce the oil.

In some cases, the volume of as&i&d gas produced in excess of lease equipment fuel requirements is very small. In such cases it is not feasible to install conservation facilities and the gas is flared. Where conservation is feasible, two possibilities exist—either it can be collected and marketed, or it can be collected and injected back into the producing reservoir or a storage zone. Such conservation is encouraged by incentives. In the case of schemes with marginal economics, a reduced royalty rate may be applied to gas that is sold, or the gas-oil ratio adjustment factor may be modified if gas is conserved. However, in the case that gas-cap gas is to be marketed, the Branch needs to be satisfied that such concurrent production will optimise hydrocarbon recovery. At the beginning of 1973, associated gas produced from 17 projects was being collected and delivered for sale, and in five projects associated gas was being collected and injected into the reservoir. It is the policy of the Branch to require, from the operator of a proposed improved recovery project, a statement concerning disposition of associated gas production. If it is not considered economic to conserve the gas, justification for this is required. Otherwise, a submission for a gas-conservation scheme is required, following the. guidelines included in the Drilling and Production Regulations. As a 'result of. this, applications to continue flaring gas from Inga Unit 4 and Inga Unit 5 bad been under review at year-end 1972. Analysis by the Branch indicated that in both cases conservation could be supported by the economics of the oil-production scheme. Consequently, as mentioned previously, proposals for gas conservation were required from the operators of both projects. These proposals were received and approved, and the facilities are scheduled to go on-stream in the spring of 1974.~ Proposals for gas conservation in Milligan Creek Unit 2 were also approved.

During 1973, 82 per cent of the associated gas produced in-the Province was conserved or used as fuel. Flared gas comprised only 16 per cent of that produced from those projects subject to some form of conservation scheme. Gas from such projects accounted, for 91 per cent of the total associated gas production.

GAS ALLOWABLES AND WELL TESTS

The "daily gas allowables" or production rate limits (PRLs) for gas-wells in the Province are established from the results of absolute open-flow potential (AOF) teats. These tests are witnessed by Branch field personnel, and the data collected are interpreted by the Reservoir Engineering Section to establish PRLs, and also for use in reservoir engineering studies.

Restriction of individual well production rates is not considered necessary in some gas pools, and in these cases either Project Allowables have been issued, or the pools' operators have approval to produce according to "Good Engineering Practices" (GEP). Table 17 presents AOF test data, individual well PRLs, Project Allowables, and GEP schemes in effect at year-end 1973. The areas included in the various Project Allowable and GEP schemes are shown on the maps following Table 15.

During 1973, two GEP projects were approved—one covered a single spacing area in the Kotcho Lake field (Map 20) and the other a single spacing area in the Petitot field (Map 27). These were implement&to' alleviate technical and deliverability problems.. By the end of the year an application was under review that sought GEP status, for practically all of the Kotcho Lake field. Well-testing schedules were reviewed for all producing gas pools in the Province, and, where necessary, flaring of gas was allowed for this purpose (three wells). Some 300 AOF and (or) reservoir pressure survey test results were analysed during the year and appropriate daily gas allowables issued.

Toward the end of 1973, gas production from the Province was falling short of maximum day demand due to production problems being encountered in the Beaver River field. As a result, several testing schedules were modified in order to ensure that production down-time from other fields was kept to a minimum. For this same reason, Inga Unit 3 Was allowed to continue producing even though it was in an overproduction condition and should have been shut in. This overproduction will now be retired during' 1974. In the meantime, gas-oil contact water injection rates were increased to offset the increased withdrawal rate.

HYDROCARBON AND ASSOCIATED SULPHUR RESERVES

The Provincial reserves of oil, gas, and gas by-products, as of December 31, 1973, are summarized in Table 18. Details of nool-by-nool estimates are published in *the* Departmental *report Hydrocarbon and By-products Reserves in British Columbia, December 31, 1973.* This report includes individual-pool rock and fluid property data. Complementary reservoir fluid data are presented here in Tables 19 and 20, for oil and gas reservoirs respectively.

The proved oil reserves in the Province as of December 31, 1973, are estimated at some 131 MMSTB. Drilling during 1973 proved-up only 1.9 MMSTB of reserves, while revision to previous estimates increased these by 2.8 MMSTB. However, 21.2 MMSTB were produced during the year, resulting in a net decrease in proved reserves of 16.6 MMSTB when compared with reserves at the end of 1972.

Proved reserves represent oil for which it is believed there is a 90 per cent or better chance that the estimated volumes will be recovered. Probable reserves are carried where the probability is estimated to be 50 per cent or more. These include primary reserves on undrilled acreage and reserves attributable to probable increases hi ultimate recovery from pools under improved recovery schemes, or for which such schemes arc planned. Probable oil reserves are estimated at 153.2 MMSTB, as of December 31, 1973, an increase of 1.2 MMSTB over the estimated of December 31, 1972.

The gas and gas by-products reserves shown in Table 18 are "established" reserves. These comprise the proved reserves plus a percentage (usually 50 per cent) of the estimated probable, reserves. As of December 31, 1973, the established raw gas reserves are estimated at 10.3 TSCF. Adjustment for removal of a percentage of the liquid hydrocarbons and acid gases results in established residue gas reserves of 8.9 TSCF, or 9.1 TSCF when converted to a standard heat content of 1,000 Btu/SCF. These volumes represent decreases over the 1972 estimates of 0.3 TSCF raw gas, and 0.3 TSCF residue gas. Drilling during 1973 added 0.2 TSCF raw gas, while net revisions to previous estimates were negligible. In addition, 0.5 TSCF of raw gas was produced during the year.

Natural gas liquids reserves at year-end 1973 are estimated at 103.9 MMSTB, a decrease of 7.3 MMSTB -from the 1972 estimate. Sulphur reserves, at 4,045 thousand long tons, were down 128 thousand long tons compared with estimates made in 1972. Sulphur reserves have again been included for pools serviced by the Fort Nelson gas plant; sulphur-extraction facilities are currently being constructed.

It should be noted that residue gas, natural gas liquids;, and sulphur production and reserves estimates are based on theoretical calculations of the quantities of these materials contained in the raw-gas reserves. Comparisons between actual and theoretical production during 1973 are included in footnotes to Table' 18. The low apparent sulphur-extraction efficiency is due to the fact that the theoretical values include the sulphur not in fact extracted from the gas in the Fort Nelson plant.

MISCELLANEOUS

Applications for permission to dispose of produced salt water into a subsurface formation are reviewed by the Reservoir Engineering Section, although the actual mechanical completion of the disposal well is approved by the Development Engineering Section. In reviewing applications, several factors are considered, such as the compatibility between injected and formation water, the water quality in the disposal zone, and the effect on this of the injected water, and whether the planned water disposal will affect hydrocarbon reserves. In addition, when disposition of water into a hydrocarbon-productive zone is planned, the probable effect on reservoir performance is evaluated, together with the flood-out pattern and time of breakthrough of injected water into adjacent producing wells. Equity considerations of adjacent lessees are also taken into account. During 1973, 11 water-disposal schemes (or modifications to existing schemes) were approved.

During 1973, several reservoir analyses and other studies were Completed. Many of these were undertaken as a result of submissions received with respect to proposed production schemes, Others were conducted for internal purposes. Among the latter were unsteady-state water-influx and material balance calculations in the Clarke Lake field, optimum production scheme evaluations in the Cecil Lake and Fort St. John fields, and preliminary reservoir analyses of the Oak and Flatrock fields' Halfway reservoirs in an effort to determine whether 'or not they were condensate pools or oil zones Overlain with gas.

Production, problems were experienced in the Beaver River field during the second half Of 1973. These were caused by excessive water production in two of the wells. In order to minimize the possibility of the same problem arising in the other three wells, wellbore pressure differentials 'in these wells Were decreased, resulting in a drastic loss of productivity from the field. Both the operator of the field and the Branch were, at year-end, attempting to determine the causes of the problem, to analyse the effect of various factors on the problem, and to evaluate the optimum production scheme for the field.

Problems were also encountered in Inga Unit 2 of the Inga Oil Field. It became apparent that injected water was bypassing the oil-zone in many instances, pressuring-up a "thief zone," and causing premature water production in several oil wells. The operator ran several tests during the year to attempt to define the problem and its solution. These tests were carried on into 1974 and it was anticipated that remedial action could be proposed in the near future. In the meantime, water-injection rates were severely curtailed during the second half of 1973 in an effort to decrease injection pressures. As a result, oil production rates had decreased by about 1,000 BOPD at year-end 1973 compared with the rate at the end of 1972.

Forecasts were prepared of oil and gas production rates from all known hydrocarbon accumulations during the latter half of 1973. The possible effect of various factors, such as installation of field gas compressors or changes in wellhead price, on these forecasts was evaluated. In addition, statistical data were assembled from which projections were made of future drilling activity in the Province, together with consequent oil and gas reserves discovery and production rates. These data were compiled into reports prepared for the British Columbia Energy Commission. A member Of the Reservoir Engineering Section attended all sessions of the Energy Commission hearings into the natural gas industry in British Columbia, in order to provide advice as required. A report was also prepared for the Energy Commission in connection with the production problems, encountered in Beaver River. This analysed the effects on Provincial gas supply, and the possibility of short-term solutions to any shortages relative to expected demand.

An application was received from Pacific Petroleums Ltd. seeking permission to prorate group water production in the Clarke Lake field back to individual wells on the basis of a meter-run temperature correlation. It was then proposed to use the resultant water-gas ratio data to, determine dry-gas production rates from individual wells., The application was not approved, pending submission of additional performance data to establish the accuracy of the method. Applications for non-standard gas-metering arrangements in two fields were approved, subject to certain conditions. The applications concerned six wells operated by Pacific Petroleums Ltd. in the Kotcho field, and two wells in the Yoyo field.

During the course of the year, meetings were held with many of the operators of oil and gas producing facilities in the Province, at which current operations were reviewed and planned improved recovery schemes were discussed. In addition, meetings were held with representatives of Canadian Arctic Gas Study Ltd. and the Canadian Petroleum Association, at which the gas reserves situation in the Province was discussed. Progress reports pertaining 'to the projects listed in Table 16 were reviewed during the year, together with a progress report for the Slave Point project in Clarke Lake.

Reservoir-pressure survey proposals for a large number of oil and gas pools were reviewed during 1973, and some considerable time was occupied in analysing the results of these surveys. The Reservoir Engineering Section continued to provide a&stance and information to other government and industry personnel. The annual publication of pool-by-pool hydrocarbon and associated sulphur reserves was prepared during the first quarter of 1973, detailing reserves estimates as of December 31, 1972. The Section advised; the Titles Division with respect to the evaluation of 25 lea& renewal applications during 1973, and the land-sale evaluation correlations were updated to reflect changed oil and gas prices and tax structures. The Section also: advised the Titles Division with respect to unitization participation factors as they affected royalty allocation in six pools subject-to unit 'Operations agreements:

Many requests for miscellaneous information were dealt with during the year. As in previous years, a map was prepared to show maximum detected: hydrogen sulphide concentrations in produced gases. This map is on file in the Charlie Lake field office for the benefit of anyone working in the field. The Reservoir Engineering and the Geology sections prepared a combined paper on the "Developed Petroleum and Natural Gas Resources of British Columbia," which was delivered to tbe Annual Meeting of the Canadian Institute of Mining & Metallurgy in April 1973. Later in the year a staff member was appointed to the Canadian Metric Commission Sector Committee No. 4.2, and also to the Provincial-Government Interdepartmental Metric Conversion Committee.

DEVELOPMENT ENGINEERING SECTION

GENERAL

The Development Engineering Section is responsible for all matters related to the location, drilling, completion, and abandonment of wells in the Province. This involves the assurance that operators of all wells drilled conform to the requirements of the Drilling and Production Regulations, which includes the submission of prescribed forms and information.

A well classification is assigned by the Section to each proposed drilling location. The classifications, as defined in the regulations, are basically twofold-development and exploratory. A location classified as, development is located in a spacing area that is contiguous to a spacing area containing an 'oil or gas well in the same objective geological pool. An exploratory well is located beyond the described contiguous spacing area and is divided in two types—wildcat and outpost. An exploratory wildcat well is located farther than 4½ miles from a designated oil or gas well and an exploratoryoutpost well is in the area between development and wildcat wells. Development wells, and in certain instances exploratory outpost wells, are further classified as deep-pool or shallow-pool tests where! an undeveloped pool below or above the objective zone is being explored.

Changes in assigned classifications are considered when an operator applies and submits the necessary supporting data. If the operator can shdw evidence that a separate potential pool is being drilled, an exploratory wildcat classification is assigned at the time the well authorization is issued. Following drilling and testing an operator can apply for discovery classification if the engineering and geological data obtained confirm that a separate pool has been encountered. Discovery wells receive the same location and confidentiality privileges as wildcat wells. The onus is on the individual operator to apply for any classification change.

The classification assigned to each well or, in tlie case of deep-pool or shallow-pool tests, to each formation, is important as it is the basis used to release the well information. Release of data for the wildcat classification is made one year after rig release, while the information from all other classifications is made 30 days after the rig-release date.

All submissions pertaining to drilling and completion operations are studied for approval by the Development. Section. An operator must obtain such approval prior to commencing to drill a well, changing a well name, abandoning a well, or in any manner changing the physical characteristics of a well. When a submission is received by the Section, all pertinent information is reviewed, which may include details of the proposed programme, the title under which the petroleum and natural gas rights arc held, and any other relevant requirements of the regulations. Witb each application to drill a well, a surveyed position must be given which is examined to assure. conformation with target and spacing regulations.. A spacing area is

assigned to a proposed well, based upon whether the primary objective, as stated by the operator, is oil or gas. If the location is off-target, the operator is advised of the production penalty that will be, applied

Any application that is submitted to alter the equipment in a well or change the proposed programme is handled in a similar manner. Details of the application are referred to the various sections of the Branch 'before final approval is granted. Prior to the abandonment of a well, the operator must transmit an abandonment programme to the field engineer for his approval, but all other types of alterations are studied at Victoria, where the official records arc retained.

In addition, tbe Development Section collects and retains, for the convenience use of all Branch personnel, drilling and production records for each well. These same data are made available, provided the subject-matter is not confidential, to interested industry personnel who visit the Victoria office. Statistics are compiled cm refineries, processing plants, and the many pipe-lines situated in the Province. The geological and geophysical reports submitted for work credits, in accordance *with the Petroleum and Natural Gas Act, are received* and filed by the Section. Requests for copying or examining these reports are directed to the Development Section, which is responsible for their release. Arrangements exist whereby copies of the reports or parts of the reports are made available to interested persons who do not wish to examine them at the Victoria office. In order to assure that only nonconfidential well information and geological reports are released, the Section has ,developed a verification system for security purposes.

Two monthly reports are prepared for distribution to subscribers, and a weekly drilling report is compiled to advise Departmental personnel of current activities. This latter report is initially compiled each Friday morning by the field office staff, who relay the information to the Victoria office for publication.

The Section is also responsible for co-ordinating and updating the Drilling and Production Regulations, as deemed necessary due to changes in field techniques and procedures. Many inquiries were answered during 1973 that related to the interpretation of the regulations and the methods of completing required reports or submissions.

DRILLING

Drilling operations completed in British Columbia during 1973 declined about 25 per cent compared to 1972. Well authorizations issued decreased by 65 to 161, while total footage drilled dropped 24 per cent to 874,753 'feet. The significant decline recorded in 1973 followed three successive years of increased drilling. Contributing factors were the lack of hydrocarbon discoveries-in the Province and a general 'orientation of exploration funds to other areas, notably northern Canada. The number of completed gas wells decreased slightly and a substantial drop was recorded in oil well completions. Only nine wells were completed as oil wells in 1973 compared to 39 during 1972.

Except for two wells, all the drilling activity took place in the northeastern corner of tbe Province east of the Rocky Mountains. The two exceptions were on abandonment in the Bowser basin and a well that was still drilling at year-end near Femie. The Bowser basin well, about 150 miles north of Prince Rupert, was the second attempt in the area and did not reveal any evidence of hydrocarbon deposits. The Femie location is in close proximity to the Alberta border and is expected to encounter difficult drilling conditions due to its mountainous location.

During 1973 the drilling operations were completed by 60 operating companies employing 53 individual drilling rigs which were owned by 16 different drilling contractors.

As in previous compilations, if more than one zone is completed in a well, each productive zone is counted as one well. Seven multiple wells were completed in 1973, all dual gas wells. At the end of 1973, four locations were awaiting evaluation to determine a final status and 23 locations were in the drilling process. Four locations were drilled and completed for water-injection purposes as an aid to oil production. Wells drilled and drilling are listed in Table 21 and annual footages drilled since 1947 are shown graphically in Figure 2.

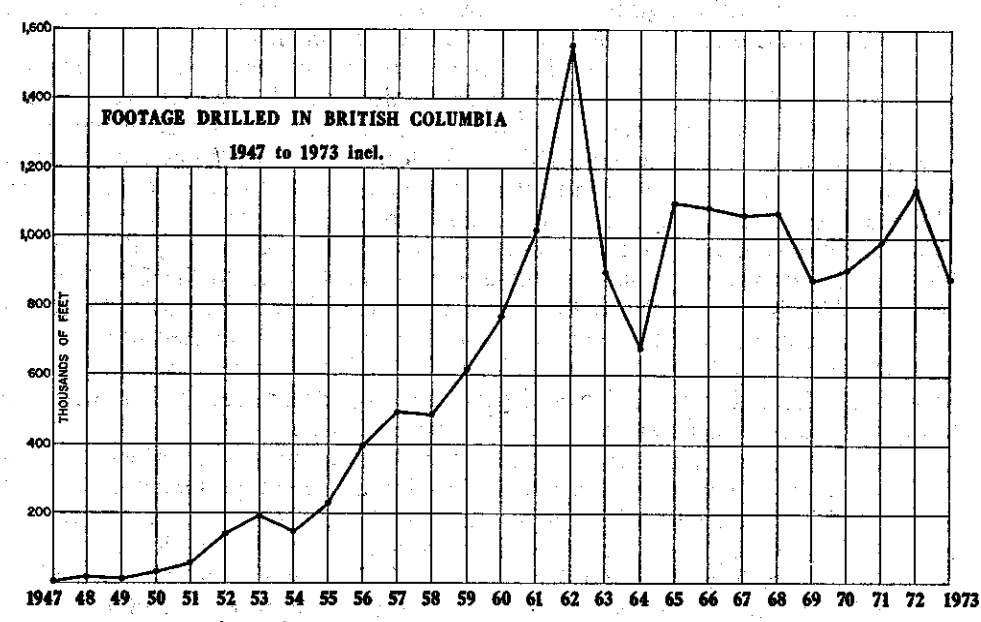


Figure 2. Footage drilled in British Columbia; 1947-73.

Workover operations were undertaken at many newly completed wells in addition to stimulation treatments performed on some of the declining wells. A workover is considered to be any operation carried out after rig-release date that changes the producing interval, or alters, or intends to alter, the producing characteristics of a well. A producing interval may be changed by perforating, cementing perforations, or by running casing or plugs. The producing characteristics of a well may be changed by any operation performed to increase the productivity of a well. Changes may include perforating, acidizing, fracturing, installing a pump, or changing a choke, but do not include the replacement of equipment- Daring 1973, operations were reported for 400 workovers performed on potential or producing wells in British Colombia.

Five new fields were designated by the Branch in-1973 and field boundaries were amended on 21 occasions. The new fields were at Bivouac, Grimly North, Kotcho Lake East, Redeye, and Thetlaandoa. Field boundaries were changed once during 1973 for 11 fields and twice for Buick Creek, Currant, Eagle, Oak, and Osprey. At, the end of 1973 there were 98 designated fields, which are listed in Table 22 and shown in Figure 3.

During 1973, 161 well authorizations were issued by the Development Section and 11 were cancelled where operators decided not to drill the wells.

Disposal of salt water produced with petroleum and natural gas was accomplished by injection into subsurface formations, preferably the formation from which the water originated. Storage of salt water is permitted in surface pits only

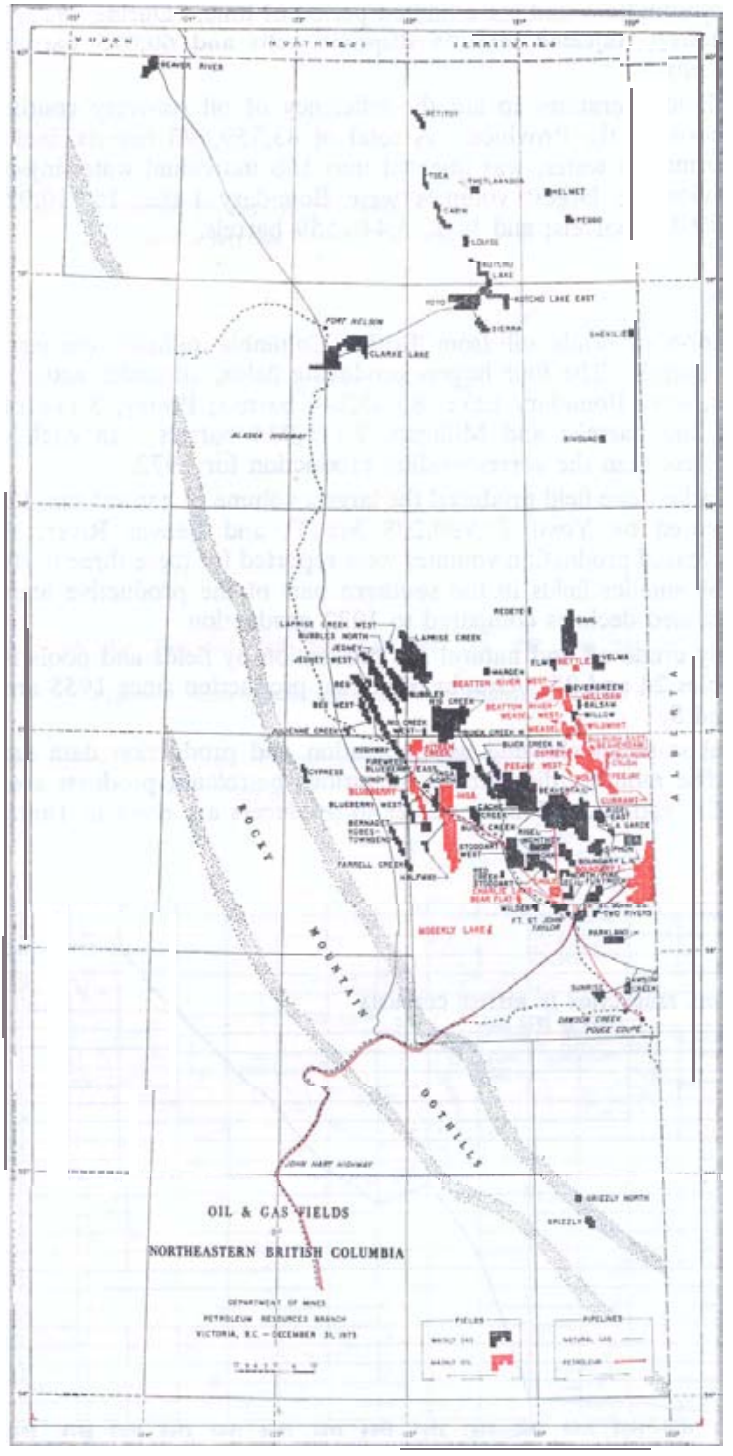


Figure 3. Petroleum and natural gas fields, 1973.

in emergency situations and for a limited period of time. During 1973, there were 7,868,175 barrels injected into 25 disposal wells and 60,875 barrels put into evaporation pits.

Waterflood operations to aid the efficiency of oil recovery continued in 10 producing pools in the Province.. A total of 43,759,896 barrels, including both fresh and formation water, was injected into 166 individual water-injection wells. Fields receiving the largest volumes were Boundary Lake, 15,710,922 barrels; Pcejay, 8,679,302 barrels; and Inga, 5,446,559 barrels.

PRODUCTION

Production of crude oil from British Columbia oilfields during 1973 was 21,189,758 barrels. The four largest producing fields, all under active waterflood programmes, were Boundary Lake, 8,643,244 barrels; Pcejay, 3,118,148 barrels; Inga, 3,087,267 barrels; and Milligan, 2,115,934 barrels. In each case these volumes are less than the corresponding production for 1972.

The Clarke Lake field produced the largest volume of natural gas, 124,289,024 MSCF, followed by Yoyo 71,990,208 MSCF, and Beaver River, 58,151,696 MSCF. Increased production volumes were reported for these three northern fields. However, the smaller fields in the southern part of the productive area generally showed continued declines compared to 1972 production.

Monthly crude oil and natural gas production by fields and pools for 1973 is given in Tables 24 and 25. Graphs of annual production since 1955 are shown in Figures 4 and 5.

General statistics showing well operation and production data are given in Table 26. The monthly dispositions of various petroleum products are shown in Tables 27, 28, and 29. Monthly values to producers are given in Table 30.

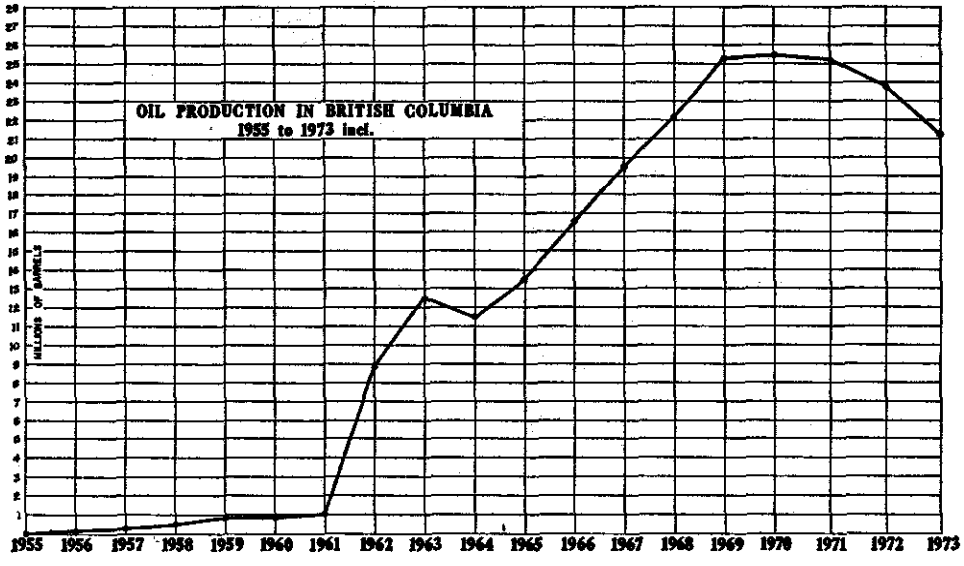


Figure 4. Oil production in British Columbia, 1955–73.

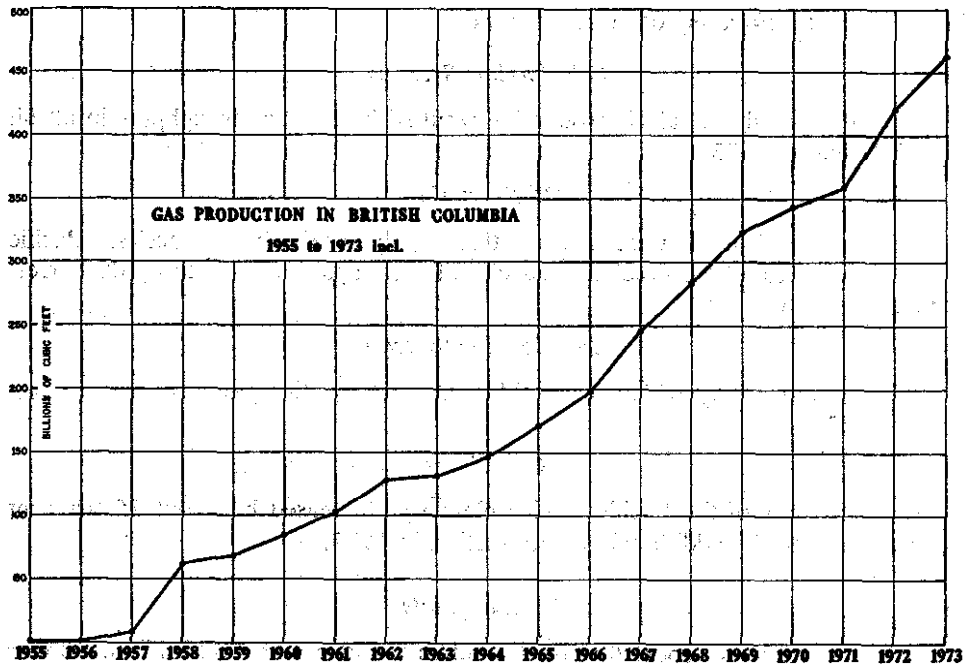


Figure 5. Gas production in British Columbia, 1955–73.

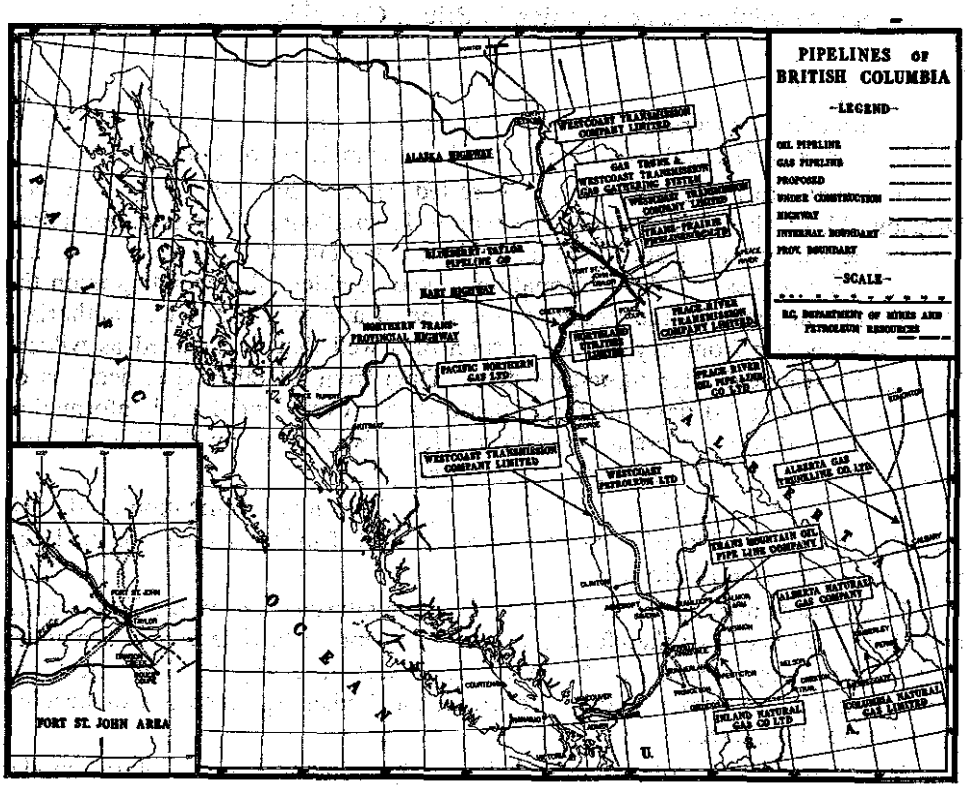


Figure 6. Petroleum and natural gas pipe-lines, 1973.

PIPE-LINES, REFINERIES, AND GAS PLANTS

Oil Pipe-line System

The decreased annual oil production resulted in smaller throughputs in all oil pipe-lines during 1973.

Oil *Refineries*

Minor modifications were made at three of the established refineries. Pacific Petroleums increased the cracking capacity of the Taylor refinery to 4,400 barrels per calendar day.

Gas Pipe-line Systems

There were many, widespread additions made to the gas pipe-line systems during 1973.

Gas Plants

The capacity of the Pacific Taylor plant' was increased by about 15 per cent to accommodate the additional gas production in 1973.

Sulphur Plants

No changes were reported at the Canadian Occidental Petroleum Ltd. sulphur plant at Taylor.

Tables 31, 32, 33, 34, and 35 provide data on the pipe-lines, refineries, gas plants, and the sulphur plant operating in British Columbia.

WELL RECORDS

Information concerning the petroleum and natural gas industry in British Columbia is collected and compiled by the Petroleum Resources Branch.

The data are made available to interested persons, in strict accordance with Division 43 of the Drilling and Production Regulations. Location, *"elevation,* current depth, casing, status, and monthly production of individual wells are released upon request. Other information is held confidential, depending upon the classification assigned by the Branch at the time of approval of the well authorization. Information from any well or portion of a well that is classified as wildcat is available one year *after* rig-release date. Data from all other classifications of wells are available 30 days after rig-release date. Confidential well information may be released to an interested person if a letter is received by the Branch from the operator of the well authorizing its release.

Information is provided by the Branch by publication, examination of Branch records, or reproduction of documents *filed.* Cost-defraying charges are made by the Branch for these services.

The records maintained by the Branch are in constant use by the Engineering and Geological Sections; therefore, they mast be kept up to date and in a manner suitable for many purposes. As published reports are expanded to meet the requirements of industry and other governmental bodies, the *methods* of keeping records most be altered.

The Petroleum Resources 'Branch has adopted many features of the model forms prepared by the Statistical Committee which was established by the annual

Mimes Ministers' Conferences. The Branch uses the following applications and reports:

Form NO.	Form Name
1.	Well Register.
2.	Application for a Well Authorization.
3.	Application to Amend, a Well Authorization.
4.	Application to Change a Well Name.
5.	Application to Abandon a Well.
6.	Application to Alter a Well.
7.	New Oil Well Report
8.	New Gas Well Report.
9.	Application for MPR-Individual Well.
9a.	Application for MPR—Unit/Project.
10.	Report of Wells Connected to a Battery.
BCS1.	Test Data and Production Report.
BCS2.	Monthly Disposition and Crown Royalty Statement.
15.	Monthly Gas-gathering Operations Report.
16.	Monthly Natural Gas Plant Statement.
17.	Monthly Natural Gas Processing Statement
18.	Monthly Sulphur Plant Operations Statement.
19.	Monthly Refinery Operations Report.
20.	Monthly Crude Oil and Condensate/Pentanes Plus Purchaser's Statement.
21.	Monthly Liquefied Petroleum Gas Purchaser's Statement.
22.	Well Completion Report.
23.	Supplement to Well Completion Report.
24.	Workover Report No.
*25.	Workover Card.
*26.	Monthly Operations Report.
27.	Application for a Rig Licence.
28.	Monthly Water Flood Operations Report.
29.	Monthly Water Receipts and Disposal Report.
30.	Statement of Nominations and Estimated Requirements for British Columbia Crude Oil and Condensate/Pentanes plus.
3 1.	New Service Well Report.
32.	Production Allowable Report—Crude Oil.
*33.	Drilling Report.
34.	Application for Test-hole Authorization(s).
*35.	Report of a Well Inspection.
36.	Confidential D.S.T. Report.
*7c.	Meter Inspection Report.
*7d.	Battery Inspection Report.
	†Monthly Natural Gas Distributor's Statcment.
	†Monthly Report on Oii Pipe-line Gathering Operations:

* For [illegible] use only.
† Used in conjunction with [illegible] Canada.

REPORTS AND PUBLICATIONS.

Schedule of Wells

An annual volume was compiled and published, giving all well information released during 1973. The data are arranged by geographical locations and provide the following information when applicable: Well authorization number, well name, location, classification, co-ordinates, elevation, total depth, status including geological pool, interval open to production, casing details, spud date, rig-release date, logs, core intervals, sample intervals, drill-stem test data, and geological markers determined by the Branch.

The information is condensed from rep& submitted to the Branch by the various operators.

Weekly Report

A weekly report is published for Departmental use from data collected by the field office staff at Charlie Lake. The week reported is from 8 a.m. on Friday to the succeeding Friday. The following information is included:

(1) Spudded wells.
(2) Cancelled locations.
(3) Changes of well names.
(4) Changes of well classification.
(5) Changes of well status.
(6) Suspended wells.
(7) Finished drilling wells.
(8) Abandoned wells.
(9) 011 wells.
(10) Gas wells.
(11) Workovers.
(12) Operating wells.
(13) Approved wells not spudded.
(14) Summary of well count, giving the following totals:
- (a) Finished drilling wells.
- (b) Abandoned wells.
- (c) Oil wells.
- (d) Gas wells.
- (c) Water-injection wells.
- (j) Gas-injection wells.
- (g) Water-source wells.
- (h) Observation wells.
- (i) Disposal wells.
- (j) Completed wells.
- (k) Locations drilled.
- (I) Multiple completions.
- (m) Drilling wells.
- (n) Suspended wells.
- (o) Approved but not spudded wells.
- (p) Locations in good standing.
- (q) Locations approved.
- (r) Locations cancelled.

The number of Completed wells is calculated by two methods to provide verification. The number of wells of different status, counting each zone of a multiple completion as a well, is compared to the number of locations drilled, less the multiple completions.

The number of locations in good standing is also calculated by two methods. The total number of locations drilled, drilling, suspended, and approved but not spudded is compared to the total number of locations approved, less the number of locations cancelled.

Oil and Gas Production Report

The Oil and Gas Production Report is prepared monthly from returns made by the operators of producing wells, pipe-lines, gas plants, oil refineries, and distribution facilities. All production data are compiled and maintained by a computer application. The contents of the report are as follows:

(1) Graphical presentations of the daily average oil 'production, the daily average marketable gas production, and the monthly footage drilled, with comparative' graphs of the totals for the preceding year.
(2) Monthly summary of the drilling and completion activity, with cumulatives for the year.
(3) New oil- and gas-well reports received during the imported month.
(4) The number of producing and producible 'oil and gas wells by field and pool.
(5) Production of crude oil, condensate, natural gas, and water by individual well, project; or unit, field and pool with gas/oil and water/oil ratios calculated, where, applicable. The quantities are given for the current month, the current year to date. 'and the all-time cumulative.
(6) Estimated oil production for 'the succeeding month, which is based upon the pipe-line returns reported to the Branch field office.
(7) Crude oil and condensate/pentanes plus disposition, with comparable totals for the same month of the preceding year.
(8) Tabulation of nominations and estimated requirements for British Columbia crude oil and condensate/pentanes plus.
(9) Natural gas supply and disposition, with comparable, volumes for the same month of the preceding year.
(10) Value of natural gas sales to British Columbia distributors.
(11) Value of crude oil and natural gas to British Columbia producers.
(12) Production and disposition of butane,, propane, and sulphur.
(13) Value of butane, propane, and sulphur to British Columbia producers.
(14) Waterflood operations showing the number of injection wells, and volumes of water by current month, current year, with total cumulative figures for each field and pool. The totals are also given for the same month of the preceding year;

This report is compiled and mailed to subscribers approximately three weeks after receipt of the returns from the operators.

Drilling and Land Report

The Drilling and Land Report is published and distributed monthly; concurrently with the Gil and Gas Production Report.

The Drilling Section is compiled from information forwarded by the Branch field office and contains the following:

(1) Monthly summary of drilling and completion activity, with cumulatives for the year.
(2) Summary of the well count, giving the following totals:
  (*a*) Locations drilled.
  (*b*) Finished drilling wells.
  (*c*) Abandoned wells.
  (*d*) Oil wells.
  (*e*) Gas wells.
  (*f*) Water-injection wells.
  (*g*) Gas-injection wells.
  (*h*) Water-source wells.
  (*i*) Observation wells.
  (*j*) Disposal wells.
  (*k*) Total wells completed.
(3) Well authorizations approved.
(4) Locations cancelled.
(5) Well authorizations outstanding.
(6) Changes of well status.
(7) Changes of well classification.
(8) Changes of well names.
(9) Suspended wells.
(10) Drilling and completed wells.
(11) Rig licences issued.
(12) Rig licences renewed.
(13) Rig licences cancelled.
(14) Well data released from confidential status.
(15) Geological reports released from confidential status.
(16) Descriptions of designated fields.
(17) Drilling and production schemes approved by the Branch during the reported month.

The Land Section is prepared by the Titles Division and contains the following:

(1) Acreage synopses.
(2) Summary of changes in acreage held under the following titles:
  (a) Permits.
  (*b*) Leases.
  (*c*) *Natural gas* licences.
  (*d*) *Drilling reservations.*
(3) Geophysical licences issued and renewed.
(4) Notices regarding dispositions of Crown petroleum and natural gas rights.
(5) Summary of disposition of permits, leases, natural gas licences, and drilling reservations.

Publications

Various publications, maps, and services concerning petroleum and natural gas operations in British Columbia are available. A catalogue containing descriptions and prices is available from the Petroleum Resources Branch, Department of Mines and Petroleum Resources, Parliament Buildings, Victoria, B.C.

TABLE 13—EXPLORATORY AND DEVELOPMENT WELLS COMPLETED, JANUARY TO DECEMBER 1973

	Oil		Gas		Total Producers		Abandonments		Status Undetermined		Service Wells		Total	
	No.	Footage	No.	Footage	No.	Footage	No.	Footage	No.	Footage	No.	Footage	No.	Footage
New field wildcats	---	------	5	34,468	5	34,468	9	89,338	---	------	---	------	14	110,308
New pool wildcats	1	4,085	15	73,953	16	78,038	34	174,170	1	6,245	---	------	51	258,453
Deep-pool tests	---	------	---	------	---	------	21	9,471	---	------	---	------	2	9,471
Outposts	3	18,241	4	19,994	7	38,235	24	122,372	1	9,156	---	------	32	169,763
Total exploratory wells	4	22,326	24	128,415	28	150,741	67	381,853	2	15,401	---	------	97	547,995
Total development wells	5	21,821	27	123,671	32	145,492	32	147,423	2	16,850	---	------	66	309,765
Subtotals	9	44,147	51	252,086	60	296,233	99	529,276	4	32,251	4	16,993	4	16,993
Totals	9	44,147	51	252,086	60	296,233	99	529,276	4	32,251	4	16,993	167	874,753

[1] Two deep-pool tests are not included in the well total as they are counted under "Development" and "Outpost." There were seven dual gas wells which were counted as single wells.

TABLE 14—GEOPHYSICAL EXPLORATION, 1973

Seismic Surveys

NOTE—Unless otherwise shown, the exploration method used is the reflection seismic survey. For indicating location, the National Topographic map-numbering system is used, except in the Peace River Block, where the township system is used.

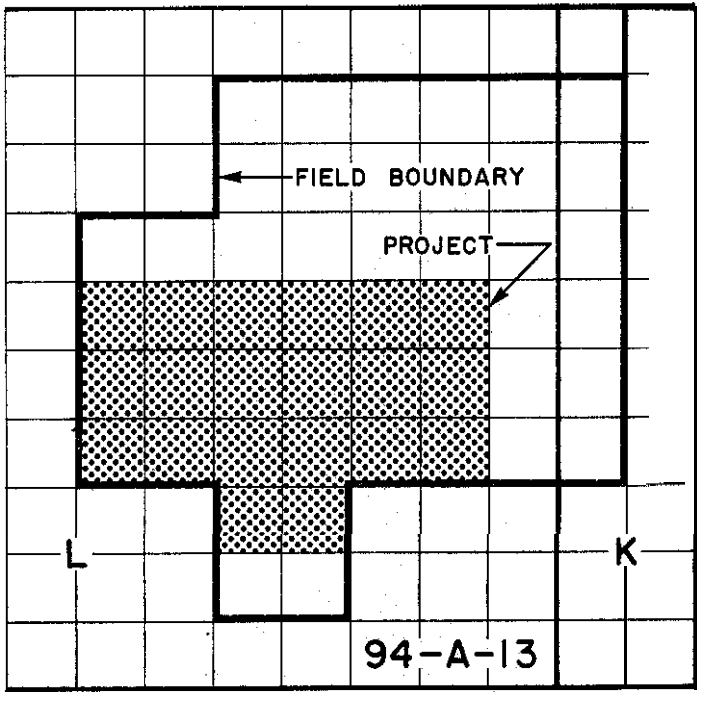
Company	Location of Exploration	Number of Seismic Crews	Number of Crew-weeks
January			
Amoco Canada Petroleum Co. Ltd.	94-I-7, -10, -11 94-J-13 94-O-3, -4 94-P-5, -6 Tp 85, R. 13–16 W6M	3	8.6
Aquitaine Co. of Canada Ltd.	94-O-5	1	1.1
	94-P-1, -2	1	0.3
Chevron Standard	94-I-10	1	2
	94-J-6	1	1
	94-P-3, -4	1	1
Hudson's Bay Oil & Gas Co. Ltd.	94-H-4, -5	1	2.5
Quasar Petroleum Ltd.	93-P-3	1	2
Imperial Oil Limited	94-J-2	1	4
Union Oil Co. of Canada Ltd.	93-I-9, -10	1	1
J. M. Huber Corporation	94-G-1	1	2
BP Oil and Gas Ltd.	94-O-8, -9 94-P-5, -12	1	3
Petrofina Canada Ltd.	Tp. 83, R. 23, 24 W6M	1	0.5
Texaco Canada Ltd.	93-P-13, -14 94-A-3, -4	1	2
Tricentrol Canada Ltd.	94-I-6	1	1
General American Oil Ltd.	94-A-5 94-B-8	1	2
Home Oil Company Limited	94-B-15	1	0.1
Tenneco Oil & Minerals, Ltd.	94-I-13 94-P-4, -5	1	1.2
February			
Amoco Canada Petroleum Co. Ltd.	94-A-13 94-B-9, -10, -15, -16 94-G-4 94-H-4 94-J-13 94-I-9, -10, -11, -14, -15 94-N-16 94-O-3, -4, -13	3	7.8
Aquitaine Co. of Canada Ltd.	94-N-16	1	
	94-O-13	1	
	94-P-1, -2	1	
Chevron Standard	94-I-13, -14 94 P 3, -4	1	
	94-J-9, 94-I-12	1	1
	94-J-14, -15	1	1
	94-J-10, -11	1	1.5
Gulf Oil Canada Limited	94-G-7	1	1
	94-B-1	1	2
Hudson's Bay Oil & Gas Co. Ltd.	94-H-4	1	0.5
	94-G-15	1	0.5
Quasar Petroleum Ltd.	93-P-3	1	4
Imperial Oil Limited	94-J-2	1	1
	94-J-11	1	1
Union Oil Co. of Canada Ltd.	93-I-9, -10	1	3.5
PanCanadian Petroleum Limited	94-K-15, -16	1	1
Frio Oil Ltd.	94-I-13	1	1.2
	94-H-9, -16	1	1
BP Oil & Gas Ltd.	94-O-8, -9 94-P-5, -12	1	2
	94-G-13	1	0.7
	94-J-6, -11	1	1.4
	Tp. 80, 81 R. 20, 21 W6M	1	1
Westcoast Petroleum Ltd.	94-N-5	1	2
Petrofina Canada Ltd.	Tp. 83, R. 23, 24 W6M	1	0.5

TABLE 14—GEOPHYSICAL EXPLORATION, 1973—*Continued*
Seismic Surveys—Continued

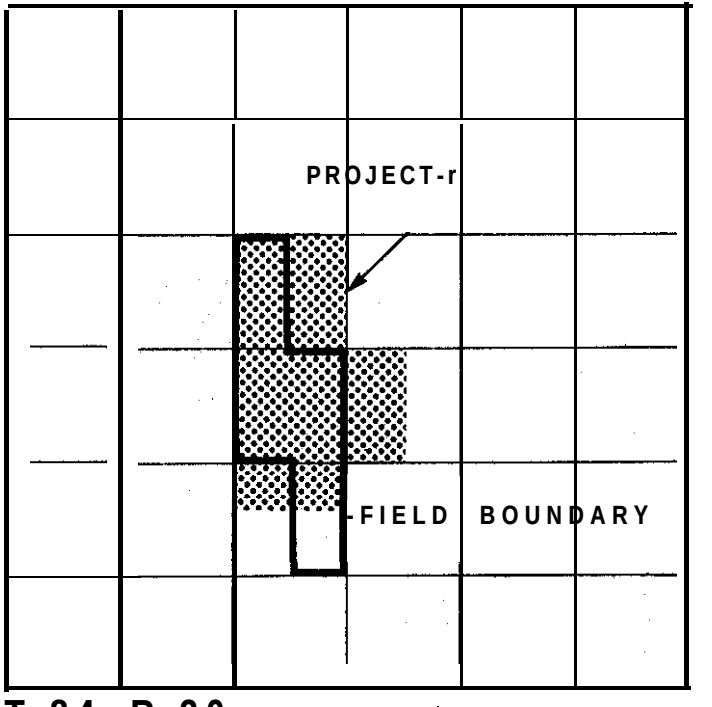
Company	Location of Exploration	Number of Seismic Crews	Number of Crew-weeks
March			
Amoco Canada Petroleum Co. Ltd.	94-A-13	3	3.1
	94-B-9, -10, -15, -16		
	94-G-1		
	94-H-4		
	94-I-10, -11, -14, -15		
	94-J-13		
	94-O-3, -4		
Aquitaine Co. of Canada Ltd.	94-O-16, 94-P-13	1	0.5
	94-O-10, -11	1	0.8
Chevron Standard	94-J-10, -11	1	1
	94-I-10, -11		1.5
Gulf Oil Canada Limited	94-B-8	1	1
Quasar Petroleum Ltd.	93-P-3, -5, -12	1	4
PanCanadian Petroleum Limited	94-K-15, -16	1	2
Frio Oil Ltd.	94-J-16	1	0.4
BP Oil & Gas Ltd.	94-O-9, 94-P-12	1	0.7
	94-J-16	1	0.4
Westcoast Petroleum Ltd.	94-K-9	1	1
	94-N-5	1	2
Teck Corporation Ltd.	94-A-13, -14	1	0.4
Texaco Canada Ltd.	94-J-9, -10	1	2
April			
Nil	*Nil*	*Nil*	*Nil*
May			
Quasar Petroleum Ltd.	93-P-5, -6	1	4
June			
Quasar Petroleum Ltd.	93-P-5, -6	1	4
Kerr McGee Corporation	93-I-15, -16	1	2
	93-P-2		
July			
Quasar Petroleum Ltd.	93-P-3, -5	1	3
Kerr McGee Corporation	93-I-15, -16	1	3
	93-P-2		
BP Oil & Gas Ltd.	93-P-4, -5, -6	1	1
August			
Nil	*Nil*	*Nil*	*Nil*
September			
Amoco Canada Petroleum Co. Ltd.	94-K-9, -10, -16	1	1.4
BP Oil & Gas Ltd.	93-P-4, -5, -6	1	0.7
October			
Amoco Canada Petroleum Co. Ltd.	94-K-9, -10, -16	1	4.3
Hudson's Bay Oil & Gas Co. Ltd.	94-B-15	1	0.5
Wainoco Oil Limited	Tp. 78, 79 R. 14, 15 W6	1	0.5
BP Oil & Gas Ltd.	93-P-4, -5, -6	1	2.4
November			
Amoco Canada Petroleum Co. Ltd.	94-K-9, -10, -16	1	4.3
	94-B-6, -7		
Quasar Petroleum Ltd.	93-P-5, -12	1	4
Wainoco Oil Limited	Tp. 78, 79 R. 14, 15 W6	1	0.5
Home Oil Company Limited	94-A-6	1	0.1
December			
Amoco Canada Petroleum Co. Ltd.	94-B-6, -7	1	3.0
Aquitaine Co. of Canada Ltd.	94-O-14	1	1.2
Quasar Petroleum Ltd.	93-P-5, -12	1	2.0
BP Oil & Gas Ltd.	Tp. 80, 81, 82 R. 14, 15 W6	1	2.0
	94-O-8, -9	1	1
	94-P-5, -12		
Western Decalta Petroleum Ltd.	94-B-7	1	2

TABLE 15—SURFACE GEOLOGICAL EXPLORATION, 1973

Company	Location of Exploration	Number of Geologists	Number of Party-weeks
June			
Amoco Canada Petroleum Co. Ltd.	94-J, K, N, O	5	2.5
	93-O	2	1.4
July			
Amoco Canada Petroleum Co. Ltd.	94-J, K, N, O	5	4.7
Chevron Standard	94-B	6	4

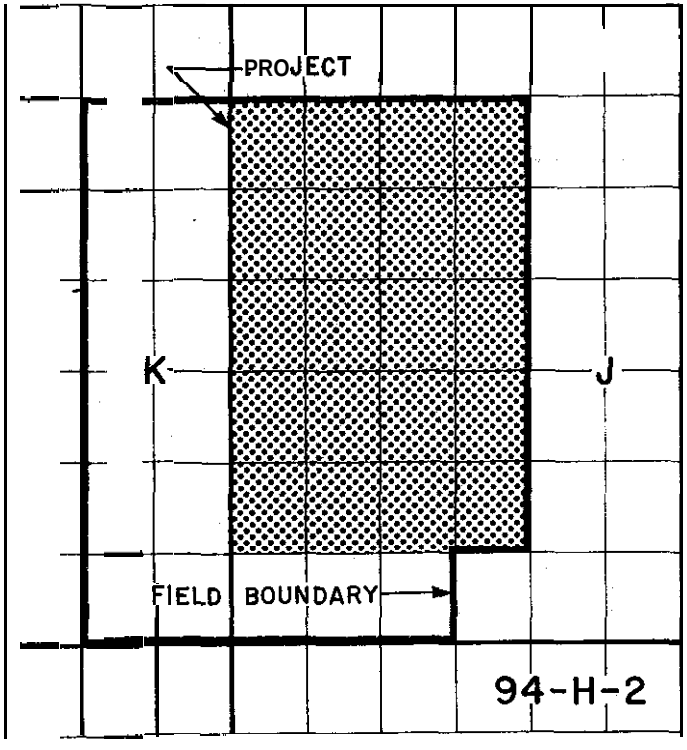


MAP 1
UNION OIL PROJECT
GETHING POOL
AITKEN CREEK FIELD

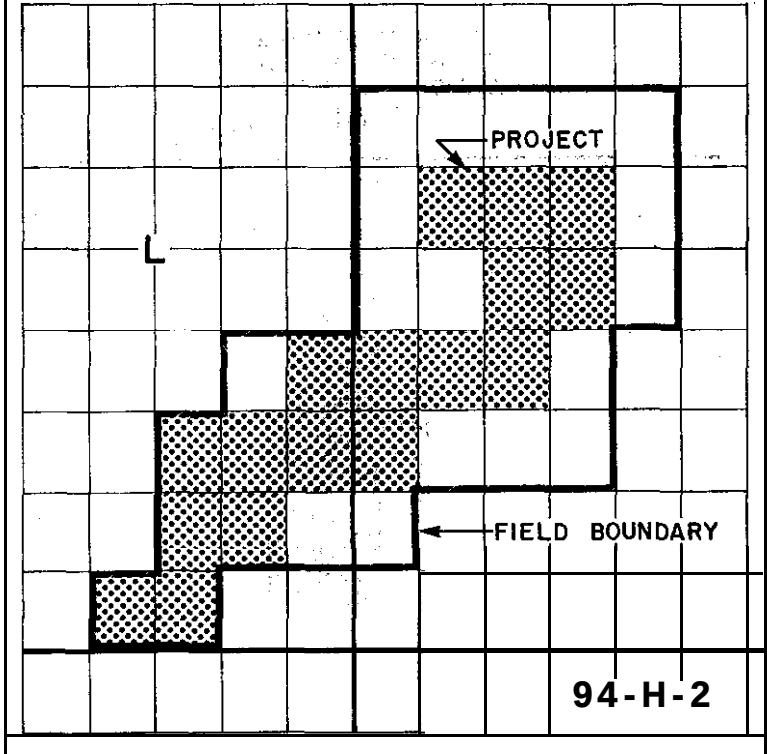


T.84 R.20

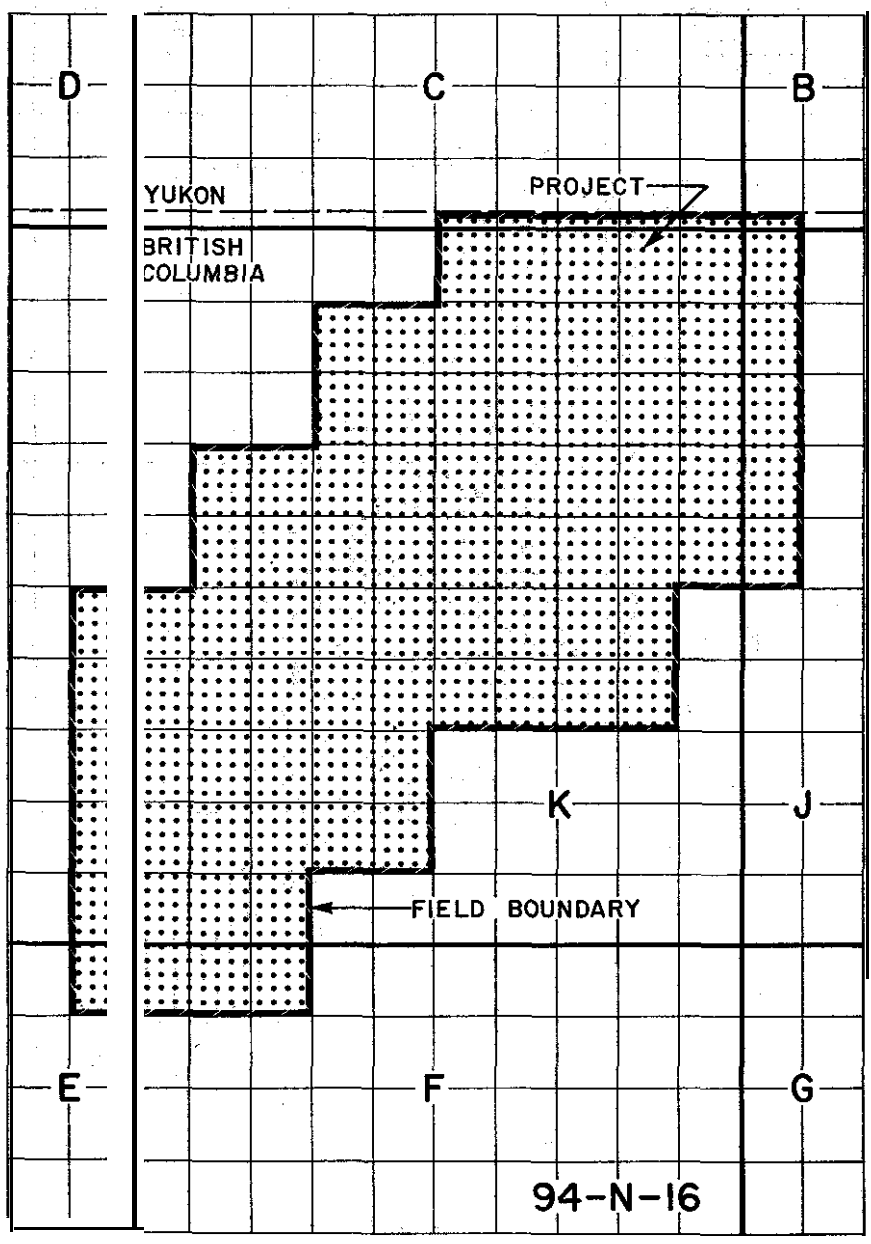
MAP 2
MONSANTO PROJECT
NORTH PINE POOL
SEAR FLAT FIELD



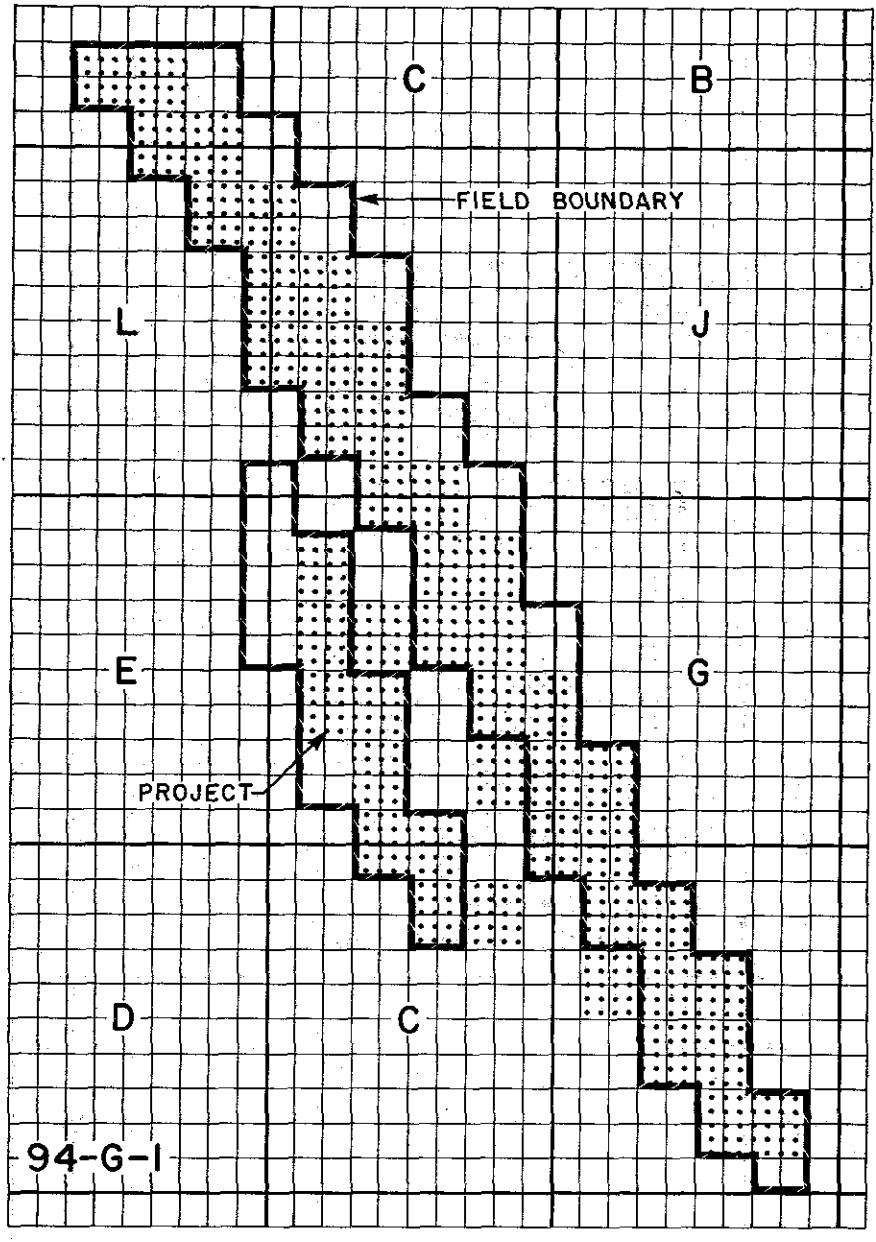
MAP 3
BP OIL PROJECT
HALFWAY POOL
BEATTON RIVER FIELD



MAP 4
BP OIL UNIT I
BLUESKY POOL
BEATTON RIVER WEST FIELD

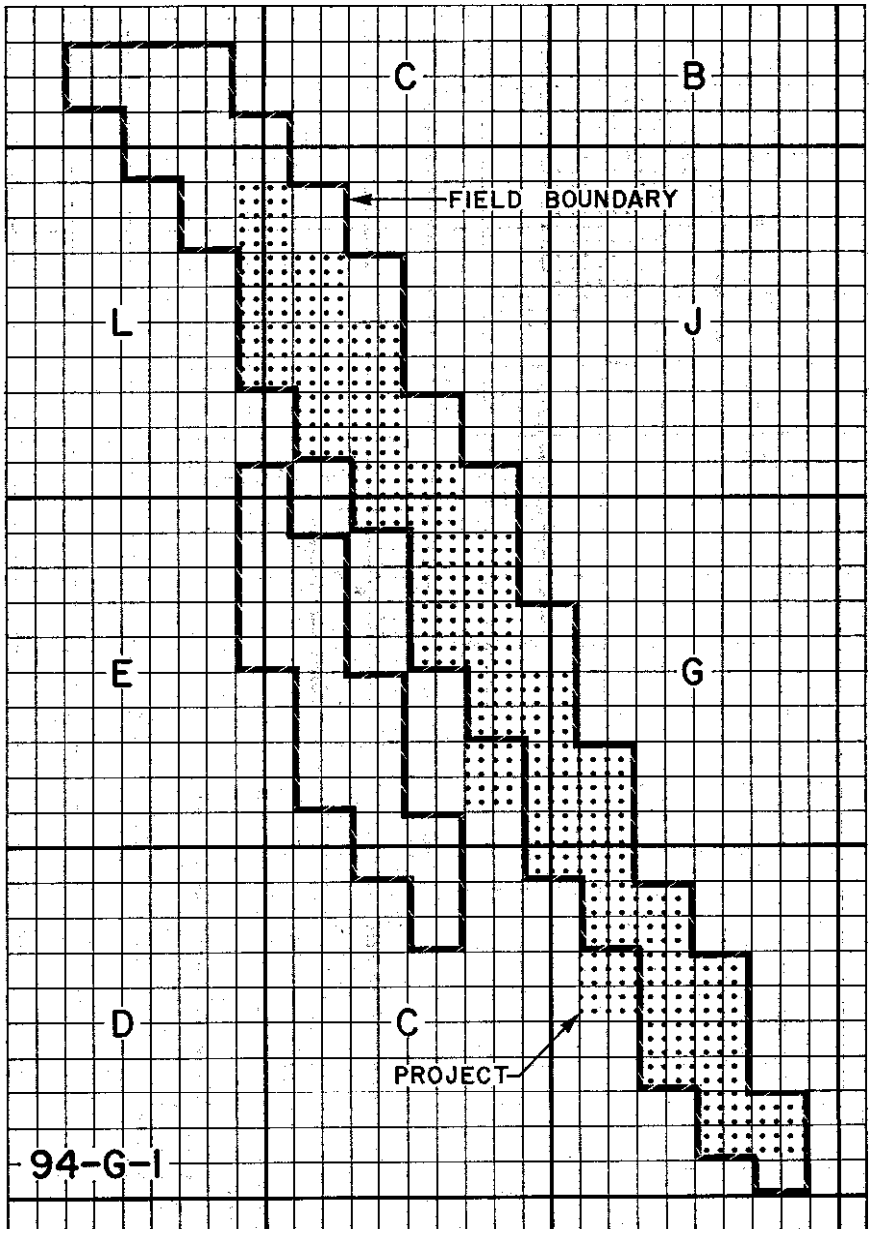


MAP 5
AMOCO PROJECT
NAHANNI POOL
BEAVER RIVER FIELD

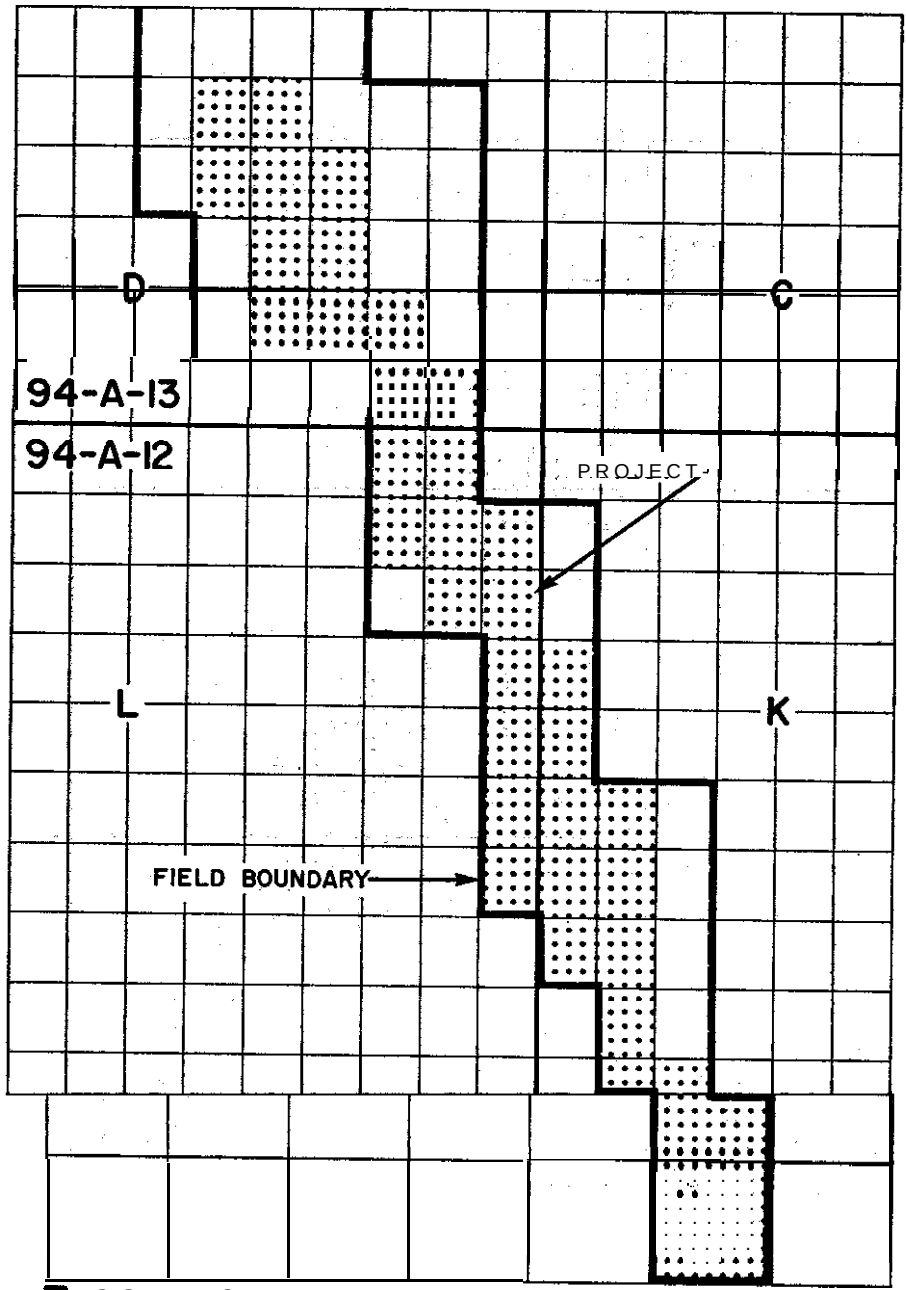


MAP 6

PACIFIC PETROLEUMS PROJECT
BALDONNEL POOL
BEG & BEG WEST FIELDS

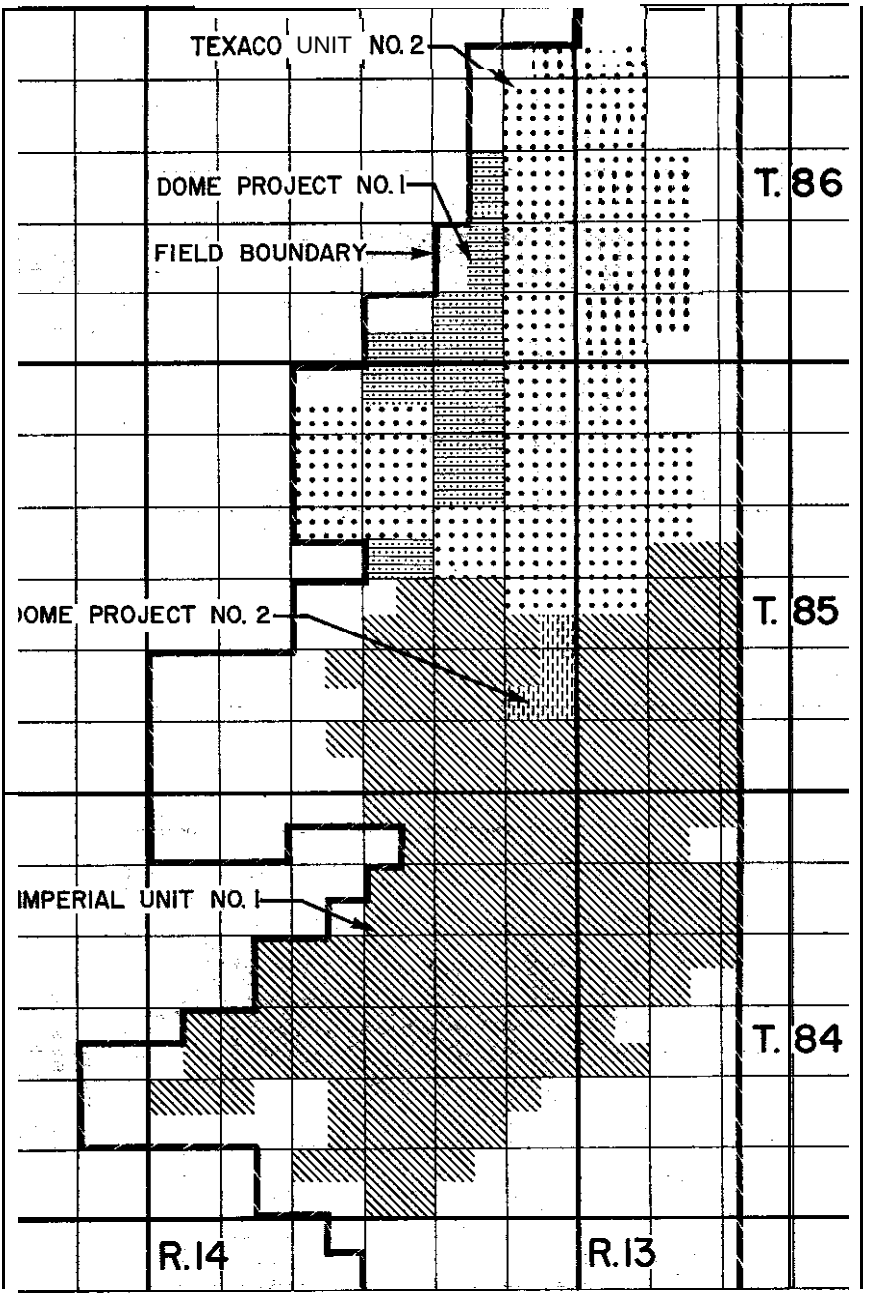


MAP 7
PACIFIC PETROLEUMS PROJECT
HALFWAY POOL
BEG FIELD

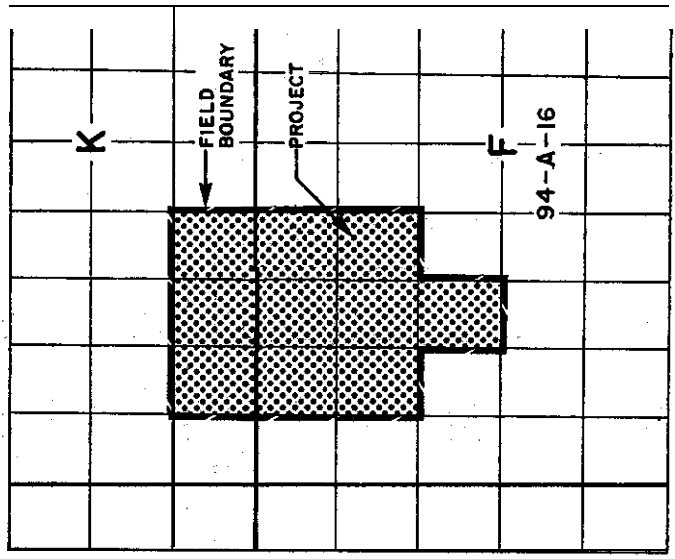


MAP 8

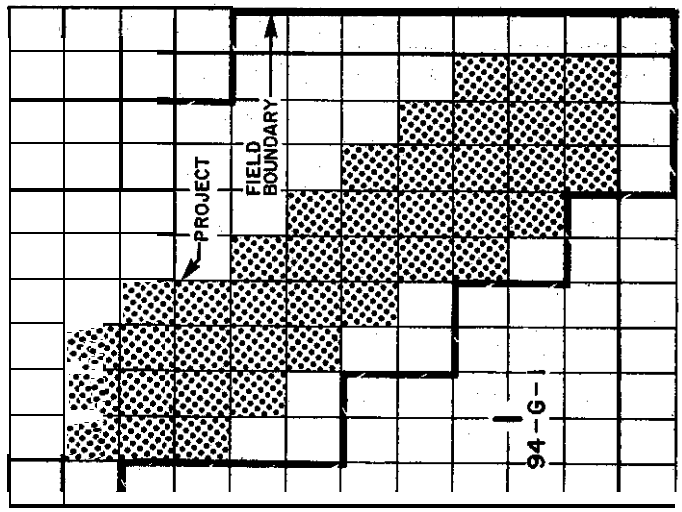
PACIFIC PETROLEUMS PROJECT
DEBOLT POOL
BLUEBERRY FIELD



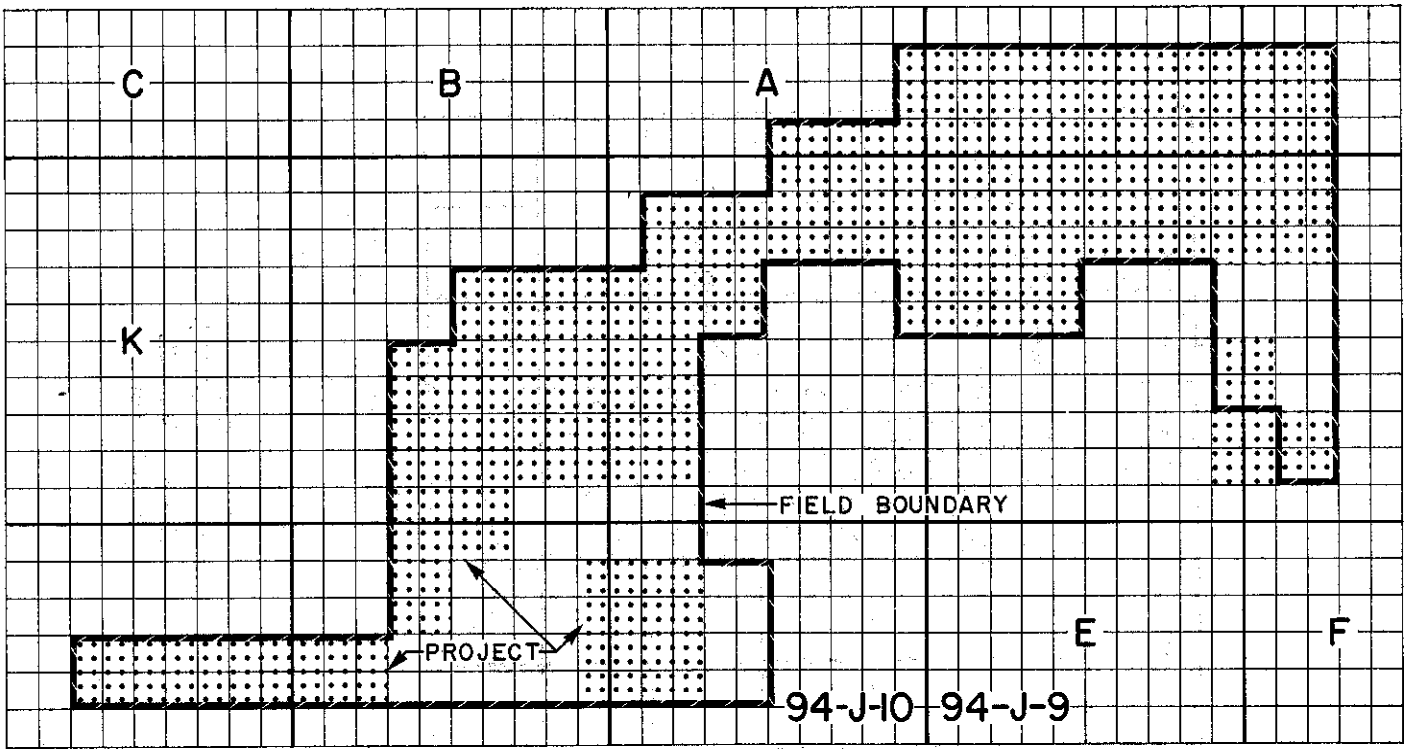
MAP 9
BOUNDARY LAKE POOL PROJECTS
BOUNDARY LAKE FIELD



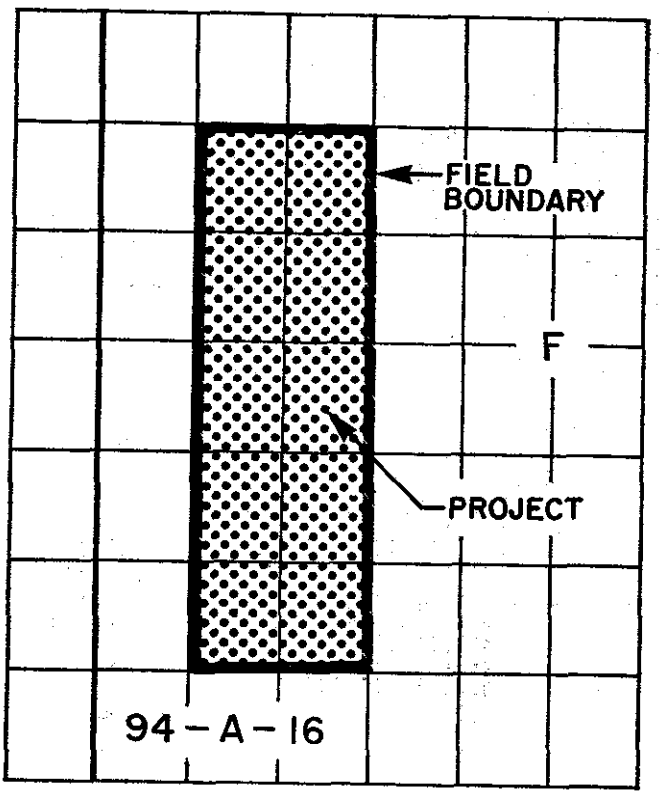
Map 11
UNION OIL PROJECT
HALFWAY POOL
BULRUSH FIELD



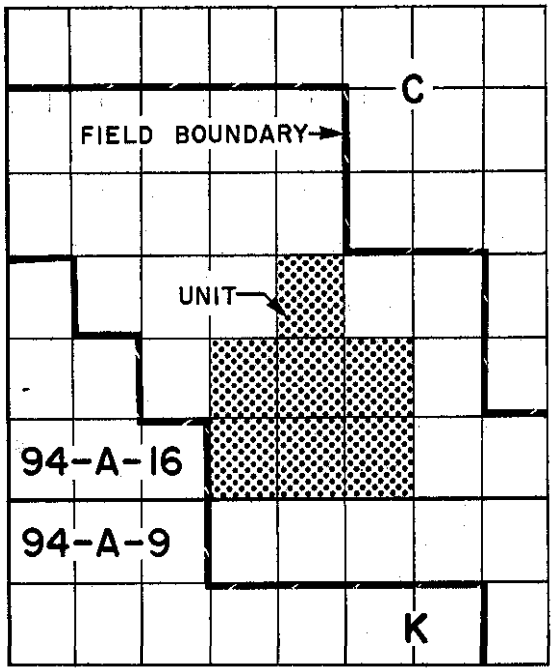
Map 10
PACIFIC PETROLEUMS PROJECT
BALDONNEL POOL
BUBBLES FIELD



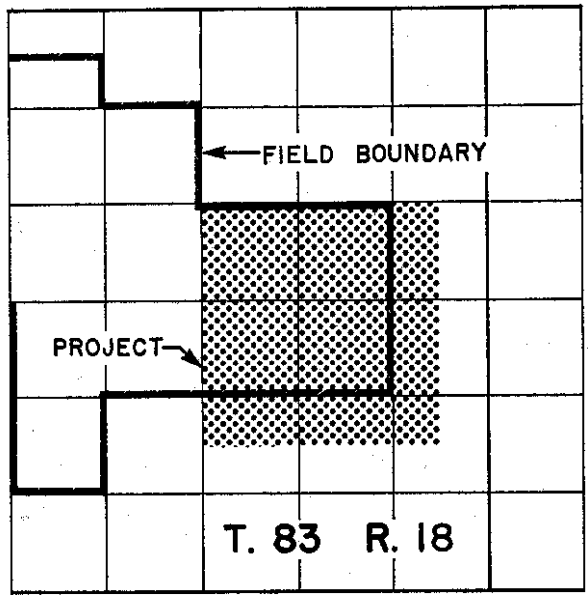
MAP 12
PACIFIC PETROLEUMS PROJECT
SLAVE POINT POOL
CLARKE LAKE FIELD



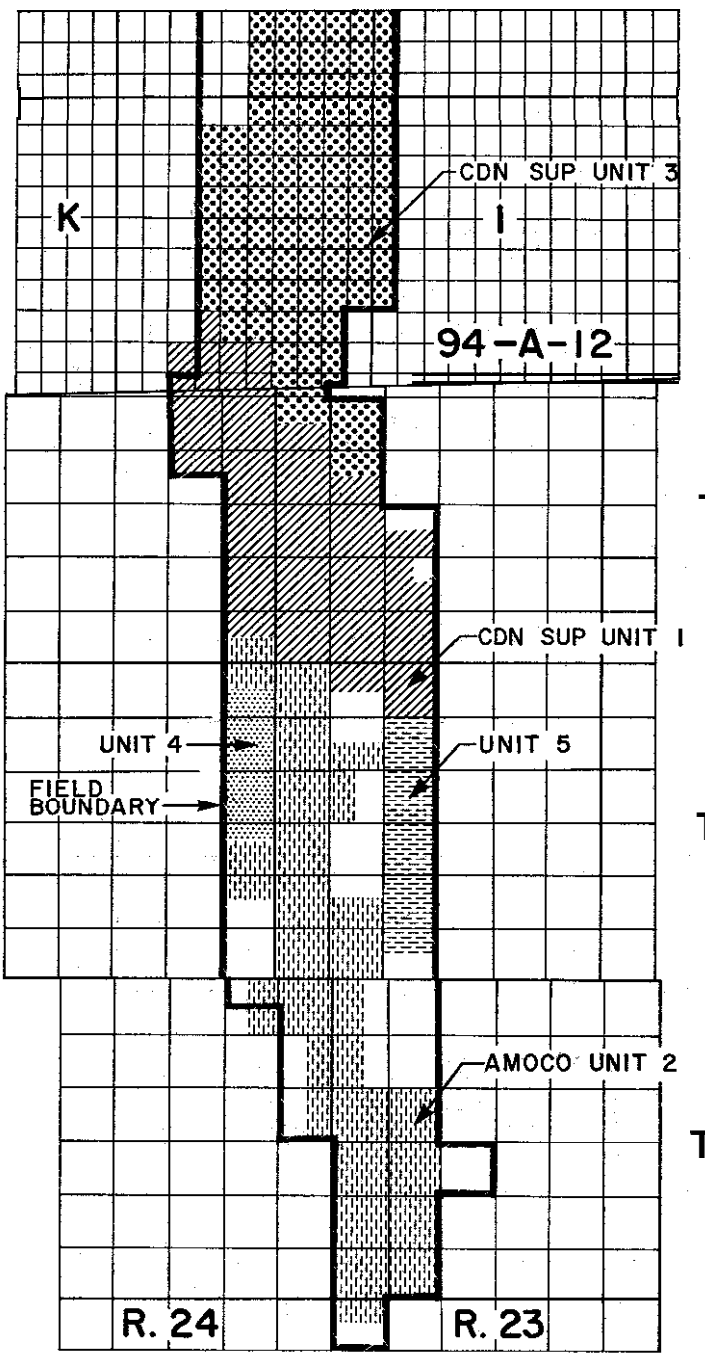
M o p
UNION OH UNIT I
HALFWAY. POOL
CRUSH FIELD



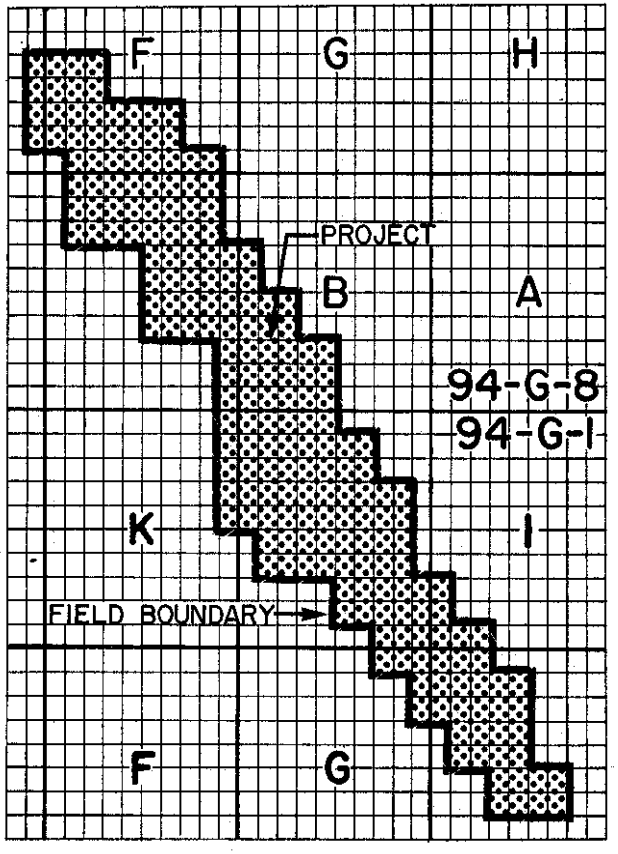
Map 14
PACIFIC PETROLEUMS UNIT I
HALFWAY POOL
CURRANT FIELD



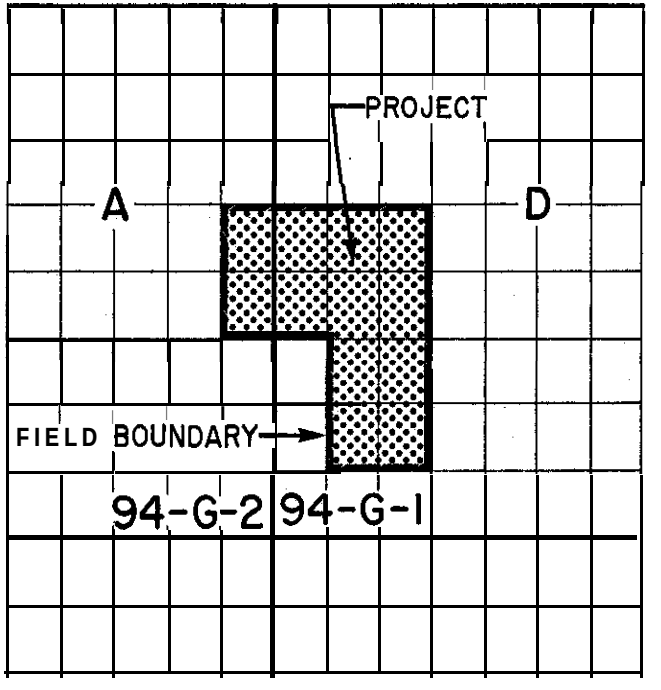
MAP 15
PACIFIC PETROLEUMS UNIT I
PINGEL POOL
FORT ST. JOHN FIELD



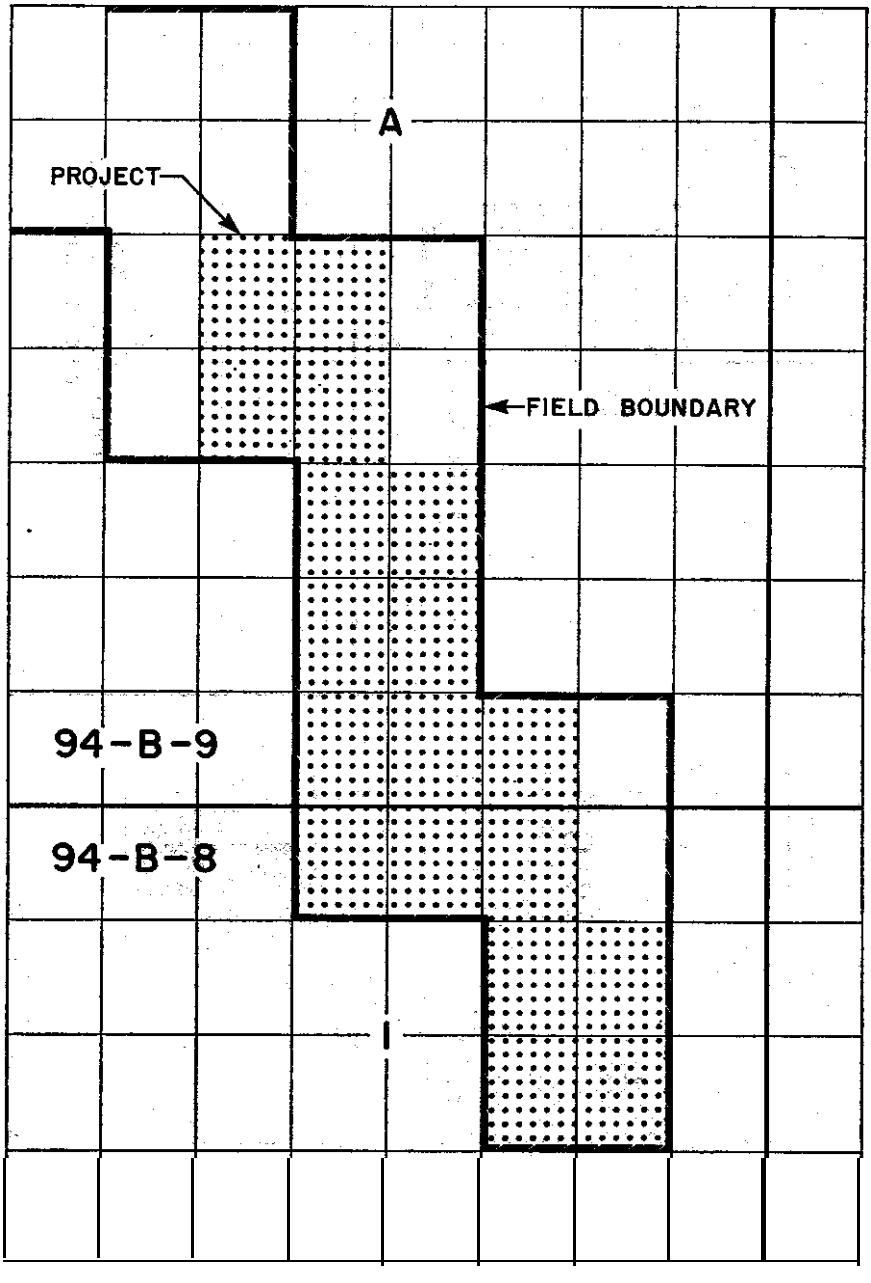
Map 16
INGA POOL UNITS
INGA FIELD



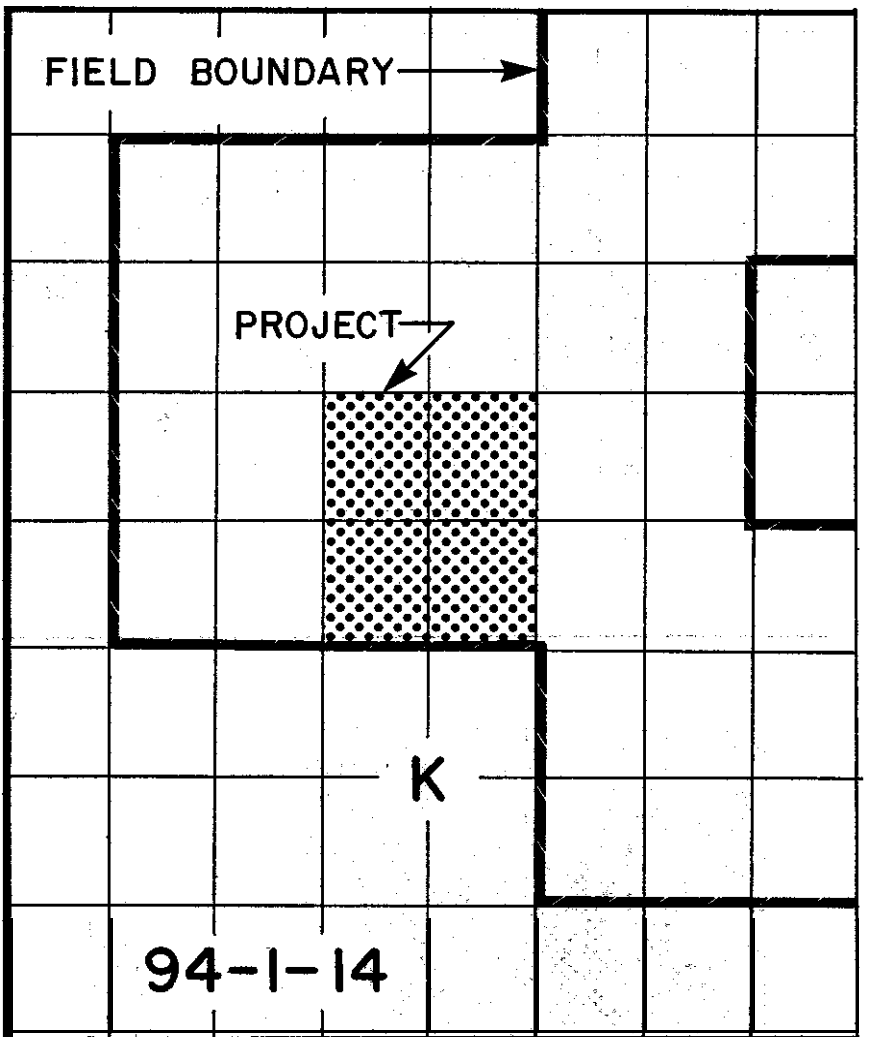
Map 17
PACIFIC PROJECTS
BALDONNEL & HALFWAY POOLS
JEDNEY FIELD



Map 18
ARCO PROJECTS
BALDONNEL & HALFWAY POOLS
JULIENNE FIELD

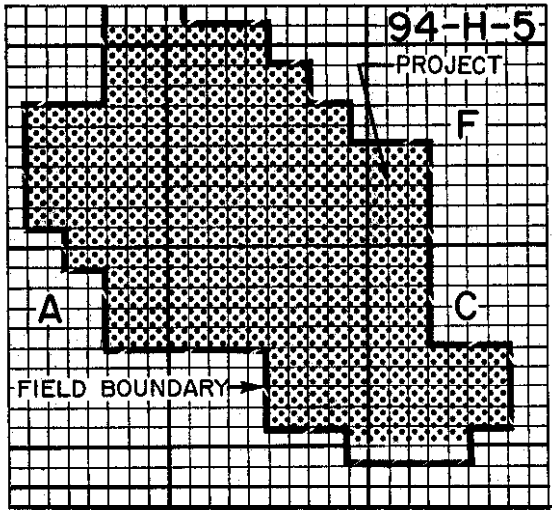


MAP 19
PACIFIC PETROLEUM PROJECT
HALFWAY POOL
KOBES-TOWNSEND FIELD

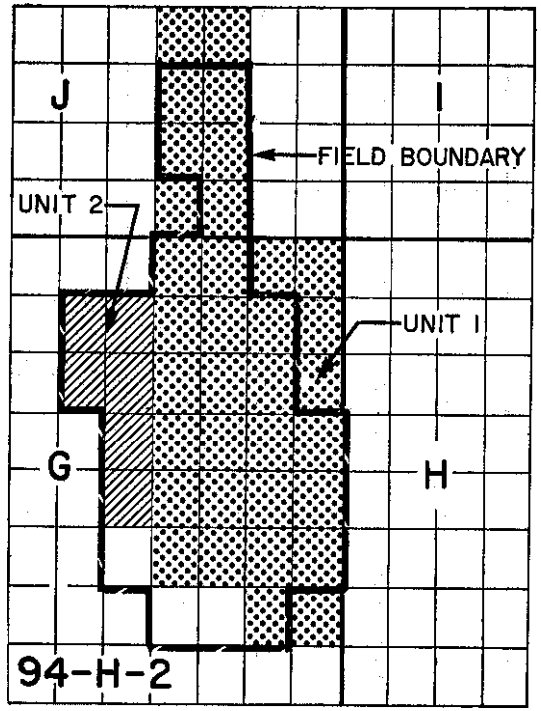


Map 20

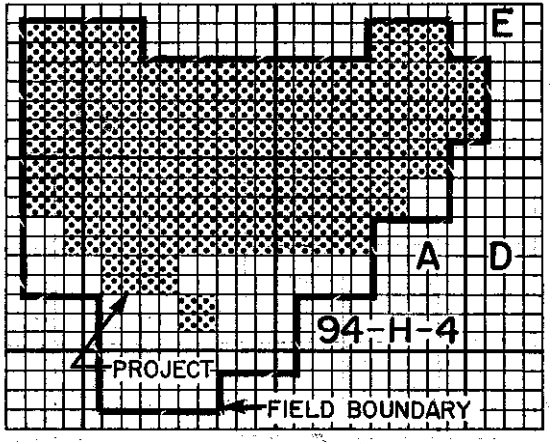
PACIFIC PETROLEUMS' PROJECT
SLAVE POINT POOL
KOTCHO LAKE FIELD



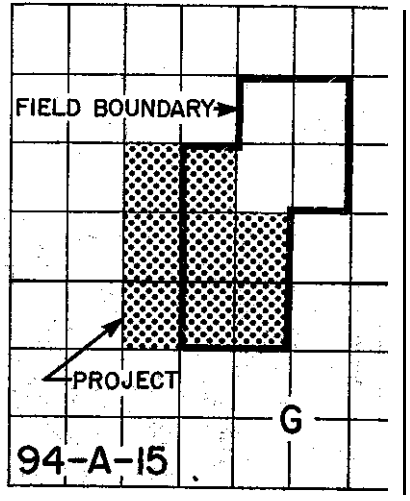
Map 21
BALDONNEL POOL PROJECT
LAPRISE CREEK FIELD



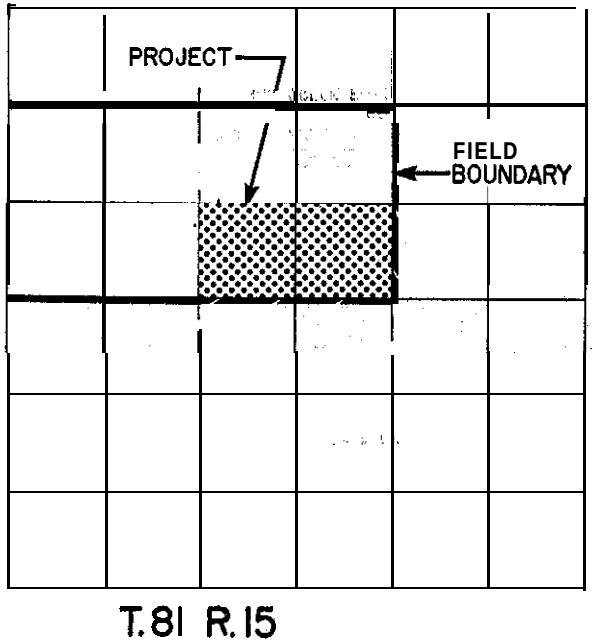
Map 22
UNION OIL UNITS
HALFWAY POOL
MILLIGAN CREEK FIELD



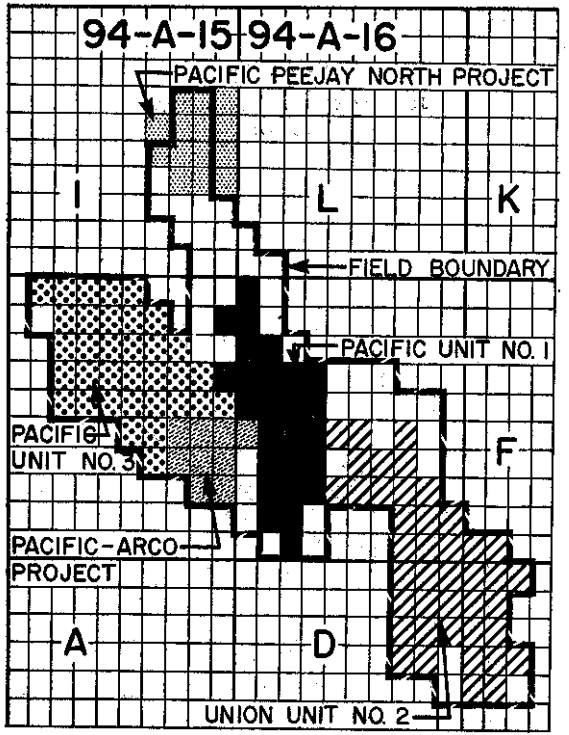
Map 23
TEXACO EXPLORATION PROJECT
BALDONNEL POOL
NIG CREEK FIELD



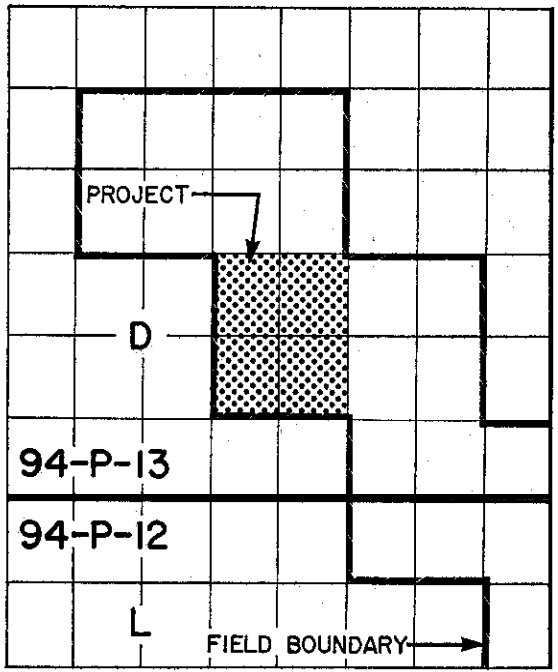
Map 24
PACIFIC PETROLEUMS PROJECT
HALFWAY POOL
OSPREY FIELD



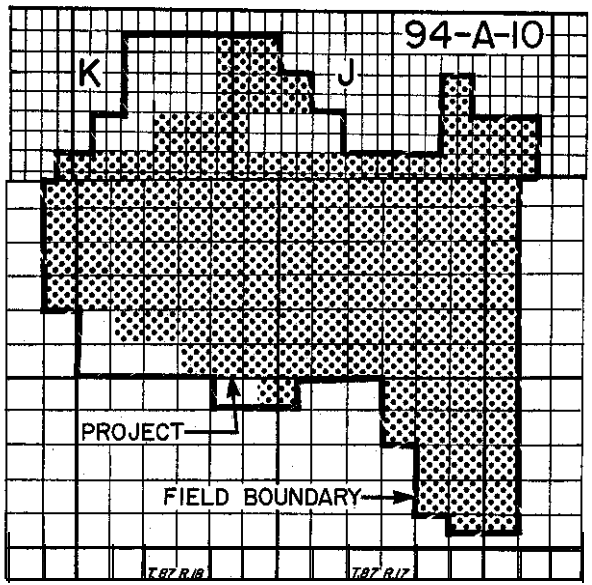
Map 25
PACIFIC PETROLEUMS PROJECT
WABAMUN POOL
PARKLAND FIELD



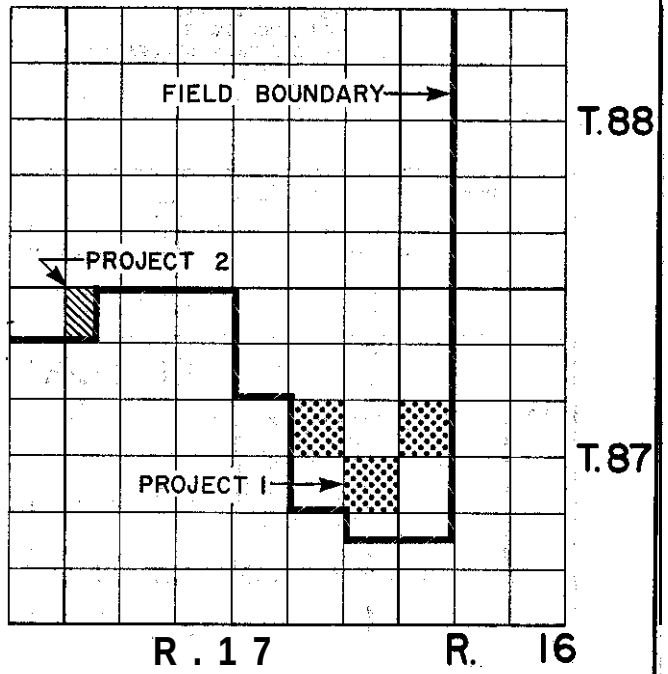
Map 26
HALFWAY POOL PROJECTS
PEEJAY FIELD



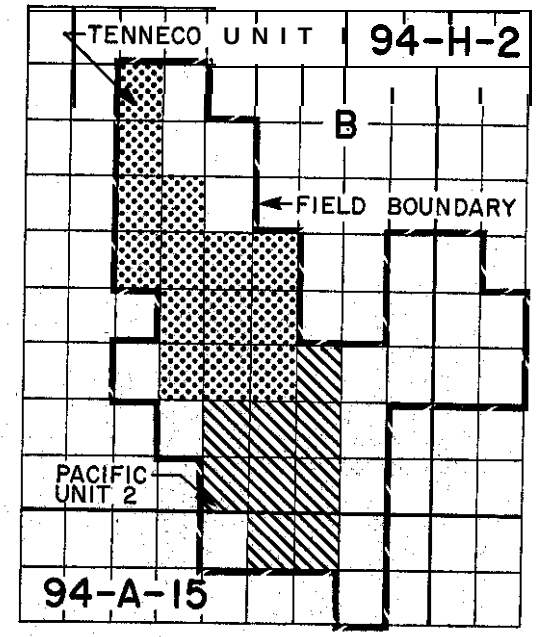
Map 27
PACIFIC PETROLEUMS PROJECT
SLAVE POINT POOL
PETITOT RIVER FIELD



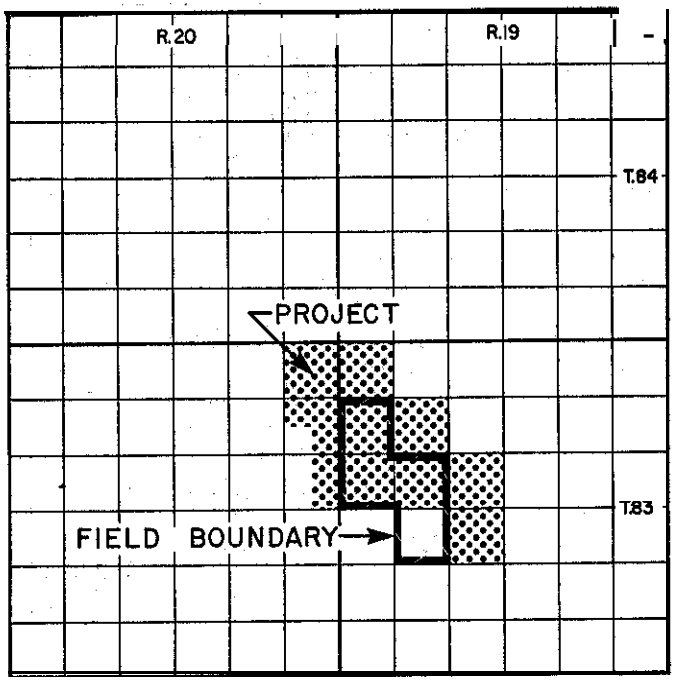
Map 28
DUNLEVY POOL PROJECT
RIGEL FIELD



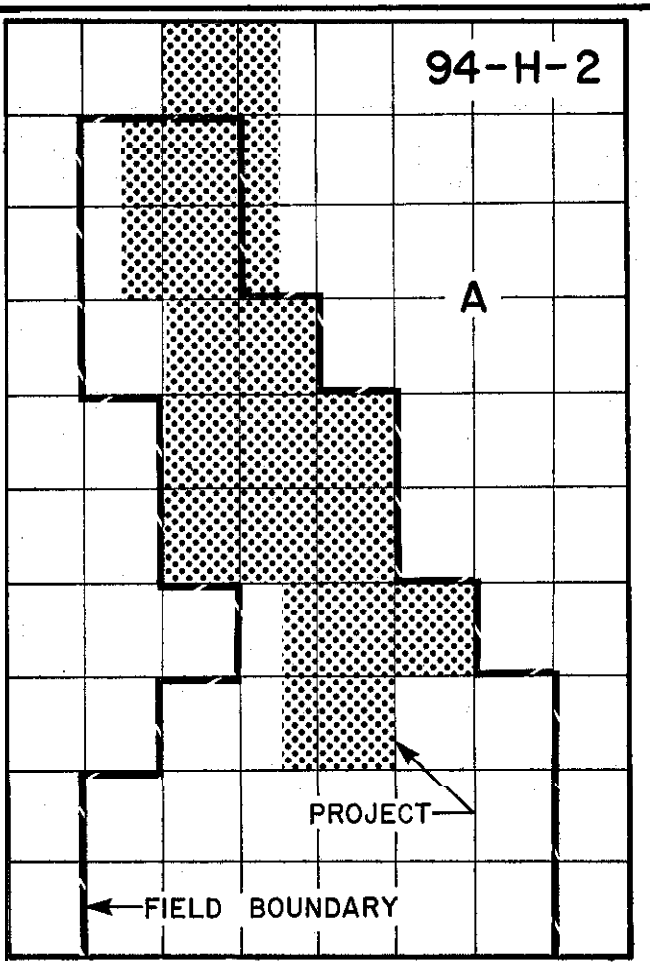
Map 29
MONSANTO CONSERVATION PROJECTS
DUNLEVY POOL
RIGEL FIELD



Map 30
HALFWAY POOL UNITS
WEASEL FIELD



Map 31
WAINOCO UNIT 1
HALFWAY & BELLOY POOLS
WILDER FIELD



Map 32
UNION OIL PROJECT
HALFWAY POOL
WILDMINT FIELD

TABLE 16—PROJECT AND INDMDUAL WELL MPR DATA AT DECEMBER 31, 1973

Field	Pool	Well or Project	Well Authorization No.	MPR STB/D	Project Data							
					Reference Map	Area (Acres)	Cumulative Injection		Number of Wells			
							MBW	MMSCF	Producers		Injectors	
									Oil	Gas	Water	Gas
Aitken Creek	Gething	Union project	----	1,125	1	1.009		28,431	6	4	—	1
Balsam	Halfway	Ipex Cox Hamilton Balsam d-47-H/94-H-2	1840	Suspended.								
Bear Flat	North Pine	Monsanto project	----	286	2	1,362		703	2	—	—	1
Beatton River	Halfway	POR Ashland Beatton d-9-J/94-H-2	2909	184	—	—		—	—	—	—	—
		CIGOL et al Beatton d-11-K/94-H-2	2915	184	—			—		—	—	—
		CIGOL et al Beatton d-21-K/94-H-2	3002	78	—			—	—	—	—	—
		Triad et al Beatton d-41-K/94-H-2	869	Suspended.								
		BPOG project	----	2,270	3	1,849		14,348	10	1	5	—
		Pool total	----	2,716	—	—		—	—	—	—	—
Beatton River West	Bluesky	BPOG Unit 1	----	1,236	4	3,426		1,722	12	—	6	—
Beaverdam	Halfway	Tenn Beaverdam d-38-L/94-A-16	1653	Suspended.								
Blueberry	Debolt	Mesa et al Blueberry b-18-K/94-A-12	2420	145	—			—	—	—	—	—
		Decalta Blueberry d-57-D/94-A-13	1333	53	—	—		—	—	—	—	—
		Pacific project	----	4,600	8	5,112		837	ii	—	—	1
		Pool total	----	4,798	—	—		—	—	—	—	—
Boundary Lake	Dunlevy	Pacific Boundary 8-15-85-14	270	79	—			—	—	—	—	—
	Cecil	Imp et al Boundary 5-26-84-14	2977	58	—			—		—	—	—
		Texaco et al Boundary A8-30-85-13	2931	86	—	—		—	—	—	—	—
		Pool total	----	144	—	—		—	—	—	—	—
	Boundary Lake	Imp Pac Boundary 8-32-84-13	991	Suspended.								
		Texaco et al Boundary 6-32-85-13	2930	155	—			—				—
		Texaco NFA Boundary 6-29-86-13	1720	Suspended.								
		Texaco NFA Boundary 16-30-86-13	1482	20	—	—		—	—		—	—
		Dome project 1	----	4,919	9	3,352	12,614		25		7	
		Dome project 2	----	1,484	9	650	4,335		6			
		Imperial Unit 1	----	38,657	9	26,743	67,851		154	—	37	
		Texaco Unit 2	----	22,723	9	14,103	53,042		120	—	22	—
		Pool total	----	67,958	—	—	—	—		—	—	—

	Halfway	Texaco NFA Boundary 8-30-85-13	1097	83	—	—	—	—	—	—	—	—
		Pacific Boundary Lake 11-14-85-14	667	101	—	—	—	—	—	—	—	—
		Sun Boundary Lake 6-23-85-14	646	83	—	—	—	—	—	—	—	—
		Amerada Boundary A6-24-85-14	1454	99	—	—	—	—	—	—	—	—
		AmMin Boundary A16-24-85-14	3219	48	—	—	—	—	—	—	—	—
		Texaco NFA Boundary 16-25-85-14	1144	Suspended.								
		Pool total	—	414	—	—	—	—	—	—	—	—
Buick Creek	Dunlevy	Texaco NFA Buick c-32-A/94-A-14	1500	144	—	—						
Bulrush	Halfway	Union Project	—	389	11	1,173		3,826	4	—	—	2
Bulrush East	Halfway	Dome Provo Co-op Bulrush d-5-K/94-A-16	1843	Suspended.								
Cecil Lake	North Pine	Scurry CAEL Cecil 4-24-84-18	3140	136	—	—	—	—	—	—	—	—
		Scurry ML CAEL Cecil 10-24-84-18	3045	174	—	—	—	—	—	—	—	—
		Pool total	—	310	—	—	—	—	—	—	—	—
Charlie Lake	Gething	Imp Pac Charlie 13-5-84-18	269	Suspended.								
Crush	Halfway	Union Unit 1	—	1,383	13	1,474	2,463	—	8	1	1	—
Currant	Halfway	Union HB Currant d-28-C/94-A-16	1768	Suspended.								
		Pacific Unit 1	—	627	14	696	2,380	—	4	—	3	—
Eagle	Belloy	Scurry CanPlac Eagle 6-22-84-18	3364	54	—	—	—	—	—	—	—	—
		Scurry CanPlac Eagle 6-27-84-18	3239	242	—	—	—	—	—	—	—	—
		Raines Eagle 8-29-84-18	2543	39	—	—	—	—	—	—	—	—
		Raines Eagle 11-29-84-18	2502	285	—	—	—	—	—	—	—	—
		Scurry CanPlac Eagle 6-34-84-18	3370	286	—	—	—	—	—	—	—	—
Elm	Halfway	Bracell et al Elm b-62-C/94-H-7	2856	Suspended.								
Flatrock	Boundary Lake	Ballinderry Flatrock 10-19-84-16	2852	153	—	—	—	—	—	—	—	—
Fort St. John	Pingel	Pacific Unit 1	—	334	15	1,260	—	—	4	—	—	—
	Belloy	Imp Pac Fort St. John 9-19-83-18	171	Suspended.								
Halfway	Blueberry	West Nat et al Halfway 14-11-87-25	1986	Suspended.								
Inga	Baldonnel	Hunt Sands Pac Imp Inga 7-16-86-23	933	Suspended.								
	Inga	Canadian Superior Unit 1	—	7,246	16	11,057	23,081	—	26	1	14	—
		Amoco Unit 2	—	7,489	16	12,703	4,517	—	34	—	11	—
		Texaco Unit 4	—	418	16	1,510	43	—	3	—	1	—
		Pacific Unit 5	—	630	16	2,913	77	—	6	—	4	—
		Pool total	—	15,783	—	—	—	—	—	—	—	—
Milligan Creek	Halfway	Union Unit 1	—	10,000	22	3,377	50,530	3,418	19	—	14	1
		Union Unit 2	—	780	22	810	—	—	6	1	—	—
		Pool total	—	10,780	—	—	—	—	—	—	—	—
Moberly Lake	Pingel	JBA Moberly 10-15-82-22	2019	61	—	—	—	—	—	—	—	—
		JBA Moberly 4-23-82-22	2463	38	—	—	—	—	—	—	—	—
		Pool total	—	99	—	—	—	—	—	—	—	—

TABLE 16—PROJECT AND INDIVIDUAL WELL MPR DATA AT DECEMBER 31, 1973—*Continued*

Field		Well or Project	Well Authorization No.	MPR STB/D	Project Data							
					Reference Map	Area (Acres)	Cumulative Injection		Number of Wells			
							MBW	MMSCF	Producers		Injectors	
									Oil	Gas	Water	Gas
Nettle	Gething	Union KCL ROC Nettle d-67-A/94-H-7	1321	Suspended.								
		Union KCL ROC Nettle d-68-A/94-H-7	1879	74	—							
		Union KCL ARCO Nettle d-69-A/94-H-7	2018	Suspended.								
Nig Creek	Baldonnel	Texaco NFA Nig d-87-A/94-H-4	2152	165	—							
Osprey	Halfway	Pacific Halfway project		130	24	619			3			
Peejay	Halfway	Pacific SR CanDel Peejay d-71-H/94-A-15	1851	59	—							
		Decalta Ranger Peejay d-51-D/94-A-16	2023	25	—							
		Pacific Unit 1		4,430	26	3,810	19,472		24		14	
		Union Unit 2		8,229	26	6,884	32.268		38		13	
		Pacific Unit 3		6,865	26	5,405	23.382		28		15	
		Pacific Peejay North project		42	26	917			1	2		
		Pacific ARCO project		2,717	26	1,317	6,312		8		3	
		Pool total		22,367	—			A . . -				
Peejay West	Halfway	Pacific SR CanDel W Peejay d-44-G/94-A-15	1008	Suspended.								
		Pacific SR West Cdn W Peejay d-54-G/94-A-15	956	Suspended.								
Rigel	Dunlevy	Monsanto IOE Fina Rigel 6-19-87-16	1692	65	—							
		Monsanto IOE Fina Rigel 11-19-87-16	1616	47	—							
		Monsanto Rigel 6-23-87-17	1942	100	—							
		Monsanto Rigel 6-31-87-17	1714	46	—							
	Dunlevy	IOE et al Rigel b-44-J/94-A-10	2565	34	—							
		CIGOL et al Rigel b-84-K/94-A-10	3109	98	—							
		Pool total		390	—							
Stoddart	Cecil	Apache Dunbar Stoddart 11-23-85-19	2548	69	—							
	Belloy	Uno-Tex et al Stoddart 6-31-85-19	2218	32	—							
		Uno-Tex et al Stoddart 10-31-85-19	1519	45	—							
		Apache et al Stoddart 6-36-85-20	2757	61	—							
		Pool total		138	—							
Wargen	Gething	Pacific Westcoast Wargen d-48-C/94-H-6	3044	Suspended.								
Weasel	Halfway	Pacific SR CanDel Weasel d-82-J/94-A-15	2055	206	—							
		Pacific Sinclair Weasel d-30-A/94-H-2	1631	Suspended.								
		Dome Provo Weasel d-2-B/94-H-2	1734	56	—							
		Tenneco Unit 1		2,551	30	1,847	10,893	1,866	9		7	1
		Pacific Unit 2		1,143	30	1,081	2,288		7		4	
		Pool total		3,956	—							

Weasel West	Halfway	Tenn et al W Weasel d-71-C/94-H-2	2834	56								
		Tenn et al W Weasel d-72-C/94-H-2	3078	142								
		Tenn Monsanto W Weasel d-82-C/94-H-2	3144	60								
		Tenn et al W Weasel d-83-C/94-H-2	3115	25								
		Pool total		283								
Wildmint	Halfway	Pacific SR CanDel Wildmint d-84-I/94-A-15	1566	Suspended.								
		Tenn Wildmint d-93-I/94-A-15	1947	Suspended.								
		Texcan Wildmint d-94-I/94-A-15	1289	167								
		Tenn Wildmint d-95-I/94-A-15	1191	47								
		Tenn Wildmint d-5-A/94-H-2	1121	Suspended.								
		Tenn Wildmint d-6-A/94-H-2	1184	Suspended.								
		Tenn Wildmint d-7-A/94-H-2	1750	Suspended.								
		CIGOL Wildmint d-13-A/94-H-2	1567	Suspended.								
		Union HB Wildmint d-15-A/94-H-2	984	Suspended.								
		Husky Colo Wildmint d-16-A/94-H-2	1304	Suspended.								
		Husky Colo Wildmint b-23-A/94-H-2	1206	Suspended.								
		Union HB Wildmint d-26-A/94-H-2	963	Suspended.								
		Union Project		3,315	32	1.869	24,397	16,116	11		7	2
		Pool total		3,529								
Willow	Gething	Union HB Willow d-20-H/94-H-2	449	122								
Wolf	Halfway	Pacific Sinclair Wolf d-82-B/94-A-15	1916	118								
		Baysel Sinclair Wolf b-92-B/94-A-15	1972	37								
		Baysel Sinclair Wolf d-93-B/94-A-15	1815	129								
		Baysel ARCO Wolf b-3-G/94-A-15	3379	105								
		Pool total		389								
Other areas	Gething	Union HB Gulf Canuck d-39-G/94-H-1	2616	Suspended.								
	Coplin	*GAO Cdn Res Pintail 2-12-85-25*	3157	42								
	Halfway	Texaco et al N Boundary 11-30-87-14	3098	147								
		Murphy N Boundary 8-31-87-14	3242	41								
		Pacific SR CanDel Ptarmigan d-90-I/94-A-15	1531	Suspended.								
		Union et al Spruce d-62-B/94-A-16	2323	Suspended.								
		Pool total		188								
	Belloy	Walnoco Fort St. John 11-23-84-19	3122	340								

TABLE 17—GAS-WELL TEST AND ALLOWABLE DATA, DECEMBER 31, 1973

Field/Pool/Project	Well Name	Well Authorization No.	Date	Pws (Psia)	"n"	AOFP (MSCF/D)	PRL (MSCF/D)
Airport—							
Cadomin	Pacific Airport 8-32-83-17 (3)	27	5-71	1,387	0.753	825	Zone abandoned.
Baldonnel	Pacific Airport 9-32-83-17 (97)	287	5-71	1,573	0.500	2,498	Zone abandoned.
Halfway	Pacific Airport 12-34-83-17 (10)	35	5-71	1,960	1.000	1,667	Zone abandoned.
Balsam—							
Bluesky	Union HB Balsam b-56-H/94-H-2	1889	2-72	1,023	——	——	——
Beaverdam—							
Halfway	Tenn Sun Beaverdam d-37-L/94-A-16	1746	——	——	——	——	——
	Tenn Beaverdam d-39-L/94-A-16	1802	——	——	——	——	2,000
Beaver River—							
Nahanni	Amoco Beaver b-19-K/94-N-16	2563	12-72	5,294	0.526	85,012	——
	Pan Am Beaver d-27-K/94-N-16	2313	10-72	5,425	0.500	63,367	——
	Pan Am Beaver c-45-K/94-N-16	2116	10-72	5,302	0.500	46,778	——
	Amoco Beaver d-A64-K/94-N-16	2547	9-72	5,123	0.500	125,890	——
	Pan Am Beaver River d-73-K/94-N-16	682	10-72	5,283	0.528	132,107	——
Nahanni total		——	——	——	——	——	GEP.
Beavertail—							
Gething	Pacific Sinclair Beavertail d-71-C/94-A-15	1893	6-72	1,041	0.744	10,251	2,563
	Pacific Sinclair Beavertail d-73-C/94-A-15	1915	6-72	1,041	0.647	23,406	6,195
	Pacific ARCo Beavertail c-92-C/94-A-15	2610	——	——	——	——	——
Gething total		——	——	——	——	——	8,758
Halfway	Pacific Sinclair Beavertail d-71-C/94-A-15	1893	——	——	——	——	——
Beg—							
Baldonnel project	Pacific Imperial Beg c-24-B/94-G-1	1359	8-70	1,567	0.500	1,458	Disposal.
	Pacific Imperial Beg d-35-B/94-G-1	1154	6-72	1,107	0.500	1,997	——
	Pacific Imperial Beg d-46-B/94-G-1	806	6-72	1,186	0.500	1,926	——
	Pacific Imperial Beg d-57-B/94-G-1	1095	6-72	1,316	0.860	1,816	Suspended.
	Pacific et al Beg a-21-F/94-G-1	711	7-70	1,611	0.500	650	Suspended.
	Pacific et al Beg b-42-F/94-G-1	748	12-66	1,524	0.925	1,535	Abandoned.
	Pacific et al Beg d-64-F/94-G-1	733	6-72	1,162	1.000	3,992	——
	Pacific et al Beg b-84-F/94-G-1	741	6-72	1,318	1.000	3,608	——
	Pacific et al Beg b-95-F/94-G-1	747	6-72	1,062	1.000	2,855	——
	Pacific et al Beg d-10-G/94-G-1	541	6-72	897	1.000	1,596	——
	Pacific et al Beg b-6-K/94-G-1	740	6-72	1,236	1.000	1,759	——
	Pacific et al Beg b-17-K/94-G-1	539	6-72	1,193	0.661	3,615	——
	Pacific et al Beg a-28-K/94-G-1	749	6-72	1,251	0.500	3,034	Suspended.
	Pacific et al Beg b-59-K/94-G-1	786	——	——	——	——	——
	Pacific et al Beg b-82-L/94-G-1	1132	7-72	1,255	0.577	2,273	——
	Pacific Pan Am Dome Beg a-4-D/94-G-8	766	7-72	848	0.625	14,322	——
	Pacific Pan Am Dome Beg d-15-D/94-G-8	855	6-63	1,332	0.600	3,600	Disposal.
Baldonnel project total		——	——	——	——	——	GEP.

Halfway project	Richfield Sohio Beg d-13-B/94-G-1	1268	6-73	742	0.500	4,196	
	Pacific Imperial Beg c-24-B/94-G-1	1359	6-72	960	0.500	3,280	———
	Pacific Imperial Beg d-35-B/94-G-1	1154	6-72	810	0.725	4,524	———
	Pacific Imperial Beg d-46-B/94-G-1	806	6-72	821	0.725	5,425	———
	Pacific Imperial Beg d-57-B/94-G-1	1095	11-72	915	0.775	10,192	———
	Richfield Sohio Beg d-77-B/94-G-1	1233	6-73	1,215	0.537	1,318	Suspended.
	Pacific et al Beg b-88-B/94-G-1	1350	6-72	1,043	0.610	4,068	- - -
	Pacific et al Beg b-A99-B/94-G-1	739	6-72	950	0.664	3,241	- - -
	Pacific et al Beg a-21-F/94-G-1	711	6-72	1,397	0.500	4,609	———
	Pacific et al Beg b-42-F/94-G-1	748	8-61	1,536	0.842	2,100	Disposal.
	Pacific et al Beg d-64-F/94-G-1	733	6-72	820	1.000	3,250	- - -
	Pacific et al Beg b-84-F/94-G-1	741	6-72	1,026	0.508	1,799	- - -
	Pacific et al Beg b-95-F/94-G-1	747	6-72	1,102	0.500	2,449	- - -
	Pacific et al Beg d-10-G/94-G-1	541	6-72	943	0.531	4,754	- - -
	Pacific et al Beg b-6-K/94-G-1	740	6-72	909	0.500	4,504	- - -
	Pacific et al Beg b-A17-K/94-G-1	2387	6-72	1,286	0.642	3,104	- - -
	Pacific et al Beg b-59-K/94-G-1	786	———	———	———	———	- - - -
Halfway project total		———	———	———	———	———	GEP.
Field total		———	———	———	———	———	GEP.
Beg West—							
Baldonnel project	Pacific et al W Beg c-84-C/94-G-1	622	6-72	1,477	0.550	2,246	Suspended.
	Pacific et al W Beg c-58-F/94-G-1	772	6-72	1,570	———	———	Suspended.
	Pacific et al W Beg a-79-F/94-G-1	620	6-72	1,496	0.726	2,792	Suspended.
Baldonnel total		———	———	———	———	———	GEP.
Bernadet—							
Gething	West Nat et al Bernadet 8-1-88-25	1106	8-72	291	0.754	265	Suspended.
Blueberry—							
Dunlevy	West Nat et al Blueberry 16-24-88-25	279	8-72	1,164	1.000	1,572	2,000
	West Nat et al Blueberry a-29-K/94-A-12	330	8-72	1,333	0.675	526	Suspended.
	West Nat et al Blueberry d-A50-K/94-A-12	357	8-73	1,270	1.000	821	Suspended.
	West Nat et al Blueberry d-38-K/94-A-12	2146	———	———	———	———	———
	West Nat et al Blueberry c-32-D/94-A-13	70	———	———	———	———	2,000[1]
	West Nat et al Blueberry d-A87-D/94-A-13	94	7-71	1,215	0.577	1,745	2,000[1]
	West Nat et al Blueberry d-97-D/94-A-13	581	8-72	800	0.571	2,218	2,000
Dunlevy total		———	———	———	———	———	8,000
Baldonnel	West Nat et al Blueberry d-A50-K/94-A-12	357	8-72	1,489	1.000	246	Suspended.
	West Nat et al Blueberry c-65-D/94-A-13	71	8-73	1,641	0.577	934	Suspended.
	West Nat et al Blueberry d-87-D/94-A-13	64	9-72	1,442	0.577	903	Suspended.
	West Nat et al Blueberry d-97-D/94-A-13	581	9-60	1,653	1.000	5,600	Suspended.
Blueberry	West Nat et al Blueberry a-61-L/94-A-12	525	10-60	2,089	———	———	———
	West Nat et al Blueberry b-13-D/94-A-13	601	———	———	———	———	———
Halfway	West Nat et al Blueberry b-22-D/94-A-13	1946	5-72	2,037	0.516	1,015	2,000
Field total		———	———	———	———	———	10,000

[1] Lease and camp fuel.

TABLE 17—GAS-WELL TEST AND ALLOWABLE DATA, DECEMBER 31, 1973—*Continued*

Field/Pool/Project	Well Name	Well Authorization No.	Date	Pws (Psia)	"n"	AOFP (MSCF/D)	PRL (MSCF/D)
Blueberry East—							
Baldonnel	West Nat et al E Blueberry b-38-C/94-A-13	103	8-73	1,778	0.820	1,897	Suspended.
Debolt	West Nat et al E Blueberry b-36-C/94-A-13	331	8-59	1,380	1.000	838	Suspended.
Blueberry West—							
Dunlevy	West Nat et al W Blueberry 2-20-88-25	278	8-73	1,228	1.000	925	Suspended.
	West Nat et al W Blueberry d-82-I/94-B-9	165	9-72	1,189	1.000	1,438	Suspended.
Dunlevy total		———	———	———	———	———	———
Baldonnel	G Basins et al W Blueberry a-7-L/94-A-12	2435	9-72	1,682	0.731	8,092	2,136
	G Basins et al W Blueberry d-19-L/94-A-12	241	8-73	1,683	0.543	1,425	Disposal.
	G Basins et al W Blueberry d-39-L/94-A-12	2551	9-72	1,676	0.798	1,869	2,000
Baldonnel total		———	———	———	———	———	4,136
Boundary Lake—							
Bluesky	Pacific Boundary 8-15-85-14	270	7-72	964	0.687	720	Suspended.[2]
	Texaco NFA Boundary 8-23-86-14	1125	———	———	———	———	———
Gething	Pacific Boundary Lake A16-4-85-14	655	7-71	788	0.839	3,215	2,000
	Pacific Boundary 12-10-85-14	352	7-72	676	0.839	5,438	2,368
Gething total		———	———	———	———	———	4,368
Dunlevy	Amerada Boundary 8-5-85-14	799	10-61	1,468	0.822	11,200	Suspended.
Baldonnel	Texaco NFA Boundary 6-30-85-13	1137	8-73	608	0.605	1,853	2,000
	Pacific Boundary Lake 11-14-85-14	667	9-71	876	0.674	1,027	2,000
	Pacific Boundary 8-15-85-14	270	7-72	1,392	0.725	3,592	Suspended.[2]
	Sun Boundary Lake 8-23-85-14	652	9-71	851	0.767	7,153	2,454
	Amerada Boundary A6-24-85-14	1454	———	———	———	———	———
	Texaco NFA Boundary Lake 6-25-85-14	687	8-73	740	0.850	3,009	2,000
Baldonnel total		———	———	———	———	———	8,454
Basal Boundary	Pacific et al Boundary 14-4-85-14	1964	7-72	1,017	0.550	1,788	2,000[2]
Halfway	Texaco NFA Boundary 16-31-86-13	836	———	———	———	———	———
	Huber et al Boundary 6-4-87-13	1501	11-64	1,569	0.900	360	Abandoned.
Field total		———	———	———	———	———	14,822
Boundary Lake North—							
Halfway	Texaco NFA N Boundary 7-3-87-14	1395	———	———	———	———	———
	Texaco NFA N Boundary 6-8-87-14	1529	8-73	1,001	1.000	14,893	5,640
	Texaco NFA N Boundary 10-9-87-14	1451	8-73	1,010	0.804	15,052	5,252
	TexacoNFA N Boundary 7-15-87-14	1881	1-73	1,501	0.850	1,971	2,000
Halfway total		———	———	———	———	———	12,892

Bubbles—							
Baldonnel	Dome Basco Bubbles b-19-A/94-G-8	464	10-72	852	0.518	2,529	2,000
	Dome Provo Bubbles c-20-A/94-G-8	526	6-68	1,017	0.500	690	Suspended.
	Dome Basco Bubbles b-50-A/94-G-8	506	———	———	———	———	———
	Dome Bubbles d-42-B/94-G-8	791	8-70	1,400	———	———	Disposal.
	McCoy Dome Bubbles b-A62-B/94-G-8	674	10-72	1,001	0.591	3,211	2,000
Baldonnel project	Pacific Sunray Imp Bubbles b-22-I/94-G-1	467	10-71	1,445	———	———	Abandoned.
	Pacific Imperial Bubbles b-33-I/94-G-1	451	10-72	730	0.754	3,017	2,000
	Pacific Imperial Bubbles b-44-I/94-G-1	466	10-72	647	0.884	6,251	3,251
	Pacific Sunray Imp Bubbles d-55-I/94-G-1	479	11-69	1,336	———	———	Disposal.
	Pacific Imperial Bubbles b-66-I/94-G-1	480	10-71	754	0.686	3,637	2,000
	Pacific Imperial Bubbles d-77-I/94-G-1	478	10-71	933	0.500	3,069	Suspended.
	Pacific Imperial Bubbles d-88-I/94-G-1	462	11-72	753	0.925	11,697	4,654
	Pacific Dome et al Bubbles d-99-I/94-G-1	615	10-71	711	0.500	1,352	2,000[3]
Baldonnel project total		———	———	———	———	———	13,905
Baldonnel total		———	———	———	———	———	17,905
Bubbles North—							
Halfway	Pac Imp N Bubbles d-95-B/94-G-8	750	8-61	1,470	0.589	2,500	Suspended.
	Pacific Imperial N Bubbles d-6-G/94-G-8	1055	———	———	———	———	———
	Pacific CIGOL N Bubbles c-36-G/94-G-8	3153	8-72	1,294	1.000	456	2,000
Buick Creek—							
Bluesky—							
Project Pool A	Texaco NFA Buick c-98-L/94-A-10	1088	9-68	855	———	———	———
	HB et al Buick d-1/7-D/94-A-15	1286	9-73	791	0.576	1,739	2,000
Project Pool B	Texaco NFA Buick c-80-D/94-A-15	1087	7-66	1,045	0.500	750	Suspended.
Project Pool C	Anadarko Cdn-Sup Buick c-32-I/94-A-11	2863	3-71	1,107	0.924	4,948	2,000
Project Pool D	HOL APC Buick a-83-B/94-A-14	3177	———	———	———	———	———
	HOL APC Buick d-93-B/94-A-14	3212	———	———	———	———	———
	HOL APC Buick a-63-B/94-A-14	3289	———	———	———	———	———
Dunlevy—							
Project Pool A	Anadarko Cdn-Sup Buick a-29-L/94-A-10	3165	10-72	1,142	0.820	23,642	5,911
	Anadarko Cdn-Sup Buick b-22-I/94-A-11	2794	2-71	1,160	0.793	2,955	2,000
	Skye Buick c-36-I/94-A-11	3169	12-73	949	0.618	6,337	2,000
	Woods Buick a-65-I/94-A-11	2785	8-71	978	0.660	7,546	2,000
	Pacific Buick a-85-I/94-A-11	1323	8-72	725	0.963	5,866	2,000
	Texaco et al Buick c-94-I/94-A-11	2693	6-73	633	0.867	39,979	17,709
	Texaco NFA Buick d-96-I/94-A-11	787	6-73	624	0.700	9,138	3,985
	Texaco NFA Buick Creek d-98-I(1)/94-A-11	45	6-73	1,073	0.980	5,523	2,000
	Texaco NFA Buick Creek c-10-A(2)/94-A-14	65	6-73	952	0.506	191	2,000
	Whitehall Buick c-34-A/94-A-14	1336	8-69	714	0.712	1,519	2,000
	Texaco NFA Buick b-A46-A/94-A-14	1508	6-73	912	0.630	797	Suspended.
Project Pool A total		———	———	———	———	———	41,605

[2] Exempted from reporting "Maximum Day Production."

[3] Leaseline well restricted to 2 MMSCF/D.

TABLE 17—GAS-WELL TEST AND ALLOWABLE DATA, DECEMBER 31, 1973—*Continued*

Field/Pool/Project	Well Name	Well Authorization No.	Date	Pws (Psia)	"n"	AOFP (MSCF/D)	PRL (MSCF/D)
Buick Creek—*Continued*							
Dunlevy—							
Project Pool B	Texaco NFA Buick c-98-L/94-A-10	1088	6-73	747	0.566	678	2,000
	Texaco NFA Buick a-31-A/94-A-14	295	6-73	729	0.661	14,241	5,113
	Whitehall Buick b-62-A/94-A-14	1303	8-69	907	1.000	3,725	2,000
	Texaco NFA Buick d-93-A/94-A-14	1346	6-73	1,180	0.694	——	Observation.
	Texaco NFA Buick c-18-D/94-A-15	1185	6-73	728	0.748	3,296	2,000
	HB Ashland Buick d-37-D	3255	2-73	893	0.518	2,147	2,000
	Texaco NFA Buick c-80-D/94-A-15	1087	6-73	620	0.682	3,048	2,000
Project Pool B total		——	——	——	——	——	15,113
Project Pool C	Anadarko Cdn Sup Buick b-44-J/94-A-11	3273	——	——	——	——	——
	Texaco NFA Buick Creek c-79-J(6)/94-A-11	110	6-73	491	0.700	1,300	2,000
	Texaco NFA Buick Creek d-83-J(4)/94-A-11	96	6-73	408	0.898	8,690	4,649
	Texaco NFA Buick d-93-J/94-A-11	728	6-73	417	0.938	7,894	3,849
	Pacific Buick Creek b-4-B/94-A-14	457	7-73	533	0.931	1,295	2,000
	Texaco NFA Buick b-10-B/94-A-14	1179	6-73	510	0.862	496	2,000
	Pacific Buick Creek c-14-B/94-A-14	469	7-73	576	0.869	1,326	2,000
	Sun Buick c-16-B/94-A-14	744	6-73	600	0.767	1,388	2,000
	Sun Buick d-19-B/94-A-14	756	6-73	518	1.000	1,139	2,000
	Texaco NFA Buick c-40-B/94-A-14	1213	6-73	567	0.940	717	Suspended.
	HOL APC Buick a-83-B/94-A-14	3177	11-73	751	0.848	2,672	2,000
	Sun Buick d-11-C/94-A-14	818	6-73	516	0.900	4,695	2,555
	Sun et al Buick c-32-C/94-A-14	1360	6-73	558	0.996	7,151	3,539
Project Pool C total		——	——	——	——	——	28,592
Project Pool D	HOL APC Buick a-63-B/94-A-14	3289	——	——	——	——	——
	HOL APC Buick d-93-B/94-A-14	3212	——	——	——	——	——
Cecil	Texaco NFA Buick Creek d-83-J(4)/94-A-11	96	6-66	490	0.583	1,500	Suspended.
Field total		——	——	——	——	——	89,310
Buick Creek North—							
Gething	Pacific West Prod N Buick c-22-F/94-A-14	1753	7-73[4]	488[4]	0.636[4]	5,376[4]	2,617[4]
	Pacific West Prod N Buick b-44-F/94-A-14	1799	——	——	——	——	——
	Dome CanDel N Buick b-66-F/94-A-14	3348	——	——	——	——	——
	Coseka N Buick d-55-F/94-A-14	3373	——	——	——	——	——
Dunlevy	Pacific West Prod N Buick a-81-C/94-A-14	2069	7-72	751	0.603	4,820	2,000
	Texaco NFA N Buick d-91-C/94-A-14	2174	9-72	731	0.736	9,499	4,417
	Pacific West Prod N Buick b-2-F/94-A-14	2026	7-73	662	0.700	1,727	2,000
	Pacific West Prod N Buick c-22-F/94-A-14	1753	7-73	(4)	(4)	(4)	Suspended.[4]
	Pacific West Prod N Buick b-44-F/94-A-14	1799	——	——	——	——	——

	Coseka N Buick d-55-F/94-A-14	3373	8-73	1,288	1.000	1,120	2,000
	Dome CanDel N Buick b-66-F/94-A-14	3348	———	———	———	———	———
	Pacific West Prod N Buick b-86-F/94-A-14	1830	7-72	1,274	0.500	1,354	Suspended.
Dunlevy total		———	———	———	———	———	10,417
Field total		———	———	———	———	———	13,034
Buick Creek West—							
Dunlevy—							
Project Pool A	Pacific West Buick Creek d-95-K(4)/94-A-11	99	7-72	393	0.790	4,338	2,000
	Pacific West Buick Creek c-5-C(11)/94-A-14	264	7-72	396	0.906	3,030	Suspended.
	Pacific West Buick Creek c-14-C(3)/94-A-14	95	8-72	619	0.975	6,514	Suspended.
	Pacific West Buick Creek d-17-C(17)/94-A-14	384	10-72	408	0.837	21,204	9,772
Project Pool A total		———	———	———	———	———	11,772
Project Pool B	Pacific West Buick Creek b-78-C(2)/94-A-14	89	7-73	757	0.712	3,461	2,000
	Pacific West Buick Creek c-80-C(10)/94-A-14	261	7-72	543	———	———	———
	Pacific West Buick Creek d-89-C(12)/94-A-14	268	7-72	665	1.000	1,351	2,000
	Pacific West Buick Creek b-91-D(9)/94-A-14	255	7-72	550	1.000	1,781	2,000
	Pacific West Buick Creek c-2-E(6)/94-A-14	239	7-72	537	0.686	4,364	2,000
Project Pool B total		———	———	———	———	———	8,000
Dunlevy total		———	———	———	———	———	19,772
Baldonnel	Pacific West Buick Creek d-58-C(8)/94-A-14	249	7-72	1,349	———	———	Suspended.
	Pacific West Buick Creek a-78-C/94-A-14	644	7-72	590	0.699	1,483	2,000
Halfway	Pacific West Buick Creek b-23-E(1)/94-A-14	86	7-62	699	0.712	2,450	Suspended.
Field total		———	———	———	———	———	21,772
Cabin—							
Slave Point	West Nat Cabin b-40-A/94-P-5	1245	3-63	2,607	0.761	28,900	Suspended.
	Pacific Cabin d-57-B/94-P-5	2425	———	———	———	———	———
	General American Cabin a-61-F/94-P-5	2665	———	———	———	———	———
	West Nat Cabin a-19-G/94-P-5	1406	2-64	2,645	0.554	31,200	Suspended.
	Pacific Cabin a-49-G/94-P-5	2058	———	———	———	———	———
Cache Creek—							
Coplin	Texcan Cache 10-20-88-22	2567	12-69	2,239	1.000	2,900	2,000
	Texcan Cache 6-22-88-22	3367	———	———	———	———	———
	Texcan Cache 6-28-88-22	2423	1-69	2,293	———	———	———
Halfway	Texcan Cache 6-22-88-22	3367	———	———	———	———	———
	Texcan Cache 6-28-88-22	2423	8-70	1,916	1.000	934	Suspended.
Clarke Lake—							
Slave Point	Pacific et al Clarke a-65-G/94-J-10	1528	8-68	2,823	0.570	10,400	Disposal.
	Hamilton Cdn-Sup Clarke d-72-G/94-J-10	2176	3-72	2,670	0.786	75,243	20,055
	Gulf Shell Clarke c-76-H/93-J-10	2459	3-69	2,877	0.500	8,400	Suspended.
	Pacific et al Clarke c-100-H/94-J-10	2506	2-70	2,762	———	———	2,000

4 Comingled production. Gething and Dunlevy not segregated.

TABLE 17—GAS-WELL TEST AND ALLOWABLE DATA, DECEMBER 31, 1973—*Continued*

Field/Pool/Project	Well Name	Well Authorization No.	Date	Pws (Psia)	"n"	AOFP (MSCF/D	PRL (MSCF/D)
Clarke Lake—*Continued*							
Slave Point project	West Nat IOE Clarke d-29-K/94-J-9	1274	8-72	2,627	0.500	133,187	uspended
	Pacific IOE Clarke c-50-K/94-J-9	1913	8-72	2,598	0.781	13,740	uspended
	Pacific Imp Clarke c-56-L/94-J-9	1833	7-73	2,406	0.552	54,956	- -
	Pacific Imp Clarke b-69-L/94-J-9	2240	———	———	———	———	lisposal.
	Pacific Imp Clarke b-72-L/94-J-9	2540	7-73	2,355	0.637	90,841	- -
	Pacific Imp Clarke d-74-L/94-J-9	3163	———	———	———	———	- -
	Pacific Imp Clarke a-77-L/94-J-9	3104	9-73	2,352	0.646	13,839	- -
	West Nat Imp Clarke Lake d-88-L/94-J-9	344	7-73	2,334	0.620	104,314	- -
	West Nat Imp Clarke Lake d-91-L/94-J-9	585	7-73	2,301	0.854	13,776	- -
	Pacific Imp Clarke c-92-L/94-J-9	3011	8-72	2,418	———	———	
	West Nat Imp Clarke Lake c-94-L/94-J-9	397	7-73	2,296	1.000	46,579	- -
	Pacific Imp Clarke b-97-L/94-J-9	3361	———	———	———	———	
	Pacific et al Clarke a-52-F/94-J-10	3228	———	———	———	———	
	Pacific et al Clarke c-54-F/94-J-10	1932	8-72	2,732	0.575	11,635	
	Pacific Apache Clarke a-61-F/94-J-10	1578	7-73	2,656	0.695	35,619	- -
	Pacific Apache Clarke b-76-G/94-J-10	1071	7-73	2,651	0.674	10,217	
	Pacific et al Clarke d-69-H/94-J-10	1866	3-70	2,802	0.500	39,051	- - -
	Pacific et al Clarke b-18-I/94-J-10	2316	7-73	2,596	0.567	21,772	
	Pacific et al Clarke c-20-I/94-J-10	2107	7-73	2,563	0.535	39,076	- -
	Pacific et al Clarke b-38-I/94-J-10	1933	7-73	2,505	———	———	- -
	Pacific et al Clarke c-69-I/94-J-10	2249	7-73	2,426	0.587	49,761	
	West Nat et al Clarke b-70-I/94-J-10	688	7-73	2,443	0.655	39,822	- - - -
	Pacific et al Clarke b-78-I/94-J-10	3378	———	———	———	———	- -
	West Nat et al Clarke c-78-I/94-J-10	505	7-73	2,403	1.000	118,655	
	Pacific Imp Clarke c-85-I/94-J-10	2310	———	———	———	———	uspended.
	Pacific Imperial Clarke c-92-I/94-J-10	1554	7-73	2,327	0.500	88,800	- -
	Pacific Imp Clarke a-94-I/94-J-10	3073	9-73	2,303	———		
	Pacific et al Clarke b-22-J/94-J-10	1796	4-70	2,759	———		- - - -
	Pacific et al Clarke b-26-J/94-J-10	2776	———	———	———	———	
	Pacific et al Clarke c-43-J/94-J-10	2239	7-73	2,500	0.649	33,722	
	Pacific et al Clarke b-46-J/94-J-10	2162	7-73	2,555	0.550	15,823	
	West Nat et al Clarke c-47-J/94-J-10	211	8-72	2,652	———	———	- -
	West Nat et al Clarke a-52-J/94-J-10	856	7-73	2,472	0.733	21,925	
	Pacific et al Clarke a-55-J/94-J-10	1966	7-73	2,520	0.715	87,555	
	Pacific Imp Clarke b-6-D/94-J-16	2820	7-73	2,286	0.500	28,596	
	West Nat Imp Clarke Lake c-8-D/94-J-16	503	7-73	2,329	1.000	116,037	
	Pacific Imp Clarke a-10-D/94-J-16	3264	9-73	2,269	0.685	377,223	- -
	Pacific Imp Clarke b-10-D/94-J-16	2509	7-73	2,317	0.591	73,557	
Slave Point project total		———	———	———	———	———	400,000
Slave Point total		———	———	———	———	———	422,055

Cypress—							
Baldonnel	HB Cypress a-65-C/94-B-15	1339	8-63	1,960	0.669	11,200	Suspended.
	HB Cypress d-87-C/94-B-15	1326	3-71	1,960	0.625	25,112	Suspended.
	HB Cypress a-28-F/94-B-15	737	3-71	1,948	0.676	50,586	Suspended.
Dahl—							
Bluesky	Sierra Dahl b-62-G/94-H-7	2628	———	———	———	———	———
	Star Dahl d-93-G/94-H-7	2622	1-72	951	0.737	5,242	2,000
	Pacific et al Dahl d-11-J/94-H-7	2445	———	———	———	———	Suspended.
	Tenn Cdn Sup Dahl d-53-J/94-H-7	1849	1-72	946	0.790	3,747	2,000
	Texaco Dahl a-67-J/94-H-7	2457	2-69	949	0.664	1,210	Suspended.
	Pacific CIGOL Dahl d-91-J/94-H-7	2466	———	———	———	———	Suspended.
	IOE Scurry Dahl d-51-B/94-H-10	2642	———	———	———	———	———
Field total		———	———	———		———	4,000
Dawson Creek—							
Dunvegan	Horizon Dawson B3-22-79-15	2216	———	———	———	———	———
Cadotte	Pacific Sc Dawson Ck 3-22-79-15 (2)	302	6-67	540	0.900	805	Suspended.
Elm—							
Halfway	Bracell et al Elm d-83-C/94-H-7	2712	3-72	1,156	0.902	4,934	2,000
Farrell Creek—							
Charlie Lake	CanDel et al Farrell a-30-L/94-A-5	2165	5-73	1,989	0.685	1,864	2,000
	CanDel et al Farrell a-41-I/94-B-8	2089	5-73	1,997	0.870	2,388	2,000
Charlie Lake total		———	———	———	———	———	4,000
Halfway	Ft St John Petroleums Farrell a-9-L/94-A-5	176	11-61	2,341	0.839	5,600	Suspended.
	CanDel et al Farrell a-30-L/94-A-5	2165	———	———	———	———	———
	CanDel et al Farrell a-41-I/94-B-8	2089	5-73	1,597	0.783	2,319	2,000
Field total		———	———	———		———	6,000
Fireweed—							
Bluesky	Skye et al Fireweed b-22-H/94-A-13	3346	———	———	———	———	———
	Skye et al Fireweed a-43-H/94-A-13	3071	3-72	1,329	0.710	3,407	2,000
Dunlevy	SOC et al Fireweed b-42-A/94-A-13	3203	8-73	1,334	0.729	13,678	3,420
	SOC et al Fireweed d-75-A/94-A-13	2993	3-72	1,304	0.559	4,538	2,000
	Union Fireweed d-53-G/94-A-13	497	———	———	———	———	———
	SOC et al Fireweed b-4-H/94-A-13	3333	10-73	1,388	1.000	2,794	2,000
	SOC et al Fireweed a-7-H/94-A-13	3152	10-73	1,339	0.759	3,108	2,000
	Skye et al Fireweed a-43-H/94-A-13	3071	3-72	1,321	———	———	———
	CDR Union Fireweed d-55-H/94-A-13	1201	———	———	———	———	———
Dunlevy total		———	———	———	———	———	9,420
Baldonnel	CDR Fireweed d-31-G/94-A-13	1384	———	———	———	———	———
	Skye et al Fireweed a-61-G/94-A-13	3087	———	———	———	———	———
Debolt	West Nat et al Fireweed a-57-A/94-A-13	507	9-60	2,472	0.625	2,050	Suspended.
	SOC et al Jeans d-75-A/94-A-13	2993	1-72	2,243	1.000	3,668	2,000
	West Nat et al Fireweed c-A1-H/94-A-13	455	———	———	———	———	———
Field total		———	———	———	———	———	13,420

TABLE 17—GAS-WELL TEST AND ALLOWABLE DATA, DECEMBER 31, 1973—*Continued*

Field/Pool/Project	Well Name	Well Authorization No.	Date	Pws (Psia)	"n"	AOFP (MSCF/D)	PRL (MSCF/D)
Flatrock—							
Siphon	CEGO et al Flatrock 10-27-84-16	1954	6-67	1,659	0.837	2,630	Suspended.
Boundary Lake	Wainoco Flatrock 6-18-84-16	3304	——	——	——	——	——
Halfway	Champlin Flatrock 10-9-84-16	2516	5-73	1,238	0.945	11,139	4,132
	Champlin et al Flatrock 11-17-84-16	2827	6-73	1,737	0.721	9,719	2,506
	Wainoco et al Flatrock 6-18-84-16	3304	5-73	1,909	——	——	2,000
	Ballinderry Flatrock 10-33-84-16	2760	10-73	1,606	0.659	8,086	2,451
	Wainoco et al Flatrock 6-13-84-17	3221	5-73	1,902	——	——	2,000
Halfway total		——	——	——	——	——	13,089
Fort St. John—							
Dunlevy	Pacific Ft St John A3-29-83-18 (31)	75	6-72	1,321	1.000	28,438	Suspended.
Baldonnel	Pacific Ft St John A9-19-83-18 (58)	190	——	——	——	——	——
	Pacific Ft St John 16-8-83-18 (83)	233	5-67	676	0.820	2,557	2,000
	Pacific Ft St John 9-14-83-18 (71)	204	——	——	——	——	——
	Pacific Ft St John 13-14-83-18 (54)	194	6-72	717	0.993	1,427	Suspended.
	Pacific Ft St John 14-15-83-18 (7)	32	6-73	1,021	0.700	3,256	Suspended.
	Pacific Ft St John A6-16-83-18 (73)	212	6-72	517	0.733	1,436	2,000
	Pacific Ft St John 6-17-83-18 (72)	210	5-72	563	0.851	3,818	2,000
	Pacific Ft St John 8-20-83-18 (43)	170	6-72	458	0.850	2,339	2,000
	Pacific Ft St John B14-21-83-18 (62)	193	6-72	447	0.625	2,162	2,000
	Pacific Ft St John 14-22-83-18 (32)	76	6-72	494	0.782	2,849	2,000
	Pacific Ft St John 13-23-83-18 (34)	82	6-72	523	0.726	2,781	2,000
	Pacific Ft St John C3-29-83-18 (56)	186	6-72	537	0.565	2,202	2,000
	Pacific Ft St John 4-32-83-18 (26)	67	6-72	930	1.000	531	Suspended.
Baldonnel total		——	——	——	——	——	16,000
Pingel	Pacific Ft St John B3-29-83-18 (52)	179	——	——	——	——	——
Halfway	Pacific Ft St John 1-20-83-18 (30)	74	6-72	365	0.839	1,175	2,000
	Pacific Ft St John 2-21-83-18 (46)	172	6-72	366	0.818	1,305	2,000
	Pacific Ft St John A14-21-83-18 (51)	178	6-72	366	0.916	1,525	2,000
	Pacific Ft St John A14-22-83-18 (61)	192	6-73	504	1.000	67	Suspended.
	Pacific Ft St John B3-29-83-18 (52)	179	6-72	406	0.856	1,593	2,000
	Pacific Ft St John 10-30-83-18 (53)	181	6-72	930	0.868	2,077	Disposal.
	Home W Ft St John 10-27-83-19	2391	5-69	1,956	0.643	3,124	Suspended.
	Pacific et al Ft St John 11-34-83-19	2138	6-72	1,668	0.833	3,842	2,000
Halfway total		——	——	——	——	——	10,000
Belloy	Pacific Ft St John 14-21-83-18 (4)	29	6-72	505	0.624	1,044	2,000
	Pacific Ft St John 3-29-83-18 (23)	58	6-73	323	0.542	1,767	2,000
	Pacific Ft St John 3-30-83-18 (6)	31	——	——	——	——	Disposal.
Belloy total		——	——	——	——	——	4,000
Field total		——	——	——	——	——	30,000

Fort St. John Southeast—							
Dunlevy	Pac Ft St John SE 10-31-82-17 (80)	220	6-73	1,303	0.854	1,511	Suspended.
Baldonnel	Pac Ft St John SE 13-2-83-17 (74)	213	6-73	734	0.766	2,964	2,000
	Pac Ft St John SE A4-10-83-17 (55)	184	6-72	939	0.500	1,986	2,000
Baldonnel total							4,000
Siphon	Pacific Ft St John SE 7-3-83-17 (49)	174	6-73	1,674	——	——	——
Pingel	Pacific Ft St John SE 8-5-83-17 (20)	52	7-71	——	——	——	——
Halfway	Pac Ft St John SE 10-33-82-17 (22)	60	6-73	1,494	1.000	5,311	Suspended.
	Pacific Ft St John SE 7-3-83-17 (49)	174	11-69	818	1.000	1,253	Abandoned.
	Pac Ft St John SE 16-3-83-17 (66)	197	6-73	438	0.795	4,931	3,164
	Pac Ft St John SE A10-4-83-17 (60)	191	6-72	729	0.649	1,845	2,000
	Pac Ft St John SE 7-5-83-17 (69)	202	6-73	1,706	1.000	1,343	Suspended.
	Pac Ft St John SE A10-10-83-17 (98)	320	6-73	662	0.845	1,779	Suspended.
Halfway total							5,164
Belloy	Pac Ft St John SE 11-32-82-17 (68)	201	5-73	492	0.745	5,513	4,850
	Pac Ft St John SE 10-4-83-17 (47)	173	5-73	719	0.810	5,366	3,390
	Pacific Ft St John SE 8-5-83-17 (20)	52	5-67	1,558	1.000	1,536	Abandoned.
	Pacific Ft St John SE 4-9-83-17 (44)	166	6-73	942	1.000	4,990	Suspended.
	Pac Ft St John SE 4-10-83-17 (12)	42	6-72	1,747	0.500	5,995	Suspended.
	Pac Ft St John SE 10-10-83-17 (79)	219	6-73	788	0.726	1,367	Suspended.
Belloy total							8,240
Field total							17,404
Grizzly—							
Dunlevy	Gray Oil PRP NW Grizzly c-25-A/93-I-15	1396	3-64	2,682	0.565	7,428	Suspended.
	Monkman Pass PRP Grizzly c-36-A/93-I-15	2973	8-72	2,598	0.522	4,411	2,000
Grizzly North—							
Dunlevy	Quasar et al Grizzly b-62-G/93-I-15	3180	12-72	2,010	0.500	12,336	3,084
Gundy Creek—							
Baldonnel	West Nat Gundy Creek b-69-A/94-B-16	253	4-59	1,618	1.000	5,000	Suspended.
	West Nat East Gundy Creek a-76-A/94-B-16	291	——	——	——	——	Suspended.
	West Nat Gundy Creek c-80-A/94-B-16	83	——	——	——	——	Suspended.
	West Nat Gundy Creek d-2-G/94-B-16	367	8-62	1,707	0.636	2,250	Suspended.
Blueberry	West Nat Gundy Creek b-69-A/94-B-16	253	4-59	1,845	1.000	8,300	Suspended.
Helmet—							
Slave Point	Atkinson Sunlite Helmet b-2-K/94-P-7	2617	——	——	——	——	——
	FPC Chevron et al Helmet b-11-K/94-P-7	2517	1-70	2,346	0.500	191,823	47,956
Highway—							
Dunlevy	West Nat et al Highway b-3-I/94-B-16	168	8-72	1,212	0.869	842	Suspended.
Baldonnel	Pacific Highway b-25-I(1)/94-B-16	112	8-58	1,653	1.000	6,600	Suspended.
	Pacific Highway a-47-I(2)/94-B-16	180	11-57	1,680	0.754	3,600	Suspended.
	Pacific Highway a-69-I(3)/94-B-16	274	11-57	1,691	0.812	3,150	Suspended.
	Pacific Highway a-90-I(4)/94-B-16	229	11-64	1,388	0.535	920	Suspended.
Debolt	Pacific Highway a-90-I(4)/94-B-16	229	7-66	880	0.553	6,885	Suspended.

[2] Exempted from reporting "Maximum Day Production."

TABLE 17—GAS-WELL TEST AND ALLOWABLE DATA, DECEMBER 31, 1973—*Continued*

Field/Pool/Project	Well Name	Well Authorization No.		Pws (Psia)	"n"	AOFP (MSCF/D)	PRL (MSCF/D)
Inga—							
Baldonnel	Pacific Inga 6-29-86-23	2327	6-72	1,362	0.864	5,618	Suspended.
	Pacific Inga 6-32-86-23	2401	6-72	1,236	0.687	2,294	Suspended.
	Pacific Inga 6-4-87-23	2412	6-72	864	0.875	4,660	Suspended.
Baldonnel total		———	———	———	———	———	———
Inga (nonunit)	SOC Cardo Inga b-46-B/94-A-13	3156	9-72	2,135	0.734	3,647	Suspended.
Inga Unit 3	West Nat et al Inga d-42-J/94-A-12	2000	4-73	2,169	———	———	Observation.
	Cdn-Sup Whitehall Inga b-44-J/94-A-12	2461	4-73	2,191	———	———	Observation.
	Francana Cabot Inga b-82-J/94-A-12	2241	4-73	2,088	0.679	39,770	———
	West Nat et al Inga b-10-A/94-A-13	470	4-73	2,073	0.824	2,325	———
	Francana et al Inga a-5-B/94-A-13	2320	4-73	2,120	0.851	457	———
	West Nat et al Inga a-22-B/94-A-13	412	11-70	2,264	1.000	3,220	———
Unit total		———	———	———	———	———	10,000[5]
Field total		———	———	———	———	———	10,000
Inga North—							
Inga	Francana Cabot N Inga d-51-K/94-A-12	2533	———	———	———	———	———
	Francana Cabot N Inga a-81-K/94-A-12	2552	10-70	2,344	0.755	10,146	2,536
	Wincan et al N Inga b-20-B/94-A-13	2684	———	———	———	———	———
Jedney—							
Gething	Pacific Imperial Jedney a-95-C/94-G-8	1366	10-63	1,142	0.531	13,600	Suspended.
Baldonnel project	Pacific Imperial Jedney c-78-H/94-G-1	1129	6-72	1,449	0.726	1,401	———
	Pacific Imperial Jedney b-99-H/94-G-1	1054	6-72	967	0.535	3,070	———
	Pacific Imperial Jedney c-100-H/94-G-1	1082	6-72	1,058	0.500	2,342	———
	Pacific Sunray Imp Jedney b-44-J/94-G-1	492	7-72	1,504	———	———	———
	Pacific Imperial Jedney b-66-J/94-G-1	475	11-72	963	0.839	5,307	———
	Pacific et al Jedney b-68-J/94-G-1	498	6-66	1,358	0.685	———	Disposal.
	Pacific Imperial Jedney d-77-J/94-G-1	484	6-72	905	0.532	1,829	———
	Pacific et al Jedney b-88-J/94-G-1	427	10-72	796	0.818	6,244	———
	Pacific Imp Jedney d-99-J/94-G-1	382	6-72	854	0.531	1,725	———
	Pacific Imperial Jedney b-10-B/94-G-8	473	11-72	829	0.766	7,558	———
	Pacific Imperial Jedney b-30-B/94-G-8	460	6-72	927	0.588	3,569	———
	Pacific Imperial Jedney d-31-C/94-G-8	1178	7-72	1,140	0.931	2,269	———
	Pacific Imperial Jedney d-44-C/94-G-8	1375	7-72	1,223	0.685	3,963	Suspended.
	Pacific Imperial Jedney d-53-C/94-G-8	820	11-72	1,285	0.880	1,839	———
	Pacific Imperial Jedney b-73-C/94-G-8	868	7-72	1,306	0.500	2,568	———
	Pacific et al Jedney c-86-C/94-G-8	778	7-72	1,069	0.500	1,881	———
	Pacific et al Jedney d-97-C/94-G-8	651	11-72	1,051	0.595	6,130	———
	Pacific Pan Am Dome Jedney c-8-F/94-G-8	1152	7-72	1,267	0.594	1,197	———
	Pacific Pan Am Dome Jedney b-28-F/94-G-8	944	7-72	1,263	0.500	2,029	———
	Skelly Jedney a-39-F/94-G-8	1334	10-73	1,104	1.000	3,563	———
Baldonnel project total		———	———	———	———	———	GEP.

Halfway project	Pacific Imperial Jedney c-57-H/94-G-1	1183	6-72	1,317	0.500	2,017	
	Pacific Imperial Jedney d-68-H/94-G-1	1256	6-72	970	0.500	2,921	
	Pacific Imperial Jedney c-78-H/94-G-1	1129	6-72	901	0.853	3,322	
	Pacific Imperial Jedney b-99-H/94-G-1	1054	6-72	819	0.726	6,037	
	Pacific Imperial Jedney c-100-H/94-G-1	1082	6-72	933	0.921	8,374	
	Pacific Imperial Jedney a-65-J/94-G-1	461	6-72	985	0.543	3,649	
	Pacific Imperial Jedney b-66-J/94-G-1	475	11-72	884	0.649	6,875	
	Pacific Imperial Jedney d-77-J/94-G-1	484	11-72	863	0.869	4,997	
	Pacific Imp Jedney d-99-J/94-G-1	382	11-72	921	0.740	3,064	
	Pacific Imp Jedney d-19-B/94-G-8	2171	———	———	———	———	
	Pacific Imperial Jedney d-31-C/94-G-8	1178	7-72	863	0.500	4,111	
	Pacific Imperial Jedney d-42-C/94-G-8	453	7-72	844	0.684	2,675	
	Pacific Imperial Jedney d-44-C/94-G-8	1375	———	———	———	———	
	Pacific Imperial Jedney d-53-C/94-G-8	820	11-72	716	0.587	2,275	
	Pacific Imperial Jedney b-73-C/94-G-8	868	7-72	794	0.588	3,271	
	Pacific Imperial Jedney b-84-C/94-G-8	691	7-72	774	0.500	2,806	
	Pacific et al Jedney c-86-C/94-G-8	778	7-72	863	0.649	2,718	
	Pacific Imperial Jedney a-95-C/94-G-8	1366	8-70	1,444	0.500	———	Disposal.
	Pacific et al Jedney d-97-C/94-G-8	651	7-72	826	0.742	3,588	
	Pacific Pan Am Dome Jedney c-8-F/94-G-8	1152	12-69	1,536	0.677	1,576	
	Pacific et al Jedney a-17-F/94-G-8	779	7-72	1,151	0.837	5,633	Suspended.
	Pacific Pan Am Dome Jedney b-28-F/94-G-8	944	7-72	800	0.554	2,807	
	Skelly Jedney a-39-F/94-G-8	1334	9-72	1,102	0.926	2,724	
	Pacific et al Jedney b-50-F/94-G-8	1907	———	———	———	———	
Halfway project total		———	———	———	———	———	GEP.
Field total		———	———	———	———	———	GEP.
Jedney West—							
Baldonnel	Pacific et al W Jedney b-84-K/94-G-1	1081	6-72	1,605	0.500	1,187	Abandoned.
Halfway	Pacific et al W Jedney b-84-K/94-G-1	1081	6-72	1,308	0.500	1,302	Abandoned.
	Pacific et al W Jedney b-6-C/94-G-8	1276	7-72	1,219	0.500	850	Suspended.
Julienne Creek—							
Baldonnel	ARCo Pac Julienne b-39-D/94-G-1	658	6-73	1,261	———	———	
	Sinclair Julienne Ck a-50-D(B13-2)/94-G-1	304	6-73	1,726	0.912	2,719	
Baldonnel total		———	———	———	———	———	GEP.
Halfway	ARCo Pac Julienne b-39-D/94-G-1	658	6-73	1,953	0.674	1,943	
	Sinclair Julienne Ck a-50-D(B13-2)/94-G-1	304	6-73	1,281	0.988	2,266	
Halfway total		———	———	———	———	———	GEP.
Field total		———	———	———	———	———	GEP.
Kobes-Townsend—							
Dunlevy	Pacific Kobes b-82-I/94-B-8	496	8-72	1,000	1.000	717	2,000
	Pacific Kobes a-3-A(4)/94-B-9	372	8-72	1,045	0.704	2,101	Suspended.
	Pacific Kobes b-24-A/94-B-9	489	8-72	900	1.000	604	2,000
Dunlevy total		———	———	———	———	———	4,000

[5] Concurrent production scheme—annual allowable, 3,650 MMSCF.

TABLE 17—GAS-WELL TEST AND ALLOWABLE DATA, DECEMBER 31, 1973—*Continued*

Field/Pool/Project	Well Name	Well Authorization No.	Date	Pws (Psia)	"n"	AOFP (MSCF/D)	PRL (MSCF/D)
Kobes-Townsend—*Continued*							
Charlie Lake	Pacific Kobes c-73-I(2)/94-B-8	299	10-72	1,451	0.500	685	2,000
	Pacific Kobes d-94-I(1)/94-B-8	141	8-72	1,152	0.824	2,935	2,000
	Pacific Kobes b-35-A(A-1)/94-B-9	177	8-72	1,205	0.564	1,477	2,000
	Pacific Kobes d-57-A/94-B-9	2588	7-70	2,333	———	———	Suspended.
	Pacific Kobes a-99-A(B-1)/94-B-9	314	8-72	1,455	0.500	636	Suspended.
	Pacific Townsend d-21-G(2)/94-B-9	251	8-71	1,213	0.864	1,296	Suspended.
Charlie Lake total		———	———	———	———	———	6,000
Halfway project	Pacific Kobes d-94-I(1)/94-B-8	141	10-72	1,691	0.627	7,464	GEP.
	Pacific Kobes b-35-A(A-1)/94-B-9	177	8-72	1,610	0.588	4,952	GEP.
Halfway project total		———	———	———	———	———	GEP.
Debolt	Pacific Kobes a-99-A(B-1)/94-B-9	314	10-72	1,399	0.869	4,091	2,000
	Pacific Townsend a-20-H(A-1)/94-B-9	164	8-71	2,093	0.700	892	Suspended.
Field total		———	———	———	———	———	12,000
Kotcho Lake—							
Slave Point	West Nat Kotcho b-54-K/94-I-14	879	2-71	2,523	———	———	———
	Pacific Kotcho c-78-K/94-I-14	3101	3-73	2,508	0.663	9,391	2,348
	Pacific Kotcho b-86-K/94-I-14	2097	2-71	2,478	0.623	96,353	Suspended.
	West Nat Kotcho d-12-C/94-P-3	1147	3-73	2,486	0.605	56,752	Suspended.
	Pacific Kotcho b-44-C/94-P-3	562	3-73	2,513	0.565	102,553	Suspended.
	Pacific Kotcho d-70-C/94-P-3	2609	3-73	2,520	0.589	16,509	4,190
	Pacific Kotcho d-100-C/94-P-3	2823	3-73	2,507	0.500	10,716	2,718
	Pacific Kotcho c-31-E/94-P-3	2877	3-73	2,516	0.551	33,560	8,487
	Pacific Kotcho a-67-E/94-P-3	3082	———	———	———	———	———
	Pacific Kotcho b-30-F/94-P-3	677	3-73	2,508	0.500	41,531	10,533
Slave Point project	Pacific Kotcho a-56-K/94-I-14	3301	———	———	———	———	———
	West Nat Kotcho Lake c-67-K/94-I-14	404	3-73	2,521	0.853	802,603	GEP.
Slave Point total		———	———	———	———	———	28,276 plus GEP.
Kotcho Lake East—							
Slave Point	Cdn Res Quintana Pac Kotcho d-71-G/94-L-14	3308	3-73	2,544	0.644	46,359	11,590
	West Nat Kotcho Lake d-39-J/94-I-14	532.	———	———	———	———	———
	Cdn Res Quintana Kotcho b-43-J/94-I-14	3107	12-73	2,532	0.500	78,988	19,747
Slave Point total		———	———	———	———	———	31,337
LaGarde—							
Dunlevy	Texaco NFA LaGarde 7-21-87-15	145	8-73	1,115	0.859	3,416	Suspended.
Boundary Lake	Texaco NFA LaGarde 10-29-87-15	1194	8-73	1,076	0.964	10,655	Suspended.

Laprise Creek—Baldonnel	Pacific et al Laprise c-12-I/94-G-8	2984	12-71	1,358	0.996	3,302	2,000
	Pacific et al Laprise d-33-I/94-G-8	2994	1-72	1,500	0.781	3,770	2,000
	Pembina Laprise d-55-I/94-G-8	3167	11-72	1,520	0.799	4,154	Suspended.
	Pacific CIGOL Laprise c-20-L/94-H-5	2945	10-71	1,369	0.927	6,854	2,000
Baldonnel project	Dome Basco Laprise Creek a-81-A/94-G-8	490	10-72	1,094	0.500	3,407	
	Dome Provo Laprise Creek d-91-A/94-G-8	653	10-72	1,062	0.500	1,485	
	Dome Provo Laprise Creek b-2-H/94-G-8	483	8-73	1,022	0.720	7,061	
	Dome Provo Laprise d-4-H/94-G-8	1852	10-72	952	0.500	3,033	
	Dome Basco Laprise Creek d-13-H/94-G-8	474	8-73	1,093	0.500	4,583	
	Dome Provo Laprise Creek a-25-H/94-G-8	654	10-72	1,023	0.500	1,444	
	Dome Provo Laprise Creek a-33-H/94-G-8	666	8-71	1,037	0.615	4,183	
	Dome Basco Laprise Ck a-35-H/94-G-8	327	8-73	1,138	0.544	6,368	
	Dome Provo Laprise a-46-H/94-G-8	665	10-72	1,119	0.645	2,680	
	Dome Provo Laprise a-52-H/94-G-8	1445	10-72	1,018	0.500	2,825	
	Dome Provo Laprise a-81-H/94-G-8	837	8-73	1,121	0.500	4,074	
	Dome Provo Laprise d-91-H/94-G-8	809	8-73	1,088	0.579	6,093	
	Dome Provo Laprise c-92-H/94-G-8	1056	10-72	976	0.578	2,223	
	Dome Laprise d-37-C/94-H-5	1392	6-68	1,376	0.668	390	Suspended.
	Pacific et al Laprise a-69-C/94-H-5	3038	1-72	1,291	0.744	14,339	
	Tenn Monsanto Laprise d-79-C/94-H-5	1371	10-72	1,127	0.684	4,294	
	Pacific Imp Laprise b-90-C/94-H-5	1970	11-72	1,074	0.740	3,470	
	Pacific Imp Laprise b-100-C/94-H-5	1999	11-72	1,084	0.783	17,202	
	Amerada Laprise d-33-D/94-H-5	1282	——	——	——	——	
	Amerada Laprise d-55-D/94-H-5	1468	8-71	1,246	0.667	3,265	
	Amerada Laprise d-77-D/94-H-5	1378	7-73	1,257	0.521	3,946	
	Pacific IOE Laprise a-85-D/94-H-5	1948	12-72	1,223	0.500	4,821	Suspended.
	Pacific et al Laprise b-88-D/94-H-5	3042	2-72	1,294	0.825	10,667	
	Amerada Laprise d-95-D/94-H-5	1477	8-71	1,432	0.500	1,171	
	Pacific et al Laprise c-98-D/94-H-5	3192	——	——	——	——	
	Pacific IOE Laprise d-3-E/94-H-5	1979	11-72	1,320	——	——	
	Amerada Laprise a-7-E/94-H-5	1337	8-71	1,385	0.500	5,709	
	Pacific IOE Laprise d-11-E/94-H-5	1364	——	——	——	——	
	Pacific Imperial Laprise a-22-E/94-H-5	715	7-71	1,144	0.554	3,490	
	Pacific Imperial Laprise c-24-E/94-H-5	1511	12-72	1,048	0.594	1,746	
	Pacific IOE Laprise a-29-E/94-H-5	1938	11-72	1,447	——	——	
	Dome Provo Laprise b-30-E/94-H-5	1837	8-73	1,053	0.649	4,153	
	Pacific Imperial Laprise a-33-E/94-H-5	690	11-72	937	0.810	9,119	
	Dome Provo Laprise c-40-E/94-H-5	1251	8-73	1,028	0.770	8,720	
	Pacific Imperial Laprise b-44-E/94-H-5	659	11-72	910	0.775	11,733	
	Pacific Imperial Laprise a-46-E/94-H-5	678	8-71	1,104	0.509	5,825	Suspended.
	Pacific Imperial Laprise a-49-E/94-H-5	1488	11-72	1,050	0.726	8,156	
	Pacific Imperial Laprise d-55-E/94-H-5	670	11-72	1,025	0.713	6,812	
	Pacific Imperial Laprise c-56-E/94-H-5	650	7-71	1,102	0.577	5,159	
	Pacific Imperial Laprise d-68-E/94-H-5	516	7-71	1,148	0.661	6,222	
	Dome Provo Laprise c-70-E/94-H-5	1225	8-73	1,102	0.510	5,656	
	Pacific Imperial Laprise c-78-E/94-H-5	551	1-73	1,093	0.700	5,649	
	Pacific Imperial Laprise a-99-E/94-H-5	1341	11-72	1,129	0.767	13,036	
Baldonnel total		——	——	——	——	——	GEP plus 6,000

TABLE 17—GAS-WELL TEST AND ALLOWABLE DATA, DECEMBER 31, :1973—*Continued*

Field/Pool/Project	Well Name	Well Authorization No.	Date	Pws (Psia)		AOFP (MSCF/D)	PRL (MSCF/D)
Laprise Creek West—							
Baldonnel	Dome CDP C&E W Laprise c-71-G/94-G-8	1015	----	----	----	----	Suspended.
	Dome CDP C&E W Laprise c-82-G/94-G-8	873	6-67	970	0.618	2,695	Suspended.
Louise—							
Slave Point	Pacific Louise c-40-L/94-P-3	2472	----	----	----	----	----
	Placid Louise c-80-L/94-P-3	1570	3-65	2,315		----	----
Milligan Creek—							
Gething	Union HB Milligan d-62-G/94-H-2	1001	12-70	1,022		----	2,000[6]
	Ipex et al Milligan d-76-G/94-H-2	2659	----	----	----	----	----
	Ashland Homestead Milligan d-85-G/94-H-2	2644	4-70	1,024	0.880	3,535	Suspended.
Montney—							
Gething	Pac Sunray Montney 16-32-86-19 (3)	119	9-58	1,123	1.000	814	Suspended.
Cecil	Pac Sunray Montney 14-36-86-19 (2)	104	7-58	1,116	1.000	2,200	Suspended.
Halfway	Pac White Rose Sec Montney 6-5-87-18	801	7-72	1,409	0.529	1,754	Suspended.
	Pac Sunray Montney 14-31-86-19 (5)	289	7-61	1,185	0.932	2,250	Suspended.
Nig Creek—							
Baldonnel	Whitehall ARCo Nig a-87-J/94-A-13	2244	----	----	----	----	----
	Huber Cdn-Sup Total Nig d-73-A/94-H-4	3389	12-73	1,434	----	----	----
	West Nat Nig a-3-B/94-H-4	1373	7-72	1,349	0.520	1,461	Suspended.
	Pacific Nig b-4-B/94-H-4	1728	7-72	1,026	0.637	2,455	2,000
	Whitehall Nig b-6-B/94-H-4	1613	7-69	1,369	0.841	7,647	2,087
	Monsanto Nig d-13-B/94-H-4	1004	2-72	1,130	0.500	1,811	2,000
	Monsanto Nig a-21-B/94-H-4	1475	2-72	944	0.677	2,728	2,000
	Texaco NFA Nig d-33-B/94-H-4	2157	3-72	1,500	0.662	720	Suspended.
	Dome Provo Nig d-35-B/94-H-4	1139	12-72	1,143	0.595	4,384	2,000
Baldonnel project	Texaco NFA Nig a-69-A/94-H-4	819	7-73	1,256	0.500	1,012	2,000
	Texaco Gulf Nig d-76-A/94-H-4	2761	7-73	1,355	0.665	2,559	----
	Texaco NFA Nig d-15-B/94-H-4	1180	7-73	1,080	0.621	6,493	2,365
	Texaco NFA Nig c-36-B/94-H-4	729	7-73	1,055	0.572	4,457	2,000
	Texaco et al Nig b-68-B/94-H-4	2784	7-73	1,099	0.665	3,419	2,000
	Texaco NFA Nig Creek b-70-B(9)/94-H-4	383	8-73	1,262	0.500	2,655	Suspended.
	Texaco NFA Nig d-71-B/94-H-4	790	8-72	1,169	1.000	1,947	Suspended.
	Texaco NFA Nig d-75-B/94-H-4	1681	7-73	906	0.587	4,985	----
	Texaco NFA Nig a-77-B/94-H-4	1762	7-73	888	0.663	5,585	----
	Texaco NFA Nig Creek a-79-B(1)/94-H-4	61	7-73	1,000	0.591	5,004	----
	Texaco NFA Nig c-90-B/94-H-4	1161	7-73	1,069	0.594	2,807	----
	Texaco NFA Nig Creek a-31-F(7)/94-H-4	294	----	----	----	----	Disposal.
	Texaco NFA Nig Creek a-1-G/94-H-4	456	7-73	842	0.898	5,755	----
	Texaco NFA Nig Creek b-2-G/94-H-4	447	7-73	899	0.564	8,913	----
	Texaco NFA Nig a-6-G/94-H-4	1740	7-73	860	0.571	6,537	----

	Texaco NFA Nig a-8-G/94-H-4	967	7-73	912	0.806	22,895	
	Texaco NFA Nig Creek a-12-G(6)/94-H-4	131	7-73	834	1.000	5,040	
	Texaco NFA Nig c-14-G/94-H-4	2178	3-72	1,311	0.670	375	Suspended.
	Texaco NFA Nig b-44-G/94-H-4	852	8-73	1,398	0.530	341	Abandoned.
	Texaco NFA Nig c-6-H/94-H-4	1654	7-73	1,049	0.764	3,909	
	Texaco NFA Nig c-14-H/94-H-4	1707	8-73	1,166	0.631	3,490	Suspended.
	Texaco NFA Nig c-33-H/94-H-4	1742	7-73	1,043	0.654	3,449	
	Texaco NFA Nig b-41-H/94-H-4	1976	8-73	1,234	1.000	363	Suspended.
Baldonnel project							80,300
Baldonnel total							90,387
Nig Creek West—							
Baldonnel	Pacific W Nig c-19-C/94-H-4	92					
	Tenn Monsanto W Nig d-39-C/94-H-4	1448	7-70	1,651	0.796	7,634	Suspended.
North Pine—							
North Pine	Pacific et al N Pine 6-24-85-18	1994	8-72	1,285	0.583	7,493	2,377
	Pacific et al N Pine 6-27-85-18	1958	8-72	1,735	0.625	24,095	Suspended.
Oak—							
Cecil	Woods Wainoco Oak 7-2-87-18	3216	1-73	1,676	0.803	10,093	2,523
Halfway	Woods Wainoco Oak 11-24-86-18	3269					
	Woods Wainoco Oak 10-27-86-18	3201	11-72	1,842	0.947	6,465	2,000
	Woods Wainoco Oak 6-35-86-18	3171	12-72	1,849	0.982	8,721	2,180
	Woods Wainoco Oak 7-2-87-18	3216	12-72	1,788	0.947	1,080	Abandoned.
	Woods Wainoco Ashland Oak 6-18-86-17	3363					
Halfway total							4,180
Field total							6,703
Parkland—							
Belloy	IOE Pac Parkland 10-26-81-16	1355	9-64	2,945	0.500	3,650	Suspended.
	Pacific Alcon Parkland 7-27-81-16	2250	8-68	2,976	0.835	7,900	Suspended.
Wabamun project	Pacific Imp Parkland 10-26-81-15	1155	11-72	2,647	0.650	4,695	
	Pacific Imp Parkland 6-29-81-15	153	12-72	2,630	0.679	20,468	
Wabamun total							20,000
Petitot River—							
Slave Point	West Nat Petitot b-90-K/94-P-12	722					
	West Nat Petitot River b-1-D/94-P-13	533	2-60	2,783	0.824	225,000	Suspended.
	West Nat Petitot River d-24-D/94-P-13	403					
Red Creek—							
North Pine	Pacific Red Creek 5-27-85-21 (36)	93	5-65	1,267	1.000	3,308	Suspended.
Halfway	Pacific Red Creek 5-27-85-21 (36)	93	7-65	1,437	1.000	2,434	Suspended.
Redeye—							
Halfway	Quasar Amoco Redeye d-69-D/94-H-10	3274					
	Pan Am Redeye d-89-D/94-H-10	2442	1-69	939	0.966	27,385	6,846

[6] Lease fuel.

TABLE 17—GAS-WELL TEST AND ALLOWABLE DATA, DECEMBER 31, 1973—*Continued*

Field/Pool/Project	Well Name	Well Authorization No.	Date	Pws (Psia)	"n"	AOFP (MSCF/D)	PRL (MSCF/D)
Rigel—							
Bluesky	Imp et al Rigel 10-35-88-18	2593	(7)	(7)	(7)	(7)	(7)
	ARCo Rigel d-33-I/94-A-10	1763	11-70	981	———	———	———
	IOE et al Rigel d-39-J/94-A-10	2686	10-70	1,118	0.509	55	Suspended.
Dunlevy	IOE Fina Rigel 7-35-87-18	2707	7-73	804	0.500	8,843	Suspended.
	Coseka Pem Rigel 10-6-88-18	3374	9-73	1,200	1.000	598	2,000
	IOE et al Rigel d-39-J/94-A-10	2686	7-73	886	0.826	6,776	Suspended.
	Cabot et al Rigel a-87-K/94-A-10	2573	———	———	———	———	———
Dunlevy project	Denision Rigel 6-31-87-16	1372	7-73	1,014	0.765	4,732	Suspended.
	Monsanto Rigel 14-23-87-17	1973	———	———	———	———	———
	IOE Fina Rigel 16-24-87-17	1739	6-69	1,040	———	———	———
	Monsanto IOE Fina Rigel 11-26-87-17	1486	4-72	958	1.000	2,270	Suspended.
	Wintershall Rigel 10-34-87-17	1365	7-73	832	0.560	3,050	
	Pacific Rigel 6-35-87-17	1293	7-72	890	1.000	3,341	Suspended.
	Monsanto Rigel 6-36-87-17	1354	8-73	845	0.565	8,575	
	Whitehall Rigel 11-18-88-16	1234	———	———	———	———	- -
	IOE Fina Rigel 7-30-88-16	2258	———	———	———	———	- -
	Imp Fina Rigel 8-1-88-17	1312	12-71	927	———	———	
	Imp Fina Rigel 6-3-88-17	1187	7-73	695	0.553	6,103	
	Imp Fina Rigel 6-8-88-17	1208	7-73	1,050	0.675	2,544	Suspended.
	Imp Fina Rigel 6-10-88-17	1090	7-73	736	0.582	7,211	
	Whitehall Rigel 6-14-8817	1149	———	———	———	———	———
	Whitehall Rigel 6-15-88-17	1148	6-71	843	0.720	25,224	- - -
	Imp Fina Rigel 6-16-88-17	1168	7-73	1,250	———	———	
	Imp et al Rigel 7-19-88-17	1107	7-73	756	0.814	13,529	
	IOE Fina Rigel 10-25-88-17	2127	12-71	963	0.500	3,337	Suspended.
	Imp Fina Rigel 4-27-88-17	130	7-73	725	0.634	4,377	
	Imp Fina Rigel 6-28-88-17	1385	7-73	1,293	———	———	———
	Imp et al Rigel 6-30-88-17	1032	7-73	765	0.716	12,240	
	IOE Fina Rigel 7-1-88-18	2974	8-73	829	0.833	1,734	
	IOE Fina Rigel 11-2-88-18	2597	7-73	781	0.837	14,064	
	Imp Fina Rigel 11-3-88-18	1593	12-71	945	———	———	
	Woods Rigel 10-8-88-18	2795	8-73	820	0.626	4,218	———
	IOE Fina Rigel 11-11-88-18	1494	7-73	782	0.671	12,852	———
	Imp et al Rigel 7-13-88-18	1978	7-73	757	0.669	9,558	
	Imp Fina Rigel 10-14-88-18	1465	7-73	790	0.663	5,021	- -
	Pacific Rigel 11-15-88-18	2572	7-72	913	0.837	1,975	- -
	Sierra Rigel 10-17-88-18	2725	9-71	992	0.700	1,198	- -
	Tenn Rigel 6-18-88-18	2987			———	———	Suspended.
	Richfield et al Rigel 10-19-88-18	1381			———	———	- - -

	Imp et al Rigel 6-21-88-18	1118	7-73	799	0.952	4,738	———
	Imp et al Rigel 7-23-88-18	1163	7-73	794	0.693	1,430	———
	Sun Rigel 10-24-88-18	1324	9-70	1,000	0.675	6,267	———
	Imp et al Rigel 6-27-88-18	828	7-73	732	0.699	4,122	———
	Texaco NFA Rigel 10-29-88-18	1222	3-72	1,048	0.620	4,249	Suspended.
	Texaco NFA Rigel 9-31-88-18 (10)	195	6-73	835	0.685	8,262	———
	Imp et al Rigel 10-35-88-18	2593	7-73	859[7]	0.658[7]	3,923[7]	———
	Pembina Rigel 10-24-88-19	3160	———	———	———	———	———
	ARCo Rigel a-27-I/94-A-10	1620	7-73	829[7]	0.777[7]	9,009[7]	———
	ARCo Rigel d-33-I/94-A-10	1763	7-73	993	———	———	———
	IOE Fina Rigel d-57-I/94-A-10	1537	7-73	853	0.676	3,036	———
	Imp IOE Fina Rigel a-21-J/94-A-10	2054	7-73	660	0.760	10,451	———
	IOE et al Rigel c-56-J/94-A-10	2537	7-73	845	0.594	9,013	———
	IOE Fina Rigel c-60-J/94-A-10	2400	7-73	834	0.622	9,080	———
	IOE Fina Rigel a-89-J/94-A-10	2354	7-73	969	0.788	1,349	*Suspended.*
	Imp et al Rigel b-22-K/94-A-10	1003	———	———	———	———	———
	Texaco NFA Rigel a-28-K/94-A-10	1370	6-73	821	0.660	1,258	———
	IOE Fina Rigel d-71-K/94-A-10	2726	7-73	837	0.734	10,394	———
Dunlevy total		———	———	———	———	———	GEP plus 2,000
Rigel East—							
Dunlevy	Texaco NFA E Rigel 10-12-88-16	1192	2-63	1,335	0.660	3,270	Suspended.
	Tenn E Rigel 6-23-88-16	1275	12-71	1,330	———	———	———
Halfway	Texaco NFA E Rigel 13-26-88-16 (4)	160	1-69	1,532	0.800	3,500	2,000
Sierra—							
Pine Point	Socony Mobil Sierra c-78-C/94-I-14	1602	2-68	3,450	0.662	610,000	Abandoned.
	Mobil Sierra c-A78-C/94-I-14	2596	5-72	3,342	0.896	374,938	96,466
	Socony Mobil Sierra c-91-D/94-I-14	1659	5-72	3,330	0.500	69,182	17,635
Pine Point total		———	———	———	———	———	114,101
Siphon—							
Dunlevy	Pacific Westcoast Siphon 11-28-86-16	3133	5-73	1,340	0.656	24,469	6,366
	Pacific Westcoast Siphon A7-33-86-16	*3118*	*5-73*	1,333	*0.843*	*20,682*	*5,454*
	Pacific West Prod Siphon 7-34-86-16	2581	5-73	1,296	0.578	15,440	4,062
	Kissinger Vaughey Siphon 6-2-87-16	2952	5-73	1,203	0.713	3,996	2,000
	Kissinger Vaughey Siphon 7-3-87-16	3077	4-73	1,331	0.695	42,668	11,230
Dunlevy total		———	———	———	———	———	29,112
Baldonnel	Pacific et al Siphon 11-27-86-16	444	10-69	1,430	———	———	Suspended.
	Dome Siphon 10-12-87-16	2446	1-70	1,381	0.966	1,550	Suspended.
Siphon	Texex Siphon 10-22-86-16	3196	———	———	———	———	———
	Pacific et al Siphon 11-27-86-16	444	7-72	1,423	0.907	5,200	2,000
	Pacific West Prod Siphon 7-34-86-16	2581	5-73	1,365	0.926	5,437	2,000
	Kissinger Vaughey Siphon 6-11-87-16	3100	3-72	1,533	0.827	3,116	Suspended.
	Dome Siphon 10-12-87-16	2446	———	———	———	———	———
Siphon total		———	———		———	———	4,000

[7] Bluesky and Dunlevy without segregation.

TABLE 17—GAS-WELL TEST AND ALLOWABLE DATA, DECEMBER 31, 1973—*Continued*

Field/Pool/Project	Well Name	Well Authorization No.	Date	Pws (Psia)	"n"	AOFP (MSCF/D)	PRL (MSCF/D)
Siphon—*Continued*							
Halfway	Pacific et al Siphon 11-27-86-16	444	7-72	1,039	0.720	3,533	2,000
	Pacific Westcoast Siphon 11-28-86-16	3133	5-73	1,569	0.879	42,180	11,380
	Woods Anadarko Siphon 7-31-86-16	3055	———	———	———	———	———
	Kissinger Vaughey Siphon 7-33-86-16	2972	5-73	1,293	0.977	9,302	2,995
	Kissinger Vaughey Siphon 6-2-87-16	2952	5-73	1,359	0.988	1,509	2,000
Halfway total		———	———	———	———	———	18,275
Field total		———	———	———	———	———	51,487
Stoddart—							
Belloy	Pacific et al Stoddart 6-29-85-18	2262	8-72	2,192	0.892	1,243	2,000
	Mesa et al Stoddart 6-31-85-18	2539	6-73	1,371	0.747	2,996	2,000
	Apache Dunbar Stoddart 11-23-85-19	2548	10-69	2,384	0.920	3,140	Abandoned.
	Apache Dunbar Stoddart 6-26-85-19	2409	12-70	2,119	0.751	14,689	4,021
	Jeff Lake Mesa Stoddart 11-34-85-19	1959	———	———	———	———	———
	Pacific et al Stoddart 10-35-85-19	2182	10-72	1,614	0.718	16,153	5,331
	Pacific Stoddart 11-2-86-19	2155	10-72	1,550	0.621	20,395	6,672
	Dome Provo Stoddart 11-8-86-19	1902	9-72	1,080	0.649	4,128	2,000
	Pacific Stoddart 6-10-86-19	2078	8-72	1,470	0.880	1,220	2,000
	Jeff Lake Altair Stoddart 6-11-86-19	1841	8-72	1,597	0.754	23,376	7,839
	Pacific et al Stoddart 11-16-86-19	1473	8-72	1,468	0.630	2,590	2,000
	Whitehall Stoddart 6-17-86-19	1770	6-69	1,395	1.000	3,341	2,000
	Pacific et al Stoddart 11-18-86-19	2562	10-72	1,167	0.729	12,197	5,622
	Pacific Stoddart 6-19-86-19	2575	6-73	1,159	0.654	9,388	3,934
	Pacific et al Stoddart 10-1-86-20	438	———	———	———	———	Suspended.
	Pacific Stoddart 2-13-86-20 (90)	262	10-72	1,129	0.756	19,795	8,472
	Pacific Stoddart 4-24-86-20 (85)	244	6-73	1,093	0.927	17,020	8,268
Belloy total		———	———	———	———	———	62,159
Stoddart West—							
Halfway	Pacific W Stoddart 6-22-86-20	2999	1-72	1,928	0.597	9,972	Abandoned.
Belloy	Woods W Stoddart 11-7-86-20	2814	9-71	2,639	0.784	19,344	4,836
	Pacific W Stoddart 11-10-86-20	1190	8-72	1,382	0.625	6,514	Suspended.
	Woods W Stoddart 10-18-86-20	2786	2-71	2,438	0.779	5,631	Suspended.
	Woods W Stoddart 11-19-86-20	2737	8-71	2,324	0.784	2,079	2,000
	Pacific et al W Stoddart 11-30-86-20	2199	10-72	2,050	0.692	12,042	2,879
	Pacific et al W Stoddart 7-5-87-20	2338	10-72	2,032	1.000	5,827	2,000
	Pacific Apache W Stoddart 10-8-87-20	3009	———	———	———	———	———
	Trend et al W Stoddart 6-16-87-20	2780	3-71	2,132	0.869	2,633	2,000
Belloy total		———	———	———	———	———	13,715

Sunrise—							
Paddy	Horizon Sunrise 11-6-79-16	2560	——	——	——	——	——
	Pacific Horizon 10-7-79-16 (3)	15	5-71	734	——	——	——
Upper Cadotte	Great Northern Sunrise A11-6-79-16	2878	3-71	632	0.724	707	Abandoned.
Cadotte	Pacific Sunrise 11-31-78-16 (6A)	19	——	——	——	——	——
	Horizon Sunrise 11-4-79-16	2569	8-70	770	——	——	——
	Horizon Sunrise 11-5-79-16	2559	8-70	683	——	——	——
	Great Northern Sunrise A11-6-79-16	2878	2-71	721	0.625	2,398	Suspended.
	GNPM Sunrise 6-7-79-16	2983	12-71	708	0.930	1,730	2,000
	Horizon Sunrise 10-8-79-16	2538	12-69	714	——	——	
	Pacific Sunrise 10-9-79-16 (4)	17	——	——	——	——	
	Horizon Sunrise 11-9-79-16	2564	8-70	730	——	——	
	GNPM Arlington Sunrise 11-2-79-17	3360	——	——	——	——	——
	GNPM Sunrise 7-12-79-17	2772	——	——	——	——	——
Tsea—							
Slave Point	Texaco NFA Tsea b-68-K/94-P-5	704	3-62	2,646	0.628	76,650	Suspended.
	Texaco NFA Tsea b-99-K/94-P-5	1426	3-64	2,734	0.523	12,600	Suspended.
Two Rivers—							
Baldonnel	Champlin et al Two Rivers 6-9-83-16	2139	6-72	1,705	——	——	Suspended.
Siphon	Champlin Two Rivers 10-5-83-16	2064	5-71	1,533	0.924	6,635	2,000
Halfway	Champlin et al Two Rivers 6-9-83-16	2139	6-72	1,821	0.878	38,422	11,377
Field total		——	——	——	——	——	13,377
Weasel—							
Baldonnel	Sinclair Pacific Weasel d-93-J/94-A-15	1790	12-65	1,113	0.675	6,050	2,000
Halfway	Tenn Ashland Weasel d-27-B/94-H-2	1703	10-65	1,248	0.754	1,070	Suspended.
Wilder—							
Halfway project	Wainoco Woods Wilder 10-19-83-19	2793	8-73	1,884	0.730	29,463	——
	Wainoco Woods Wilder 7-30-83-19	2773	10-72	1,786	0.866	17,266	——
Halfway project	PRL	——	——	——	——	——	12,500
Belloy	Amerada Rac Wilder 11-17-83-19	697	——	——	——	——	——
	Wainoco Woods Wilder 11-20-83-19	2708	8-70	2,602	1.000	1,132	Suspended.
Wildmint—							
Bluesky	Union HB Wildmint d-25-A/94-H-2	919	11-72	1,041	——	——	——
Willow—							
Halfway	Union HB Willow d-11-G/94-H-2	1292	3-73	704	0.741	3,026	Suspended.
	Union HB Willow b-10-H/94-H-2	830	9-73	637	0.510	15,077	6,947
Yoyo—							
Slave Point	West Nat et al Yoyo a-74-H/94-I-13	887	3-62	2,686	0.791	185,000	——
Pine Point	West Nat et al Yoyo a-74-H/94-I-13	887	3-73	2,579	0.536	13,954	3,489
	BVX Mesa Redwater Yoyo b-86-H/94-I-13	2907	3-73	2,612	0.588	23,152	5,788
	Pacific Placid Yoyo d-95-H/94-I-13	1634	——	——	——	——	Disposal.
	Pacific Yoyo d-12-I/94-I-13	2602	3-71	2,754	0.581	249,608	62,402
	Placid Frontier Yoyo b-24-I/94-I-13	1895	3-67	2,883	0.845	132,000	Suspended.
	West Nat et al Yoyo b-29-I/94-I-13	1230	1-64	2,921	0.577	3,500	Suspended.
	Uno-Tex Hamilton Yoyo c-34-I/94-I-13	2229	2-68	2,838	0.640	92,000	Suspended.

TABLE 17—GAS-WELL TEST AND ALLOWABLE DATA, DECEMBER 31, 1973—*Continued*

Field/Pool/Project	Well Name	Well Authorization No.	Date	Pws (Psia)	"n"	AOFP (MSCF/D)	PRL (MSCF/D)
Yoyo—*Continued*	West Nat Yoyo b-98-E/94-I-14	1405	3-73	2,571	0.533	101,710	27,428
	Pacific Yoyo a-2-L/94-I-14	2271	3-71	2,795	0.684	89,523	23,175
	Pacific Yoyo d-7-L/94-I-14	2035	3-73	2,583	0.600	104,763	28,173
	Placid Frontier Yoyo b-10-L/94-I-14	1569	3-65	3,021	0.643	63,000	Suspended.
	Frontier Yoyo c-18-L/94-I-14	1431	3-73	2,571	0.596	222,212	60,211
	West Nat et al Yoyo b-24-L/94-I-14	1313	1-73	2,598	0.524	78,787	20,965
	Tenn Altair Yoyo a-47-L/94-I-14	1831	7-72	2,661	0.693	209,828	56,047
	Uno-Tex Hamilton Yoyo a-49-L/94-I-14	2068	3-71	2,761	1.000	288,903	72,226
Pine Point total							359,904
Other areas—							
Cadotte	Westcoast Pouce Coupe 8-18-80-13 (6)	—	7-60	595	—	—	
	Westcoast Pouce Coupe 6-30-80-13 (1)	—	—	—	—	—	
Notikewin	Westcoast Kiskatinaw 8-30-80-14 (5)	—	—	—	—	—	
Bluesky	Pacific Westcoast Pouce 7-30-80-13	2995	—	—	—	—	—
	Texaco NFA Junction b-9-F(12)/94-A-15	300	8-73	983	0.539	9,462	2,506
	Pacific et al Caribou d-27-H/94-A-16	3117	—	—	—	—	—
	Imp Fina Altares a-83-A/94-B-8	410	3-71	1,238	—	—	Suspended.
	Union HB Gulf Ladyfern d-77-H/94-H-1	2615	3-70	1,047	0.729	6,016	2,000
	Dome Antelope a-63-L/94-H-1	3142	—	—	—	—	—
	Triad BP Pickell Creek c-88-I/94-H-3	695	—	—	—	—	—
	Triad BP Birley d-17-A/94-H-6	987	—	—	—	—	—
	GPD et al Gleam d-90-J/94-H-6	3108	—	—	—	—	—
	Texaco NFA Silver c-52-K/94-H-6	571	—	—	—	—	—
	Pan Am Dome Silver d-81-L/94-H-6	2406	—	—	—	—	—
	Dome Nettle b-44-A/94-H-7	3126	—	—	—	—	—
	Texaco NFA Judy c-53-D/94-P-6	717	—	—	—	—	—
Bluesky total							4,506
Gething	Texcan N Nancy d-46-I/94-A-15	1905	—	—	—	—	—
	Union HB Beaverdam d-64-L/94-A-16	1825	—	—	—	—	—
	Union ROC Firebird d-89-D/94-H-2	707	3-71	1,091	0.811	6,713	Suspended.
Dunlevy	Texaco NFA E Osborn a-45-J/94-A-9	1257	—	—	—	—	—
	Anadarko Cdn-Sup Buick d-39-L/94-A-10	3366	—	—	—	—	—
	Fina Bearberry d-95-L/94-A-11	3240	—	—	—	—	—
	SOC et al Inga d-55-B/94-A-13	3376	10-73	1,340	0.841	2,071	2,000
	SOC et al W Jeans c-78-B/94-A-13	3227	—	—	—	—	Suspended.
	HB BA Union Lime c-80-C/94-H-1	122	—	—	—	—	—
Baldonnel	Pacific Westcoast Pouce 7-30-80-13	2995	—	—	—	—	—
	Westcoast Pingel 13-11-81-17 (8)	4	—	—	—	—	—
	Pacific Ft St John 12-7-84-18 (19)	62	8-70	1,503	0.770	1,977	Suspended.

Baldonnel	Pacific Ft St John 1-15-84-19 (5)	30	9-52	1,594			
	Wainoco Ft St John 11-23-84-19	3122					
	Wainoco Ft St John 6-24-84-19	3060	7-72	1,587			Abandoned.
	Sinclair Bear Ck 11-18-84-20 (B2-3)	243					
	White Rose Sec Montney 10-29-86-18	1130	9-62	1,520	0.669	1,640	Suspended.
	Tenn LaGarde 6-35-87-15	1200	11-63	1,665	0.754	1,250	Suspended.
	Texaco NFA E Osborn 6-33-88-14	1319	1-69	1,309	0.746	1,168	2,000
	TGS Falls c-32-F/93-O-9	2230					
	Hunt Sands Sun Falls c-18-G/93-O-9	1028					
	Triad BP Sukunka a-43-B/93-P-5	1517	9-65	4,601	0.637	120,000	Suspended.
	Whitehall Numac Nig a-49-J/94-A-13	2012	1-67	1,578	1.000	1,100	Abandoned.
	Altair Sarcee C&E Zeke c-34-L/94-A-14	1332					
	Pacific et al Coyote d-51-C/94-A-16	3125	4-72	1,225	0.763	10,291	2,573
	Texaco NFA Cameron River b-49-L(1)/94-B-9	120					
	HB Cypress a-92-K/94-B-10	2365	3-71	1,960	0.630	53,208	Suspended.
	FPC Richfield Daiber c-56-D/94-B-16	432	9-71	2,008	0.573	1,166	2,000
	FPC Richfield Daiber c-76-D(1)/94-B-16	386	9-71	2,011	0.726	11,289	Suspended.
	Woods Amerada N Julienne d-33-H/94-G-2	2574	2-70	1,961	1.000	540	2,000
	Sinclair et al N Julienne c-54-H/94-G-2	757	8-71	1,944			
	Uno-Tex et al Lily d-67-K/94-G-2	3088					
	Pan Am Dome Sikanni b-43-B/94-G-7	1335	9-63	1,726	0.832	5,500	Suspended.
	Union ARCo Firebird d-43-D/94-H-2	2060					
	Pacific Sunray Imp Sojer a-61-L/94-H-4	472					
	Champlin Bass Martin c-91-B/94-H-5	2245					
	Ashland CK Tb Wargen d-19-B/94-H-6	2119					
Baldonnel total							8,573
Charlie Lake	Richfield-Prespatou Crk d-59-A(1)/94-H-3	240					
Siphon	Union HB Alder c-39-I/94-H-2	721	3-70	907			
Coplin	TPPL et al W Inga 6-11-87-24	3070					
	TPPL et al W Inga 10-17-87-24	3121	9-72	2,109			
	Union Silverberry 6-16-88-20	3076	1-73	1,857	0.961	143,848	35,962
	Texaco NFA Redeye d-69-I/94-H-6	1549					
Inga	Westcoast et al Goose 6-5-85-21	2989	11-72	1,857	0.814	6,551	Suspended.
Pingel	Pacific et al Pingel 13-17-81-17 (1)	36					Suspended.
	Pacific Pingel Creek 5-26-81-18 (2)	66					
"A" Marker	Dome Drake b-48-F/94-H-1	3141					
Halfway	HB et al Moberly 16-20-79-25	2174					
	Wainoco Ft St John 11-12-84-19	3010	1-72	1,953	0.891	4,996	, 2,000
	Wainoco Ft St John 6-24-84-19	3060					
	Pacific Wilder 13-1-84-20 (14)	47	12-53	2,035	0.780	5,500	Suspended.
	Cankee CIGOL Melanie d-68-K/94-A-9	1859					
	Sinclair Pacific Mink d-88-A/94-A-15	1564					
	Dome et al W Peejay d-31-G/94-A-15	1927					
	GraMic Scurry et al N Nancy d-30-I/94-A-15	2713					
	Pacific SR CanDel Beaverdam d-71-I/94-A-15	2101	4-67	1,323	0.794	4,400	Suspended.
	Pacific SR CanDel W Dede b-45-K/94-A-15	1271	3-63	1,411	0.700	5,600	Suspended.
	Union HB Spruce d-74-E/94-A-16	2664					
	ARCo et al E Bulrush d-93-F/94-A-16	2603					

TABLE 17—GAS-WELL TEST AND ALLOWABLE DATA, DECEMBER 31, 1973—*Continued*

Field/Pool/Project	Well Name	Well Authorization No.	Date	Pws (Psia)	"n"	AOFP (MSCF/D)	PRL (MSCF/D)
Other areas—*Continued*							
Halfway—*Continued*							
	Sinclair et al Graham c-53-D(B5-1)/94-B-9	238					- -
	Texaco NFA Cameron River d-43-H/94-B-10	433	2-60	3,861			- - -
	Pacific S Julienne b-70-K/94-B-16	2779					uspended.
	Texaco Tepee d-99-G/94-G-8	1432					
	Pacific Tepee d-31-K/94-G-8	3342				- -	
	Mesa et al Prophet c-97-D/94-G-15	2160					
	Fina Tommy Lakes a-29-A/94-G-16	566	3-60	768	0.554	2,850	uspended.
	Ashland Cankee Tb Snowberry b-57-D/94-H-1	1892					
	Bracell et al Harrier d-18-B/94-H-2	2789	12-70	1,278			
	Richfield et al Big Arrow c-71-F(1)/94-H-2	159					
	CIGOL S Milligan d-24-G/94-H-2	3135				- - -	
	Placid Banner Sandy d-28-G/94-H-2	2496					- -
	Union et al W Milligan c-50-G/94-H-2	1266	3-63	1,256	0.717	14,000	uspended.
	CIGOL Ashland Beatton d-99-G/94-H-2	3112				- -	
	Union HB Bluebell d-22-H/94-H-2	2296				---Y	
	KCL et al Woodrush d-83-H/94-H-2	2115					
	Triad BP Pickell b-84-I/94-H-3	908					- - -
	Triad BP Birley a-5-A/94-H-6	724					
	Lobitos Black d-57-F/94-H-6	1315					
	Dome Nettle b-44-A/94-H-7	3126					
	HB Union Bogbean b-6-B/94-H-8	3297				- -	- -
	Quasar Amoco Redeye d-69-D/94-H-10	3274					
Permo-Carboniferous	Texaco NFA East Osborn a-33-J(7)/94-A-9	322	1-69	1,937	0.624	8,070	2,018
	CSP Town c-69-J/94-B-16	315	8-61	1,992			
	Mesa et al Moose Lick b-8-K/94-G-2	2185	1-68	2,784	0.625	15,300	uspended.
	BA HB W Pocketknife d-33-I/94-G-6	1393	8-64	2,054	0.789	121,083	uspended.
Belloy	FPC Kilkerran 12-31-78-14	154	8-66	3,473	1.000	1,450	uspended.
	Pacific Two Rivers 2-27-82-16 (37)	135	- -				
	Wainoco Francana Pluto 10-27-85-17	2992					
	Pacific Red Creek 6-7-85-20 (39)	102					
	Apache Woods W Stoddard 10-14-87-21	2777	9-71	2,291	0,721	9 %	2,000
Mississippian	Pacific et al Jackfish c-97-H/94-J-7	3097				- -	
	Aquit et al Tattoo a-78-L/94-0-10	3291					
	Aquit AmMin et al Windflower d-87-A/94-0-11	3330	3-73	534	1.000		8,182
Upper Kiskatinaw	Sinclair et al Doe 6-16-81-14(B6-1)	230	7-72	3,016	0.500	-,%	2,000
	Home et al Attachie 7-20-84-22	2961	3-73	2,872	1.000	11,550	2,888
Upper Kiskatinaw total							4,888
Debolt	SOC et al Graham b-21-D/94-B-9	3158					
	Sinclair et al Lily d-12-K(XB 18-1)/94-G-2	385	8-71	2,917			uspended.
	ARCo Pacific FPC Grassy a-A75-D/94-G-7	2687	6-70	2,132	1.000	181,349	45,349

	HB Pacific Pocketknife c-37-L/94-G-7	468	7-60	1,727		26,600	Suspended.
	Mesa et al Prophet c-97-D/94-G-15	2160	——	——		——	——
	West Nat Bougie Creek a-49-I/94-G-15	138	——				——
	Wainoco Pennzoil Kyklo c-79-I/94-I-11	3050	——	——	——	——	——
	Texaco NFA Walrus b-86-L/94-I-16	947	——	——	——	——	——
	Pacific S Ft Nelson b-96-B(1)/94-J-10	348	5-58	1,051	0.599	2,350	Suspended.
Banff	Dome et al Imp Slave d-10-I/94-H-11	2225	3-68	2,684	0.500	1,400	Suspended.
	Pacific et al Ekwan a-55-G/94-I-10	897	——	——	——	——	——
Jean Marie	Placid Hunt Amoco Niteal a-58-E/94-I-3	2611	——	——	——	——	——
Slave Point	*HB Imperial Union Paddy* a-49-B(1)/94-H-16	129	8-55	3,114	1.000	8,250	Suspended.
	Atlantic Tees a-16-J/94-I-6	1542	——	——	——	——	——
	IOE Junior c-3-C/94-I-11	1249	3-63	2,696	0.500	4,700	Suspended.
	Imp Junior c-98-C/94-I-11	926	3-62	2,714	0.500	90,000	Suspended.
	Mobil Sahtaneh c-70-I/94-I-12	2436	3-69	2,746	0.781	3,610	Suspended.
	Pacific Sextet c-22-K/94-I-12	2884	3-71	2,690	0.692	4,373	2,000
	Atkinson Helmet Gunnel a-97-K/94-I-12	2629	——	——	——	——	——
	Pacific Gunnel c-95-L/94-I-12	1239	2-63	2,648	——	——	——
	Cdn Res Quintana Adsett a-36-G/94-J-2	3032	8-72	3,542	0.566	7,409	2,000
	Pacific et al Jackfish a-30-K/94-J-8	999	1-63	1,955	——		——
	BA Shell Klua Creek a-50-C(1)/94-J-9	157	——	——	——	——	——
	Mesa Pubco S Clarke b-75-F/94-J-9	2817	5-73	2,777	0.563	59,712	14,928
	West Nat Imp Clarke Lake b-78-J/94-J-9	700	12-68	3,331	——	——	——
	Pacific et al Milo c-43-E/94-J-10	2260	——	——	——	——	——
	IOE E Clarke b-6-A/94-J-16	1576	3-67	3,146	0.685	(8)	Suspended.
	Pan Am A-1 Cam Lake a-31-I/94-O-16	594	——	——			——
	SOBC Helmet b-49-G/94-P-7	1279	——	——	——	——	——
	Tenn FPC Tooga d-18-K/94-P-2	2066	——	——	——	——	——
	FPC Chevron Peggo b-53-I/94-P-7	2453	2-70	2,322	0.724	751	2,000
	GAOL GERC Helmet c-40-K/94-P-7	2839	3-71	2,349	——	——	——
	Huber Quintana et al Hostli a-74-G/94-P-8	2902	1-72	2,123	0.560	10,545	2,636
	Huber Quintana Amoco Hostli d-81-G/94-P-8	3056	——	——	——	——	——
	Pan Am et al Dilly a-30-K/94-P-12	877	3-62	2,766	1.000	14,700	Suspended.
	CanDel Barnwell HB Hoss b-82-G/94-P-14	2234	——	——	——	——	——
Slave Point total		——	——	——		——	23,564
Sulphur Point	Socony Mobil Swat b-50-F/94-I-5	1835	——	——			——
	Apache CPOG IOE Clarke d-24-I/94-J-9	2470	2-70	2,823	——		——
	BP et al Gote d-37-D/94-P-12	3063	3-72	3,232	——		——
Pine Point	Socony Mobil S Sierra a-98-K/94-I-11	1814	2-67	3,623	1.000	188,000	Suspended.
	Penzl Mesa Fontas d-77-H/94-J-8	3268	——				——
	Penzl Mesa Fontas a-36-C/94-J-9	3235	——	——			——
	Atapco et al Klua b-19-G/94-J-9	3241	——	——			——
	Pan Am A-1 Komie a-51-A/94-O-8	527	3-70	3,713	——	——	——
	Texaco NFA Missle d-54-A/94-O-9	2232	3-68	3,728	0.550	3,972	Suspended.
	Pan Am IOE Union Hostil d-48-J/94-P-8	2287	——				——
	Chevron N Helmet a-54-B/94-P-10	2108	——				——
Other areas total		——	——				134,536

[8] Not available.

TABLE 18—HYDROCARBON AND BY-PRODUCTS RESERVES, DECEMBER 31, 1973

	Crude Oil, MSTB		Raw Gas, BSCF		Established			
	Proved	Probable	Proved	Probable	Residue Gas, BSCF	Residue Gas, BSCF (Basis 1,000 Btu/SCF)	Natural Gas Liquids, MSTB	Sulphur MLT
Original hydrocarbon in place	1,214,064	91,213	15,773.7	1,396.0	(1)	(1)	(1)	(1)
			Established					
Ultimate recovery, current estimate	360,727	153,171	13,776.8		12,046.4	12,437.1	172,058	5,355
Cumulative production to December 31, 1972	208,308	———	3,042.2		2,694.3	2,847.2	62,362	1,171
Reserves estimated at December 31, 1972	147,803	151,937	10,550.4		9,191.3	9,441.7	111,182	4,173
Revisions in 1973	+2,764	+17	+4.7		+1.0	−17.6	−4,055	−96
Drilling in 1973	+1,852	+1,217	+179.5		+159.8	+165.8	+2,569	+106
Production in 1973	−21,191	———	−474.7		−423.2	−442.2	−5,823	−138
Cumulative production adjustments[2]	−1	———	———		———	———	———	———
Reserves at December 31, 1973	131,227	153,171	10,259.9		8,928.9	9,147.7	103,873	4,045

NOTES:

MSTB=Thousand stock tank barrels, where one barrel contains 34.97 imperial gallons.

BSCF=Billion standard cubic feet at 14.65 psia and 60°F.

MLT=Thousand long tons.

Associated and solution gas reserves are included for pools in which a conservation scheme is in operation or for which firm conservation plans have been proposed.

The production data shown above for residue gas, natural gas liquids, and sulphur are based on theoretical volumes produced with the raw gas and are derived from gas analyses data. The actual volume of gas delivered to transmission-lines in 1973 was 415.5 BSCF, and actually extracted quantities of NGL and sulphur were 2,442,503 barrels and 72,807 long tons respectively. In addition, 126,485 barrels of NGL were removed at the wellhead.

[1] Not available.

[2] Adjustment to cumulative production carried in 1972 reserves report.

TABLE 19—OILFIELD RESERVOIR FLUID DATA

Field	Pool/Project	Rock Type and Age	Trapping	Producing Mechanism	Fluid Contacts (G/O, O/W) (Feet SS)	Datum Depth (Feet SS)	Initial Reservoir		Saturation Pressure at G/O Contact and Reservoir Temperature (Psig)	Combination Formation Volume Factor at Initial Pressure (RB/STB)	Initial Solution Gas-Oil Ratio (SCF/STB)	Initial Oil Viscosity (Cp)
							Pressure (Psig)	Temp. (°F)				
Aitken Creek	Gething	Sandstone/Lower Cretaceous	Structural/ Stratigraphic	Depletion/ Gas cap	G/O 1270	1,270	1,546	140	1,546	1.307	542	0.476
Balsam	Halfway	Sandstone/Triassic	Stratigraphic	Gas cap	G/O 1138	1,138	1,187	130	1,187	1.1441	2801	—
Bear Flat	North Pine	Sandstone/Triassic	Stratigraphic	Depletion/ Gas cap	G/O 2285	2,338	1,971	130	1,954	1.160	544	—
Beatton River	Halfway A—BP. project	Sandstone/Triassic	Structural/ Stratigraphic	Waterflood	G/O 1110, O/W 1158	1,134	1,172	129	1,164	1.1517	277	1.149
	Halfway B	Sandstone/Triassic	Structural/ Stratigraphic	Depletion/ Gas cap	G/O 1125, O/W 1134	1,125	1,162	129	1,162	1.1513	277	1.149
	Halfway C	Sandstone/Triassic	Structural/ Stratigraphic	Depletion	O/W 1192	1,170	1,172	129	1,170	1.152	277	1.149
	Halfway D	Sandstone/Triassic	Structural/ Stratigraphic	Depletion/ Gas cap	G/O 1154, O/W 1160	1,157	(2)	129	1,179	1.1517	277	1.149
	Halfway B	Sandstone/Triassic	Structural/ Stratigraphic	Depletion	O/W *1%.-	1,177	1,172	129	1,170	1.152	277	1.149
Beatton River West	Bluesky	Sandstone/Lower Cretaceous	Structural/ Stratigraphic	Depletion/ Gas cap		—	1,024	118	1,021	1.208	377	0.565
	Unit 1	Sandstone/Lower Cretaceous	Structural/ Stratigraphic	Depletion/ Gas cap		—	1,024	118	1,021	—	377	0.565
Beaverdam	Halfway A	Sandstone/Triassic	Stratigraphic	Depletion/ Gas cap	G/O 1380	1,380	1,350	127	1,350	1.201	361	—
Blueberry	Debolt A	Carbonate/ Mississippian	Structural/ Stratigraphic	Gas cap/ Partial water	G/O 4034, O/W 4191	4,112	2,768	168	2,744	1.353	641	0.652
	Debolt B	Carbonate/ Mississippian	Structural/ Stratigraphic	Gas cap/ Partial water	G/O 4031, O/W 4116	4,073	2,754	168	2,741	1.353	640	—
Boundary Lake	Dunlevy B	Sandstone/Lower Cretaceous	Structural	Gas cap	G/O 1340, O/W 1345	1,340	1,454	110	1,454	1.1201	2651	—
	Cecil A	Sandstone/Triassic	Stratigraphic	Depletion	None	1,673	1,698	(2)	1,698	1.2161	4551	(2)
	Cecil B	Sandstone/Triassic	Stratigraphic	Depletion	None	1,673	1,698	(2)	1,698	1.216	4551	(2)
	Boundary Lake	Carbonate/Triassic	Structural/ Stratigraphic		(main) G/O 1700	1,750	1,835	118	1,818	1.278	530	0.960
	Unit 1	Carbonate/Triassic	Structural/ Stratigraphic	Waterflood.								

1 Standing's correlation.
2 Not available.

TABLE 19—OILFIELD RESERVOIR FLUID DATA—*Continued*

Field	Pool/Project	Rock Type and Age	Trapping	Producing Mechanism	Fluid Contacts (G/O, O/W) (Feet SS)	Datum Depth (Feet SS)	Initial Reservoir Pressure (Psig)	Initial Reservoir Temp. (°F)	Saturation Pressure at G/O Contact and Reservoir Temperature (Psig)	Combination Formation Volume Factor at Initial Pressure (RB/STB)	Initial Solution Gas-Oil Ratio (SCF/STB)	Initial Oil Viscosity (Cp)
Boundary Lake—*Continued*	Unit 2	Carbonate/Triassic	Structural/ Stratigraphic	Waterflood.								
	Dome project 1	Carbonate/Triassic	Structural/ Stratigraphic	Waterflood.								
	Dome project 2	Carbonate/Triassic	Structural/ Stratigraphic	Waterflood.								
	Halfway	Sandstone/Triassic	Structural/ Stratigraphic	Depletion/ Gas cap	G/O 2071, O/W 2092	2,071	1,700	125	1,700	1.225	464	
Buick Creek	Dunlevy A	Sandstone/Lower Cretaceous	Stratigraphic	Gas cap/ Depletion	G/O 1260, O/W 1280	1,260	1,291	122	1,291	1.148[1]	305[1]	
	Dunlevy B	Sandstone/Lower Cretaceous	Stratigraphic	Gas cap/ Depletion	G/O 1223, ONV none	1,225	1,290	122	1,290	1.148[1]	305[1]	
	Dunlevy C	Sandstone/Lower Cretaceous	Stratigraphic	Gas cap/ Depletion	G/O 1251, O/W 1282	1,251	1,291	122	1,291	1.148[1]	305[1]	
Buick Creek West	Dunlevy A	Sandstone/Lower Cretaceous	Stratigraphic	Gas cap/ Depletion	G/O 1252, O/W 1282	1,252	1,318	123	1,318	1.150[1]	300[1]	
	Dunlevy B	Sandstone/Lower Cretaceous	Stratigraphic	Gas cap/ Depletion	G/O 1246, ONV 1250	1,246	1,317	123	1,317	1.150[1]	300[1]	
Bulrush	Halfway	Sandstone/Triassic	Stratigraphic	Depletion/ Gas cap	G/O 1320	1,320	1,318	132	1,318	1.198	353	0.950
Bulrush Be&--- Cecil-	Halfway	Sandstone/Triassic	Stratigraphic	Depletion	None	1,285	1,314	131	1,314[3]	1.197	352	0.951
Charlie Lake	North Pine A	Sandstone/Triassic	Stratigraphic	Gas cap	G/O 2167	2,167	1,921	128	1,921	1.258	521	
	Gething	Sandstone/Lower Cretaceous	Stratigraphic	Depletion		1,020	1,096	116	(2)	1.200[3]	(2)	
Crush	Halfway Unit 1	Sandstone/Triassic	Structural/ Stratigraphic	Waterflood	0,0 1366	1,402	1,356	132	1,345	1.200	359	1.030
Currant	Halfway Unit 1	Sandstone/Triassic	Stratigraphic	Waterflood	G/O 1555	1,555	1,399	134	1,399	1.204	375	0.800
Eagle	Belloy A	Carbonate/Permian	Stratigraphic	Depletion		3,800	2,422	160	2,422[3]	1.289	531	
	Belloy B	Carbonate/Permian	Stratigraphic	Depletion		3,800	2,417	160	2,417[3]	1.289	530	
Elm	Halfway A	Sandstone/Triassic	Stratigraphic	Depletion/ Gas cap	G/O 1061, O/W 1076	1,061	1,140	128	1,140	1.205	365	
Fireweed	Baldonnel B	Carbonate/Triassic	Stratigraphic	Depletion		1,538	1,638	138	1,638	1.241[1]	485	
Flatrock	Boundary Lake	Carbonate/Triassic	Stratigraphic	Depletion		2,015	1,693	133	1,320[1]	1.160[1]	320[3]	
Fort St. John--	Pingel	Sandstone/Triassic	Stratigraphic	Gas cap	0,0 2290, O/W 2343	2,332	1,921	125	1,905	1.156	533	1.600

	Belloy	Carbonate/Permian	Structural/ Stratigraphic	Depletion		4,160	2,769	155	———	1.3343	———	———
Halfway	Blueberry	Sandstone/Triassic	Stratigraphic	Depletion		2,157	2,112	130	2,1121	1.3001	6201	———
Inga	Baldonnel	Carbonate/Triassic	Structural	Depletion	G/O 1796	1,796	1,788	126	1,788	1.2401	4701	———
	Inga—											
	Unit 1	Sandstone/Triassic	Structural/ Stratigraphic	Waterflood	G/O 2405, G/O 2432	2,519	2,333	140	2,310	1.348	676	0.440
	Unit 2	Sandstone/Triassic	Structural/ Stratigraphic	Waterflood	G/O 2432	2,519	2,333	140	2,310	1.348	676	0.440
	Unit 3	Sandstone/Triassic	Structural/ Stratigraphic	Concurrent	G/O 2405	2,519	2,333	140	2,310	(2)	(4)	(4)
	Unit 4	Sandstone/Triassic	Structural/ Stratigraphic			2,519	2,333	140	2,310	1.348	676	0.440
	Unit 5	Sandstone/Triassic	Structural/ Stratigraphic			2,519	2,333	140	2,310	1.348	676	0.440
Milligan Creek	Halfway—											
	Unit 1	Sandstone/Triassic	Structural/ Stratigraphic	Waterflood	G/O 1127, O/W 1200	1,170	1,167	132	1,152	1.1594	281	0.832
	Unit 2	Sandstone/Triassic	Stratigraphic	Waterflood	G/O 1181, O/W 1200	1,171	1,167	132	1,167	1.1597	281	0.832
Moberly Lake	Pingel	Sandstone/Triassic	Structural/ Stratigraphic	Depletion		2,233	2,291	130	2,2911	1.3401	7001	———
Nettle	Bluesky-Gething	Sandstone/Lower Cretaceous	Stratigraphic	Depletion/ Gas cap	G/O 711, O/W 715	711	944	118	944	1.1121	2301	0.580
Nig Creek	Baldonnel D	Carbonate/Triassic	Stratigraphic	Depletion	None	1,399	1,535	140	1,535	1.2131	4001	———
North Pine	Siphon	Sandstone/Triassic	Stratigraphic	Depletion		1,867	1,860	130	1,7501	1.2211	4503	0.730
Osprey	Halfway	Sandstone/Triassic	Stratigraphic	Depletion	G/O 1525	1,525	1,418	128	1,418	1.205	380	1.040
Oak	Halfway	Sandstone/Triassic		Gas cap	G/O 2353	2,353	1,836	132	1,836	1.235	470	———
Parkland	Belloy B	Carbonate/Permian	Structural/ Stratigraphic	Depletion/ Gas cap	G/O 4664, O/W 4668	4,664	2,930	153	2,930	1.4551	9051	———
Peejay	Halfway—											
	Unit 1	Sandstone/Triassic	Stratigraphic	Waterflood	G/O 1427, G/O 1438, O/W 1504	1,465	1,359	132	1,346	1.1736	333	0.850
	Unit 2	Sandstone/Triassic	Stratigraphic	Waterflood	G/O 1435, O/W 1547	1,490	1,367	134	1,349	1.1924	343	0.840
	Unit 3	Sandstone/Triassic	Stratigraphic	Waterflood	G/O 1450, O/W 1543	1,500	1,363	133	1,347	1.184	315	0.892
	Pacific-ARCo project	Sandstone/Triassic	Stratigraphic	Waterflood	G/O 1450, O/W 1543	1,500	1,363	133	1,347	1.184	315	0.892
	North project	Sandstone/Triassic	Stratigraphic	Gas cap	G/O 1355	1,355	1,344	130	1,344	1.200	359	———
Peejay West	Halfway	Sandstone/Triassic	Stratigraphic	Depletion/ Gas cap	G/O 1608, O/W 1620	1,608	1,451	131	1,451	1.207	390	0.850

1 Standing's correlation.
2 Not available.
3 Estimated.
4 Gas cap only.

TABLE 19—OILFIELD RESERVOIR FLUID DATA—*Continued*

Field	Pool/Project	Rock Type and Age	Trapping	Producing Mechanism	Fluid Contacts (G/O, O/W) (Feet SS)	Datum Depth (Feet SS)	Initial Reservoir		Saturation Pressure at G/O Contact and Reservoir Temperature (Psig)	Combination Formation Volume Factor at Initial Pressure (RB/STB)	Initial Solution Gas-Oil Ratio (SCF/STB)	Initial Oil Viscosity (Cp)
							Pressure (Psig)	Temp (°F)				
Rigel	Dunlevy A	Sandstone/Lower Cretaceous	Stratigraphic	Depletion/ Gas cap	G/O 1237	1,237	1,280	118	1,280	1.148[1]	320[1]	----
	Dunlevy B	Sandstone/Lower Cretaceous	Stratigraphic	Depletion/ Gas cap	G/O 1278	1,278	1,285	118	1,285	1.148[1]	320[1]	----
	Dunlevy C	Sandstone/Lower Cretaceous	Stratigraphic	Depletion/ Gas cap	G/O 1263	1,263	1,283	118	1,283	1.148[1]	320[1]	----
	Dunlevy D	Sandstone/Lower Cretaceous	Stratigraphic		G/O 1303	1,303	1,288	118	1,288	1.148[1]	320[1]	----
	Dunlevy E	Sandstone/Lower Cretaceous	Stratigraphic		G/O 1220	1,231	1,291	118	1,287	1.148	320	----
	Lower Dunlevy	Sandstone/Lower Cretaceous	Stratigraphic	Depletion		1,368	1,425	125	1,425[8]	1.173[1]	355[1]	----
Siphon	Baldonnel B	Carbonate/Triassic	Structural/ Stratigraphic	Gas cap	G/O 1459	1,459	1,430	128	1,430	1.149[1]	300[1]	----
Stoddart	Cecil	Sandstone/Triassic	Structural/ Stratigraphic	Depletion	None	1,875	1,802	125	1,800[1]	1.180[1]	370[8]	----
	Belloy A	Sandstone/Permian	Structural/ Stratigraphic	Gas cap	G/O 3726	3,726	2,411	155	2,411	1.335[1]	645[1]	----
	Belloy C	Sandstone/Permian	Structural/ Stratigraphic	Depletion	O/W 3845	3,798	2,419	155	2,419	1.337[1]	650[1]	----
Two Rivers	Siphon	Sandstone/Triassic	Structural/ Stratigraphic	Gas cap/ Depletion	G/O 2138, O/W 2147	2,138	1,803	126	1,803	1.248[1]	510[1]	----
Wargen	Gething	Sandstone/Lower Cretaceous	Stratigraphic	Gas cap	G/O 1095	1,095	1,100	120	1,100	1.142[1]	285[1]	----
Weasel	Halfway—Unit 1	Sandstone/Triassic	Stratigraphic	Waterflood	G/O 1375	1,377	1,300	132	1,293	1.195	344	0.898
	Unit 2	Sandstone/Triassic	Stratigraphic	Waterflood	O/W 1410	1,377	1,300	132	1,293	1.195	344	0.898
	Halfway AB	Sandstone/Triassic	Stratigraphic	Depletion/ Gas cap	G/O 1312	1,312	1,246	132	1,246	1.186	321	0.895
	Halfway H	Sandstone/Triassic	Stratigraphic	Gas cap	G/O 1294	1,294	1,210	132	1,210	1.171	320	----
Weasel West	Halfway A	Sandstone/Triassic	Stratigraphic	Depletion		1,358	1,278	132	1,278	1.192	338	----
	Halfway B	Sandstone/Triassic	Stratigraphic	Depletion	G/O 13% O/W 1363	1,358	1,278	132	1,278	1.192	338	----
Wildmint	Halfway—Union HB project	Sandstone/Triassic	Structural/ Stratigraphic	Waterflood	G/O 1252	1,272	1,217	132	1,210	1.148	259	1.05

	Union B project	Sandstone/Triassic	Structural/ Stratigraphic	Depletion/ Gas cap	G/O 1294	1,294	1,264	132	1,264	1.190	330	1.05
	Union C project	Sandstone/Triassic	Structural/ Stratigraphic	Depletion	None	1,327	1,264	132	1,264	1.190	330[3]	1.05
	Union D project	Sandstone/Triassic	Structural/ Stratigraphic	Depletion	None	1,303	1,256	132	1,208	1.170	330[3]	1.05
	Union E project	Sandstone/Triassic	Structural/ Stratigraphic	Depletion	None	1,272	1,217	132	1,210	1.148	259	1.05
	Union F project	Sandstone/Triassic	Structural/ Stratigraphic	Depletion/ Gas cap	G/O 1344	1,344	1,294	132	1,294	1.195	345	———
Willow	Gething	Sandstone/Lower Cretaceous	Stratigraphic	Depletion/ Gas cap	G/O 820	820	1,019	118	1,019	1.115[1]	236	———
Wolf	Halfway	Sandstone/Triassic	Structural/ Stratigraphic	Depletion/ Gas cap	G/O 1670, O/W 1689	1,670	1,487	143	1,487	1.210	402	0.832[3]

[1] Standing's correlation. [2] Not available. [3] Estimated. [4] Gas cap only.

TABLE 20—GASFIELD RESERVOIR FLUID DATA

Field/Area	Pool/Project	Rock Type and Age	Trapping	Fluid Contacts G/W (Ft. SS)	Datum Depth (Ft. SS)	Specific Gravity of Gas	Critical Value	
							Pressure (psia)	Temperature (°R)
Airport	Dunlevy	Sandstone/Lower Cretaceous	Stratigraphic		1,521	0.581	680	347
	Baldonnel	Carbonate/Triassic	Stratigraphic	——	1,761	0.661	682	373
	Halfway	Sandstone/Triassic	Stratigraphic	——	2,667	0.693	678	369
Balsam	Bluesky	Sandstone/Lower Cretaceous	Stratigraphic	——	780	0.650	677	375
	Halfway	Sandstone/Triassic	Stratigraphic	——	1,105	0.642	687	370
Beaverdam	Halfway B	Sandstone/Triassic	Stratigraphic	——	1,326	0.662	686	378
Beaver River	*Nahanni*	*Carbonate/Devonian*	*Structural*	11,907	10,500	0.642	698	356
Beavertail	Gething	Sandstone/Lower Cretaceous	Stratigraphic	None	1,050	0.653	673	374
	Halfway	Sandstone/Triassic	Structural/Stratigraphic	1,833	1,790	0.635	678	379
Beg	Baldonnel A	Carbonate/Triassic	Structural	1,525	1,400	0.652	674	374
	Baldonnel B	Carbonate/Triassic	Structural	1,525	1,400	0.652	674	374
	Baldonnel C	Carbonate/Triassic	Structural	1,370	1,310	0.652	674	374
	Halfway	Sandstone/Triassic	Structural	2,346	2,200	0.673	669	382
Beg West	Baldonnel A	Carbonate/Triassic	Structural	None	1,400	0.653	678	372
	Baldonnel B	Carbonate/Triassic	Structural	None	1,400	0.653	678	372
Bernadet	Gething	Sandstone/Lower Cretaceous	Structural/Stratigraphic	——	842	0.644	670	372
Bivouac	*Debolt*	*Carbonate/Mississippian*	*Structural/Stratigraphic*	138	125	0.621	683	364
Blueberry	Dunlevy A	Sandstone/Lower Cretaceous	Structural	——	1,200	0.675	673	384
	Dunlevy B	Sandstone/Lower Cretaceous	Structural	——	1,200	0.659	675	369
	Baldonnel A	Carbonate/Triassic	Structural	——	1,560	0.673	677	379
	Baldonnel B	Carbonate/Triassic	Structural	——	1,560	0.673	677	379
	Blueberry	Sandstone/Triassic	Structural/Stratigraphic	——	2,150	0.939	664	459
	Charlie Lake	Sandstone/Triassic	Stratigraphic	——	2,150	0.802	676	416
	Halfway	Sandstone/Triassic	Structural/Stratigraphic	——	2,572	0.695	680	387
Blueberry East	Baldonnel	Carbonate/Triassic	Structural	——	1,800	0.675	681	380
	Debolt	Carbonate/Mississippian	Structural	——	4,025	0.615	679	359
Blueberry West	*Dunlevy A*	*Sandstone/Lower Cretaceous*	*Structural*	None	1,084	0.659	682	373
	Dunlevy B	Sandstone/Lower Cretaceous	Structural	None	1,260	0.658	678	375
	Baldonnel	Carbonate/Triassic	Structural	1,620	1,576	0.646	674	374
Boundary Lake	Bluesky A	Sandstone/Lower Cretaceous	Structural/Stratigraphic	——	1,095	0.634	669	365
	Bluesky B	Sandstone/Lower Cretaceous	Structural/Stratigraphic	——	1,140	0.622	671	365
	Gething A	Sandstone/Lower Cretaceous	Structural/Stratigraphic	——	1,217	0.641	678	369
	Gething B	Sandstone/Lower Cretaceous	Structural/Stratigraphic	——	1,319	0.648	682	370
	Dunlevy A	Sandstone/Lower Cretaceous	Stratigraphic	1,345	1,339	0.629	678	365
	Baldonnel A	Carbonate/Triassic	Structural	1,513	1,480	0.677	681	390
	Baldonnel B	Carbonate/Triassic	Structural	1,496	1,480	0.677	681	390
	Basal Boundary Lake	*Carbonate/Triassic*	*Structural*	——	1,757	0.683	663	378
	Halfway B	Sandstone/Triassic	Structural	——	1,866	0.631	670	368
	Halfway A	Sandstone/Triassic	Stratigraphic	1,930	1,900	0.631	670	378

	Halfway B	Sandstone/Triassic	Stratigraphic	1,852	1,816	0.696	680	380
Bubbles	Baldonnel	Carbonate/Triassic	Structural	None	1,350	0.663	682	373
Bubbles North	Halfway	Sandstone/Triassic	Stratigraphic	——	1,800	0.663	678	375
Buick Creek	Bluesky A	Sandstone/Lower Cretaceous	Structural/Stratigraphic	——	1,150	0.637	670	372
	Bluesky B	Sandstone/Lower Cretaceous	Structural/Stratigraphic	——	1,132	0.637	670	372
	Bluesky C	Sandstone/Lower Cretaceous	Stratigraphic	——	1,127	0.676	673	377
	Bluesky D	Sandstone/Lower Cretaceous	Stratigraphic	——	1,119	0.664	670	378
	Dunlevy A	Sandstone/Lower Cretaceous	Structural/Stratigraphic	1,287	1,260	0.659	670	378
	Dunlevy B	Sandstone/Lower Cretaceous	Structural/Stratigraphic	1,260	1,225	0.649	674	374
	Dunlevy C	Sandstone/Lower Cretaceous	Structural/Stratigraphic	1,260	1,225	0.659	670	378
	Dunlevy D	Sandstone/Lower Cretaceous	Structural/Stratigraphic	——	1,305	0.668	671	377
	Lower Dunlevy	Sandstone/Lower Cretaceous	Structural/Stratigraphic	——	1,277	0.659	670	378
	Baldonnel	Carbonate/Triassic	Stratigraphic	——	1,412	0.692	681	383
	Cecil	Sandstone/Triassic	Structural/Stratigraphic	——	1,626	0.613	671	362
Buick Creek North	Gething	Sandstone/Lower Cretaceous	Structural/Stratigraphic	——	1,073	0.685	672	386
	Dunlevy	Sandstone/Lower Cretaceous	Structural/Stratigraphic	1,233	1,185	0.670	677	380
Buick Creek West	Dunlevy A	Sandstone/Lower Cretaceous	Structural/Stratigraphic	1,252	1,150	0.657	678	375
	Dunlevy B	Sandstone/Lower Cretaceous	Structural/Stratigraphic	None	1,150	0.657	678	375
	Baldonnel	Carbonate/Triassic	Structural/Stratigraphic	——	1,375	0.698	680	387
	Halfway	Sandstone/Triassic	Structural	——	2,200	0.748	679	403
	Debolt	Carbonate/Mississippian	Structural/Stratigraphic	——	3,250	0.606	675	361
Cabin	Slave Point A	Carbonate/Devonian	Stratigraphic	4,808	4,800	0.651	706	353
	Slave Point B	Carbonate/Devonian	Stratigraphic	4,857	4,800	0.686	727	371
	Slave Point C	Carbonate/Devonian	Stratigraphic	4,806	4,800	0.637	704	359
Cache Creek	Coplin	Sandstone/Triassic	Stratigraphic	None	2,134	0.631	671	369
	Halfway	Sandstone/Triassic	Structural/Stratigraphic	2,607	2,560	0.805	805	441
Cecil	Cecil	Sandstone/Triassic	Stratigraphic	——	1,901	0.687	663	379
	North Pine B	Sandstone/Triassic	Stratigraphic	——	2,268	0.683	667	384
	Halfway	Sandstone/Triassic	Stratigraphic	——	2,534	0.716	662	386
Clarke Lake	Jean Marie	Carbonate/Devonian	Stratigraphic	——	3,000	0.607	670	345
	Slave Point	Carbonate/Devonian	Stratigraphic	5,231	5,000	0.653	705	360
Currant	Halfway B	Sandstone/Triassic	Stratigraphic	None	1,360	0.637	672	370
Cypress	Baldonnel	Carbonate/Triassic	Structural	1,210	1,025	0.584	672	354
Dahl	Bluesky	Sandstone/Lower Cretaceous	Stratigraphic	729	700	0.642	678	372
Dawson Creek	Cadotte	Sandstone/Lower Cretaceous	Structural/Stratigraphic	——	363	0.581	671	347
Eagle	Halfway	Sandstone/Triassic	Stratigraphic	2,548	2,336	0.680	677	382
	Belloy C	Carbonate/Permian	Stratigraphic	——	3,846	0.659	671	376
Elm	Halfway A	Sandstone/Triassic	Stratigraphic	——	1,061	0.645	674	374
	Halfway B	Sandstone/Triassic	Stratigraphic	1,076	1,074	0.645	674	374
Farrell Creek	Charlie Lake	Sandstone/Triassic	Structural	——	2,624	0.644	675	372
	Halfway A	Sandstone/Triassic	Structural	——	3,223	0.658	678	375
	Halfway B	Sandstone/Triassic	Structural	——	3,242	0.658	678	375
Fireweed	Bluesky	Sandstone/Lower Cretaceous	Stratigraphic	——	1,094	0.669	674	382
	Dunlevy A	Sandstone/Lower Cretaceous	Stratigraphic	1,341	1,284	0.684	680	383
	Dunlevy B	Sandstone/Lower Cretaceous	Stratigraphic	1,305	1,252	0.684	680	383
	Dunlevy C	Sandstone/Lower Cretaceous	Stratigraphic	——	1,263	0.658	678	375
	Baldonnel A	Carbonate/Triassic	Stratigraphic	——	1,568	0.672	689	382

TABLE 20—GASFIELD RESERVOIR FLUID DATA—*Continued*

Field/Area	Pool/Project	Rock Type and Age	Trapping	Fluid Contacts G/W (Ft. SS)	Datum Depth (Ft. SS)	Specific Gravity of Gas	Critical Value	
							Pressure (psia)	Temperature (°R)
Fireweed—*Continued*	Debolt A	Carbonate/Mississippian	Stratigraphic	—	3,560	0.606	675	361
	Debolt B	Carbonate/Mississippian	Stratigraphic	—	3,545	0.606	675	361
	Debolt C	Carbonate/Mississippian	Stratigraphic	—	3,737	0.606	675	361
Flatrock	Siphon	Sandstone/Triassic	Stratigraphic	—	1,825	0.648	665	366
	Halfway A	Sandstone/Triassic	Stratigraphic	—	2,542	0.650	681	375
	Halfway B	Sandstone/Triassic	Stratigraphic	—	2,429	0.670	705	383
	Halfway C	Sandstone/Triassic	Stratigraphic	—	2,482	0.775	671	403
Fort St. John	Dunlevy	Sandstone/Lower Cretaceous	Structural	1,045	980	0.581	680	347
	Baldonnel	Carbonate/Triassic	Structural	1,765	1,650	0.661	682	373
	Halfway A	Sandstone/Triassic	Structural	2,700	2,660	0.680	677	382
	Halfway B	Sandstone/Triassic	Structural	2,700	2,677	0.623	700	368
	Belloy	Carbonate/Permian	Structural/Stratigraphic	—	4,105	0.655	670	378
	Debolt	Carbonate/Mississippian	Stratigraphic	—	4,739	0.671	666	376
Fort St. John Southeast	Dunlevy	Sandstone/Lower Cretaceous	Structural	—	1,101	0.581	680	347
	Baldonnel	Carbonate/Triassic	Structural	—	1,800	0.702	668	392
	Siphon	Sandstone/Triassic	Structural	—	2,335	0.648	665	366
	Pingel	Sandstone/Triassic	Structural	—	2,335	0.648	665	366
	Halfway	Sandstone/Triassic	Structural	None	2,836	0.693	678	369
	Belloy	Carbonate/Permian	Structural/Stratigraphic	4,290	4,255	0.640	674	371
Grizzly	Dunlevy	Sandstone/Lower Cretaceous	Structural/Stratigraphic	—	4,150	0.620	696	354
Grizzly North	Dunlevy	Sandstone/Lower Cretaceous	Structural	—	4,792	0.593	687	353
	Baldonnel	Carbonate/Triassic	Structural	—	7,086	0.625	714	365
	Halfway	Sandstone/Triassic	Structural	—	9,250	0.612	724	370
Gundy Creek	Dunlevy	Sandstone/Lower Cretaceous	Stratigraphic	—	1,276	0.659	675	369
	Baldonnel A	Carbonate/Triassic	Structural	1,750	1,730	0.630	674	367
	Baldonnel B	Carbonate/Triassic	Structural	1,778	1,730	0.630	674	367
	Blueberry	Sandstone/Triassic	Structural/Stratigraphic	—	2,256	0.655	670	378
Halfway	Baldonnel	Carbonate/Triassic	Structural	1,400±	1,351	0.639	670	372
	Coplin	Sandstone/Triassic	Structural	—	1,880	0.693	667	385
Helmet	Slave Point	Carbonate/Devonian	Stratigraphic	4,162	4,124	0.661	719	368
Highway	Dunlevy	Sandstone/Lower Cretaceous	Structural	—	1,127	0.669	686	375
	Baldonnel	Carbonate/Triassic	Structural	—	1,472	0.675	677	382
	Debolt	Carbonate/Mississippian	Structural	—	3,900	0.609	671	362
Inga	Gething	Sandstone/Lower Cretaceous	Structural/Stratigraphic	—	1,140	0.670	668	379
	Baldonnel B	Carbonate/Triassic	Structural	1,823	1,803	0.689	693	388
	Baldonnel D	Carbonate/Triassic	Stratigraphic	—	1,866	0.689	693	388
Inga North	Inga	Sandstone/Triassic	Stratigraphic	2,545	2,299	0.825	923	482
Jedney	Gething	Sandstone/Lower Cretaceous	Structural/Stratigraphic	—	1,125	0.663	678	375

	Baldonnel	Carbonate/Triassic	Structural	—	1,300	0.693	699	376
	Halfway	Sandstone/Triassic	Structural	2,054±	1,905	0.673	673	381
Jedney West	Baldonnel	Carbonate/Triassic	Structural	—	1,500	0.693	499	376
	Halfway	Sandstone/Triassic	Structural	—	2,100	0.673	673	381
Julienne Creek	Baldonnel	Carbonate/Triassic	Structural/Stratigraphic	None	1,769	0.656	678	375
	Halfway	Sandstone/Triassic	Structural/Stratigraphic	None	2,833	0.614	671	362
	Debolt	Carbonate/Mississippian	Structural/Stratigraphic	—	4,457	0.560	673	341
	Shunda	Carbonate/Mississippian	Structural/Stratigraphic	—	5,575	0.560	673	341
Kobes-Townsend	Dunlevy	Sandstone/Lower Cretaceous	Structural	—	714	0.651	674	374
	Charlie Lake A	Sandstone/Triassic	Structural/Stratigraphic	—	2,578	0.652	670	376
	Charlie Lake B	Sandstone/Triassic	Structural/Stratigraphic	—	2,424	0.638	673	369
	Charlie Lake C	Sandstone/Triassic	Structural/Stratigraphic	—	2,348	0.629	670	368
	Halfway	Sandstone/Triassic	Structural/Stratigraphic	—	2,820	0.638	670	372
	Belloy	Carbonate/Permian	Structural/Stratigraphic	—	4,540	0.695	668	392
	Debolt	Carbonate/Mississippian	Structural/Stratigraphic	—	4,600	0.647	678	372
Kotcho Lake	Slave Point A	Carbonate/Devonian	Stratigraphic	4,675	4,580	0.670	722	361
	Slave Point B	Carbonate/Devonian	Stratigraphic	4,542	4,529	0.670	722	361
Kotcho East	Bluesky A	Sandstone/Lower Cretaceous	Stratigraphic	23	11	0.629	688	364
	Bluesky B	Sandstone/Lower Cretaceous	Stratigraphic	34	20	0.629	688	364
	Slave Point A	Carbonate/Devonian	Stratigraphic	None	4,410	0.670	722	361
	Slave Point B	Carbonate/Devonian	Stratigraphic	—	4,523	0.675	727	371
	Slave Point C	Carbonate/Devonian	Stratigraphic	—	4,605	0.679	730	372
Lagarde	Dunlevy	Sandstone/Lower Cretaceous	Structural/Stratigraphic	—	1,160	0.636	683	370
	Baldonnel	Carbonate/Triassic	Structural/Stratigraphic	—	1,361	0.628	671	361
	Boundary Lake	Carbonate/Triassic	Stratigraphic	—	1,579	0.706	667	392
Laprise Creek	Baldonnel	Carbonate/Triassic	Structural/Stratigraphic	1,426	1,250	0.676	681	380
Laprise Creek West	Baldonnel	Carbonate/Triassic	Structural/Stratigraphic	—	1,375	0.694	669	388
Louise	Slave Point	Carbonate/Devonian	Stratigraphic	4,931	4,821	0.657	715	365
Milligan Creek	Gething A	Sandstone/Lower Cretaceous	Stratigraphic	—	800	0.669	677	380
	Gething B	Sandstone/Lower Cretaceous	Stratigraphic	—	762	0.669	677	380
Montney	Gething	Sandstone/Lower Cretaceous	Structural/Stratigraphic	—	1,065	0.670	668	379
	Cecil	Sandstone/Triassic	Structural/Stratigraphic	—	1,784	0.664	657	372
	Halfway A	Sandstone/Triassic	Structural	—	2,400	0.704	685	385
	Halfway B	Sandstone/Triassic	Structural	—	2,350	0.701	680	387
Nettle	Gething	Sandstone/Lower Cretaceous	Stratigraphic	—	701	0.641	678	369
	Siphon	Sandstone/Triassic	Stratigraphic	—	773	0.663	676	378
	Halfway	Sandstone/Triassic	Structural	—	925	0.635	681	367
Nig Creek	Baldonnel A	Carbonate/Triassic	Structural/Stratigraphic	—	1,399	0.681	693	384
	Baldonnel B	Carbonate/Triassic	Structural/Stratigraphic	None	1,508	0.677	681	380
	Baldonnel C	Carbonate/Triassic	Structural/Stratigraphic	None	1,399	0.671	687	380
	Halfway	Sandstone/Triassic	Stratigraphic	—	1,970	0.748	679	403
	Slave Point	Carbonate/Devonian	Stratigraphic	—	8,050	0.762	749	376
Nig Creek West	Baldonnel	Carbonate/Triassic	Stratigraphic	1,494±	1,482	0.693	686	381
North Pine	North Pine	Sandstone/Triassic	Structural/Stratigraphic	None	2,096	0.677	668	386
Oak	Cecil	Sandstone/Triassic	Stratigraphic	1,807	1,805	0.676	672	377

TABLE 20—GASFIELD RESERVOIR FLUID DATA—*Continued*

Field/Area	Pool/Project	Rock Type and Age	Trapping	Fluid Contacts G/W (Ft. SS)	Datum Depth (Ft. SS)	Specific Gravity of Gas	Critical Value	
							Pressure (psia)	Temperature (°R)
Parkland	Belloy A	Carbonate/Permian	Structural/Stratigraphic	4,608	4,588	0.674	655	360
	Belloy B	Carbonate/Permian	Structural/Stratigraphic	4,668	4,642	0.674	655	360
	Wabamun	Carbonate/Devonian	Structural/Stratigraphic	———	8,500	0.623	693	348
Peejay	Gething	Sandstone/Cretaceous	Structural/Stratigraphic	———	933	0.642	677	371
	Baldonnel	Carbonate/Triassic	Structural/Stratigraphic	———	1,019	0.638	676	371
Peggo	Slave Point A	Carbonate/Devonian	Stratigraphic	3,982	3,965	0.642	703	358
	Slave Point B	Carbonate/Devonian	Stratigraphic	4,032	4,012	0.642	703	358
Petitot River	Slave Point	Carbonate/Devonian	Structural/Stratigraphic	5,157	5,100	0.673	714	357
Red Creek	North Pine	Sandstone/Triassic	Structural/Stratigraphic	———	2,300	0.614	675	361
	Halfway	Sandstone/Triassic	Structural	———	2,686	0.779	674	415
Redeye	Halfway	Sandstone/Triassic	Stratigraphic	989	966	0.694	672	388
Rigel	Bluesky	Sandstone/Lower Cretaceous	Structural/Stratigraphic	1,180	1,170	0.650	676	375
	Dunlevy	Sandstone/Lower Cretaceous	Structural/Stratigraphic	1,242	1,195	0.654	674	374
Rigel East	Dunlevy	Sandstone/Lower Cretaceous	Stratigraphic	———	1,177	0.647	674	372
	Halfway	Sandstone/Triassic	Stratigraphic	1,842	1,827	0.649	677	373
Shekilie	Slave Point	Carbonate/Devonian	Stratigraphic	4,110	4,055	0.649	698	357
Sierra	Pine Point	Carbonate/Devonian	Stratigraphic	5,457	5,250	0.690	730	373
Siphon	Dunlevy	Sandstone/Lower Cretaceous	Stratigraphic	1,243	1,220	0.661	679	377
	Baldonnel A	Carbonate/Triassic	Structural/Stratigraphic	None	1,480	0.645	692	371
	Siphon	Sandstone/Triassic	Stratigraphic	1,632	1,615	0.704	716	398
	Halfway	Sandstone/Triassic	Structural/Stratigraphic	2,171	2,120	0.666	688	380
Stoddart	Belloy A	Sandstone/Permian	Stratigraphic	None	3,726	0.695	668	392
	Belloy B	Sandstone/Permian	Stratigraphic	None	3,726	0.695	668	392
Stoddart West	Halfway	Sandstone/Triassic	Stratigraphic	———	2,572	0.693	706	389
	Belloy A	Sandstone/Permian	Stratigraphic	None	3,830	0.664	677	380
	Belloy B	Sandstone/Permian	Stratigraphic	3,792	3,786	0.664	677	380
Sunrise	Cadotte	Sandstone/Lower Cretaceous	Stratigraphic	———	349	0.575	675	350
Thetlaandoa	Mississippian A	Carbonate/Mississippian	Stratigraphic	+253	+275	0.615	696	355
	Mississippian B	Carbonate/Mississippian	Stratigraphic	———	+240	0.615	696	355
Tsea	Slave Point	Carbonate/Devonian	Stratigraphic	5,021	5,000	0.657	713	358
Two Rivers	Baldonnel	Carbonate/Triassic	Structural	———	1,941	0.676	710	385
	Halfway	Sandstone/Triassic	Structural	———	2,839	0.668	693	382
Velma	Gething	Sandstone/Lower Cretaceous	Stratigraphic	None	654	0.641	678	369
	"A" Marker	Sandstone/Triassic	Stratigraphic	None	719	0.643	676	370
Weasel	Baldonnel	Carbonate/Triassic	Structural	———	979	0.638	676	371
	Halfway E	Sandstone/Triassic	Stratigraphic	———	1,435	0.649	678	372
	Halfway F	Sandstone/Triassic	Stratigraphic	1,262	1,260	0.649	678	372
	Halfway G	Sandstone/Triassic	Stratigraphic	———	1,389	0.649	678	372

Weasel West	Bluesky	Sandstone/Lower Cretaceous	Stratigraphic	----	913	0.669	680	381
Wilder	Halfway	Sandstone/Triassic	Structural/Stratigraphic	2,706	2,670	0.630	704	369
	Belloy A	Carbonate/Permian	Stratigraphic	——	4,255	0.668	671	380
	Belloy B	Carbonate/Permian	Stratigraphic	----	4,115	0.673	672	383
Wildmint	Bluesky	Sandstone/Lower Cretaceous	Stratigraphic	.....	814	0.650	677	375
Willow	Halfway	Sandstone/Triassic	Structural	1,238	1,225	0.635	678	379
Yoyo	Slave Point	Carbonate/Devonian	Stratigraphic	None	4,800	0.613	696	351
	Pine Point	Carbonate/Devonian	Structural/Stratigraphic	5,420	5,322	0.704	729	368

TABLE 21—WELLS DRILLED AND DRILLING, 1973

Well Authorization No.	Well Name	Date Spudded	Date Rig Released	Total Depth (Ft.)	Status at December 31, 1973
3307	ARCO Bivouac a-87-C	Jan. 19, 1973	Feb. 1, 1973	2,170	Mississippian gas.
3269	ARCO Bivouac c-54-C	Dec. 29, 1972	Jan. 12, 1973	2,180	Abandoned—dry.
3417	AmMin HBOG Etset c-58-F	Dec. 29, 1973			Drilling.
3415	AmMin Thetlaandoa d-37-C	Dec. 14, 1973	Dec. 24, 1973	1,890	Mississippian gas.
3331	Amoco et al Sundown a-10-A	Dec. 28, 1973	June 33, 1973	15,741	Abandoned—dry.
3305	Amoco HB Emile a-56-F	Jan. 19, 1973	Jan. 3, 1973	1,715	Abandoned—dry.
3280	Amoco Kotcho b-15-K	Jan. 15, 1973	Jan. 27, 1973	2,750	Abandoned—dry.
3375	Amoco et al La Biche a-67-D	Oct. 14, 1973			Drilling.
3350	Amoco et al Thetlaandoa c-30-K	Feb. 28, 1973	Mar. 17, 1973	3,400	Mississippian gas.
3333	Amoco et al Thetlaandoa c-34-L	Jan. 31, 1973	Feb. 8, 1973	2,250	Mississippian gas.
3413	Amoco et al Thetlaandoa c-89-G	Dec. 16, 1973	Dec. 26, 1973	2,280	Mississippian gas.
3414	Amoco et al Thetlaandoa d-83-G	Dec. 30, 1973	- -		Drilling.
3265	Anadarko Cdn-Sup Buick 12-34-88-19	Dec. 27, 1972	Jan. 6, 1913	3,825	Bluesky gas.
3273	Anadarko Cdn-Sup Buick b-44-J	Jan. 11, 1973	Jan. 33, 1973	3,780	Dunlevy gas.
3366	Anadarko Cdn-Sup Buick d-39-L	June 26, 1973	July 7, 1973	3,770	Dunlevy gas.
3447	Anadarko Ashland Osborn d-35-L	Dec. 30, 1973			Drilling.
3328	Aquit AmMin et al Windflower c-24-H	Feb. 11, 1973	Mar. 2, 1973	3,675	Abandoned—dry.
3330	Aquit AmMin et al Windflower d-87-A	Mar. 5, 1973	Mar. 22, 573	2,700	Mississippian gas.
3291	Aquit et al Tattoo a-78-L	Jan. 13, 1973	Feb. 7, 1973	3,750	Mississippian gas.
3425	Aquit et al Tattoo b-96-B	Dec. 30, 1973			Drilling.
33%	Ashland W Siphon 10-2-87-17	Jan. 22, 1973	Feb. 4, 1973	4,496	Abandoned—dry.
3241	Atapco et al Klua b-19-G	Jan. 4, 1973	Mar. 6, 1973	7,724	Pine Point gas.
3319	Baysel ARCO Wolf b-3-G	Aug. 24, 1973	Sept. 3, 1973	4,085	Halfway oil.
3381	BP et al Esker c-51-D	Jan. 18, 1973	Feb. 19, 1973	7,420	Abandoned—dry.
3326	BP et al Etsho a-77-I	Dec. 16, 1973			Drilling.
3282	BP et al Fortune d-61-A	Jan. 8, 1973	Mar. 13.1913	9,906	Abandoned—dry.
3352	BP Ethyl B Hockey d-100-L	Mar. 8, 1973	Mar. 30.1973	4,050	Abandoned—dry.
3341	Buckeye Pac Union Prophet d-83-D	Mar. 2, 1973	Apr. 11, 1973	7,292	Abandoned—dry.
3316	Buttes GAO GEOG Helmet c-12-L	Feb. 20, 1973	Mar. 10.1973	6,190	Abandoned—dry.
3314	Buttes GAO Sextet d-39-J	Mar. 3, 1973	Mar. 30.1973	6,790	Abandoned—dry.
3345	CanDel et al LL & E Trutch b-2-K	Mar. 3, 1973	June 21, 1973	6,912	Charlie Lake gas.
3262	Cdn Res Quintana Adsett b-14-G	Dec. 31, 1972	Feb. 13.1973	8,570	Abandoned—dry.
3412	Cdn Res Quintana Hiller c 92-J	Dec. 28. 1973			Drilling.
3303	Cdn Res Quintana Junior c-63-H	Jan. 22, 1973	Feb. 27, 1973	6,775	Abandoned—dry.
3107	Cdn Res Quintana Kotcho b-43-J	Feb. 18, 1972	Jan. 12, 1973	6,552	Slave Point gas.
3286	Cdn Res Quintana Pac Kotcho a-1-I	Jan. 9, 1973	Jan. 18, 1973	2,530	Abandoned—dry.
3358	Cdn Res Quintana Pac Kotcho b-46-B	Mar. 7, 1973	Mar. 29, 1973	6,381	Abandoned—dry.
3411	Cdn Res Quintana Pac Kotcho b-68-H	Dec. 3, 1973			Drilling.
3263	Cdn Res Quintana Pac Kotcho b-66-I	Dec. 25, 1972	Jan. 6, 1973	2,543	Abandoned—dry.
3308	Cdn Res Quintana Pac Kotcho d-71-G	Jan. 23, 1973	Mar. 2, 1973	6,642	Slave Point gas.
3338	Cdn-Sup Bear 16-15-84-20	June 8, 1973	June 22, 1973	5,000	Abandoned—dry.

3223	Cdn-Sup Inga 8-5-88-23	Dec. 12, 1972	Jan. 7, 1973	5,531	Abandoned—dry.
3393	Chevron Birch b-47-I	Oct. 22, 1973	Dec. 7, 1973	6,245	Finished drilling.
3371	Chevron Mobil Evie b-94-H	Aug. 24, 1973	Sept. 5, 1973	8,140	Abandoned—dry.
3418	CIGOL et al Rigel d-74-K	Dec. 4, 1973	Dec. 15, 1973	3,610	Abandoned—dry.
3089	Consol et al Evergreen d-95-I	Jan. 26, 1973	Feb. 3, 1973	3,760	Abandoned—dry.
3401	Coseka N Buick d-53-F	Nov. 6, 1973	Nov. 15, 1973	4,045	Abandoned—dry.
3373	Coseka N Buick d-55-J	July 29, 1973	Aug. 8, 1973	4,000	Multiple Gething and Dunlevy gas.
3374	Coseka Pem Rigel 10-6-88-18	Aug. 15, 1973	Sept. 4, 1973	4,663	Multiple Bluesky and Dunlevy gas.
3387	Cox Union W Buick c-32-E	Oct. 13, 1973	Nov. 12, 1973	6,322	Debolt gas.
3402	Decalta et al Beavertail a-65-C	Nov. 14, 1973	Nov. 23, 1973	3,495	Abandoned—dry.
3343	DeKalb et al Jackfish d-44-F	Feb. 27, 1973	Apr. 3, 1973	7,690	Abandoned—dry.
3303	DeKalb et al Jackfish b-96-E	Jan. 26, 1973	Mar. 30, 1973	7,732	Abandoned—dry.
3357	Dome CanDel Buick b-86-D	Mar. 15, 1973	Mar. 23, 1973	3,610	Abandoned—dry.
3348	Dome CanDel N Buick b-66-F	Mar. 6, 1973	Mar. 14, 1973	3,978	Multiple Gething and Dunlevy gas.
3339	Dome CEGO Pingel 10-24-81-18	Oct. 16, 1973	Nov. 8, 1973	6,050	Abandoned—dry.
3215	Dome et al Ritchie c-62-G	Dec. 21, 1972	May 6, 1973	9,700	Abandoned—dry.
3340	Dome Velma b-26-C	Feb. 26, 1973	Mar. 3, 1973	3,400	Abandoned—dry.
3385	Fina Bearberry c-98-L	Nov. 5, 1973	Nov. 22, 1973	4,595	Abandoned—dry.
3386	Fina Bearberry c-35-D	Oct. 17, 1973	Nov. 3, 1973	4,450	Abandoned—dry.
3240	Fina Bearberry d-95-L	Dec. 30, 1972	Jan. 24, 1973	5,400	Dunlevy gas.
3272	Frio-El Can-Numac E Clarke c-36-I	Jan. 14, 1973	Feb. 17, 1973	7,700	Abandoned—dry.
3359	GAO Cdn Res Pintail 4-12-85-25	Mar. 13, 1973	Apr. 4, 1973	4,879	Abandoned—dry.
3360	GNPM Arlington Sunrise 11-2-79-17	Mar. 21, 1973	Mar. 28, 1973	3,400	Cadotte gas.
3299	GPD NOEL et al Kahntah a-100-F	Jan. 18, 1973	Jan. 26, 1973	1,679	Abandoned—dry.
3318	GPD NOEL et al Kahntah c-29-J	Jan. 28, 1973	Feb. 3, 1973	1,800	Abandoned—dry.
3300	HB Ashland Buick c-34-D	Jan. 17, 1973	Jan. 28, 1973	3,553	Abandoned—dry.
3255	HB Ashland Buick d-37-D	Dec. 31, 1972	Jan. 14, 1973	3,613	Dunlevy gas.
3174	HB et al Moberly 16-20-79-25	Aug. 25, 1972	Feb. 15, 1973	11,003	Halfway gas.
3336	HB et al Velma a-69-C	Feb. 27, 1973	Mar. 10, 1973	3,510	Gething gas.
3256	HB et al Velma b-8-F	Jan. 10, 1973	Jan. 18, 1973	3,455	Abandoned—dry.
3260	HB Otter b-17-E	Jan. 31, 1973	Feb. 16, 1973	3,595	Abandoned—dry.
3257	HB Otter d-91-H	Feb. 23, 1973	Mar. 5, 1973	3,600	Abandoned—dry.
3297	HB Union Bogbean b-6-B	Feb. 16, 1973	Feb. 25, 1973	3,420	Halfway gas.
3247	HB Union Ladyfern b-4-I	Jan. 24, 1973	Jan. 31, 1973	3,480	Abandoned—dry.
3420	HB Robertson d-91-E	Dec. 27, 1973	———	———	Drilling.
3289	HOL APC Buick a-63-B	Jan. 26, 1973	Feb. 5, 1973	3,850	Multiple Bluesky and Dunlevy gas.
3355	HOL APC Buick d-15-G	Mar. 10, 1973	Mar. 22, 1973	3,900	Abandoned—dry.
3238	Home et al Farmington 10-24-80-16	Dec. 25, 1972	Jan. 6, 1973	2,861	Abandoned—dry.
3232	Home et al Minaker a-83-J	Dec. 8, 1972	May 4, 1973	11,537	Abandoned—dry.
3389	Huber Cdn-Sup Total Nig d-73-A	Oct. 18, 1973	Nov. 20, 1973	4,344	Baldonnel gas.
3429	IOE Pembina E Beg c-12-G	Dec. 16, 1973	———	———	Drilling.
3380	Inexco et al Tornado b-9-J	Oct. 24, 1973	———	———	Drilling.
3321	Ipex et al Currant d-73-K	Feb. 4, 1973	Feb. 19, 1973	4,089	Halfway gas.
3287	JB Expl Prespatou c-80-A	Jan. 25, 1973	Feb. 13, 1973	4,340	Abandoned—dry.
3288	JB Expl Wargen a-83-G	Feb. 17, 1973	Mar. 4, 1973	4,010	Abandoned—dry.
3403	KM et al Mast b-60-A	Nov. 11, 1973	———	———	Drilling.
3319	KM AEG Mast d-80-A	Mar. 11, 1973	Oct. 1, 1973	11,718	Dunlevy gas.

TABLE 21—WELLS DRILLED AND DRILLING, 1973—*Continued*

Well Authorization No.	Well Name	Date Spudded	Date Rig Released	Total Depth (Ft.)	Status at December 31, 1973
3407	KM AEG Quasar Grizzly a-49-H	Dec. 14, 1973			Drilling.
3390	LH Aikman b-22-C	Nov. 15, 1973			Drilling.
3384	Lamar Hunt et al Umbach d-39-J	Sept. 29, 1973	Oct. 15, 1973	4,670	Abandoned—dry.
3405	Mesa Oval 6-24-86-15	Nov. 25, 1973	Dec. 30, 1973	9,920	Abandoned—dry.
3372	Monsanto Ft St John SE 6-23-83-17	July 30, 1973	Aug. 15, 1973	5,320	Abandoned—dry.
3242	Murphy N Boundary 8-31-87-14	Dec. 22, 1972	Jan. 12, 1973	4,509	Halfway oil.
3431	Murphy N Boundary 8-1-88-15	Dec. 12, 1973	Dec. 31, 1973	4,385	Abandoned—dry.
3335	Oakwood IOE et al Scatter d-98-F	Feb. 23, 1973	Aug. 30, 1973	12,322	Abandoned—dry.
3437	PATP et al Weasel d-39-A	Dec. 17, 1973	Dec. 27, 1973	3,750	Finished drilling.
2965	POR Beatton d-8-J	Feb. 21, 1973	Mar. 2, 1973	3,840	Abandoned—dry.
3423	Pacific Cabin b-42-B	Dec. 18, 1973			Drilling.
3422	Pacific Cabin d-79-B	Dec. 15, 1973			Drilling.
3324	Pacific CIGOL Dahl d-39-A	Feb. 13, 1973	Feb. 20, 1973	3,245	Abandoned—dry.
3117	Pacific et al Caribou d-27-H	Jan. 9, 1973	Jan. 21, 1973	3,970	Gething gas.
3378	Pacific et al Clarke b-78-L	Sept. 3, 1973	Oct. 4, 1973	6,281	Slave Point gas.
3228	Pacific et al Clarke c-52-F	Nov. 25, 1972	Jan. 2, 1973	6,530	Slave Point gas.
3312	Pacific et al Coyote c-80-B	Jan. 25, 1973	Feb. 10, 1973	3,982	Abandoned—dry.
3293	Pacific et al Hawthorne 7-5-86-24	Jan. 1, 1973	Jan. 29, 1973	5,800	Abandoned—dry.
3284	Pacific et al Inga 14-21-87-23	Dec. 12, 1973	Dec. 25, 1973	5,363	Inga oil.
3408	Pacific et al Laprise b-68-D	Nov. 25, 1973	Dec. 7, 1973	4,265	Abandoned—dry.
3365	Pacific Flatrock 16-12-84-17	July 4, 1973	July 23, 1973	4,880	Abandoned—dry.
3331	Pacific HB Klowee d-9-E	Feb. 23, 1973	Mar. 30, 1973	7,203	Abandoned—dry.
3264	Pacific Imp Clarke a-10-D	Jan. 12, 1973	Feb. 14, 1973	6,265	Slave Point gas.
3361	Pacific Imp Clarke b-97-L	Mar. 27, 1973	Apr. 27, 1973	6,325	Slave Point gas.
3243	Pacific IOE Inga 16-28-87-23	Feb. 1, 1973	Feb. 20, 1973	5,415	Water injection.
3301	Pacific Kotcho a-56-K	Feb. 14, 1973	Mar. 25, 1973	6,601	Slave Point gas.
3377	Pacific et al Laprise c-34-D	Aug. 15, 1973	Aug. 26, 1973	4,455	Abandoned—dry.
3409	Pacific Muskwa b-94-L	Dec. 19, 1973			Drilling.
3383	Pacific et al Peejay b-52-H	Oct. 2, 1973	Oct. 11, 1973	3,903	Water injection.
3271	Pacific Petitot a-45-D	Jan. 7, 1973	Feb. 2, 1973	6,656	Abandoned—dry.
3130	Pacific et al Rabbit b-39-A	Jan. 24, 1973	Feb. 2, 1973	3,980	Abandoned—dry.
3132	Pacific et al Rabbit b-82-B	Jan. 12, 1973	Jan. 23, 1973	4,035	Abandoned—dry.
3320	Pacific et al S Osprey d-73-G	Feb. 5, 1973	Feb. 16, 1973	3,917	Halfway gas.
3342	Pacific Tepee d-31-K	Feb. 20, 1973	Mar. 22, 1973	4,858	Halfway gas.
3313	Pacific WP Clarke c-31-G	Feb. 19, 1973	Mar. 3, 1973	7,319	Abandoned—dry.
3285	Pacific WP S Black c-72-C	Jan. 3, 1973	Jan. 12, 1973	4,085	Abandoned—dry.
3424	Pacific Yoyo d-17-L	Dec. 7, 1973			Drilling.
3398	Pembina Coseka Rigel 10-32-87-18	Nov. 10, 1973	Dec. 2, 1973	4,680	Abandoned—dry.
3329	Pembina Laprise d-79-I	Feb. 18, 1973	Mar. 8, 1973	3,940	Abandoned—dry.
3235	Penzl Mesa Clarke a-36-C	Dec. 10, 1972	Jan. 10, 1973	7,050	Slave Point gas.
3419	Penzl Mesa Fontas a-24-H	Dec. 16, 1973			Drilling.

3268	Penzi Mesa Fontas d-77-H	Dec. 31, 1972	Feb. 17, 1973	8,250	Slave Point gas.
3334	Penzi Mesa Jackfish d-45-K	Feb. 22, 1973	Mar. 23, 1973	7,380	Abandoned—dry.
3253	Provident Siphon 7-8-87-15	Jan. 16, 1973	Feb. 2, 1973	4,575	Abandoned—dry.
3388	Provident Wincan Oak 6-13-86-18	Oct. 9, 1973	Oct. 23, 1973	4,610	Abandoned—dry.
3317	Provident Wincan Oak 10-22-86-18	Feb. 6, 1973	Feb. 24, 1973	4,635	Abandoned—dry.
3275	Quasar Amoco Gutah d-73-E	Mar. 12, 1973	Mar. 18, 1973	3,270	Abandoned—dry.
3277	Quasar Amoco Lapp d-62-D	Feb. 18, 1973	Feb. 25, 1973	3,400	Abandoned—dry.
3279	Quasar Amoco Mars d-39-H	Jan. 29, 1973	Feb. 6, 1973	3,460	Abandoned—dry.
3278	Quasar Amoco Mercury d-39-A	Jan. 16, 1973	Jan. 25, 1973	3,810	Abandoned—dry.
3276	Quasar Amoco Slave d-33-H	Feb. 8, 1973	Feb. 16, 1973	3,350	Abandoned—dry.
3258	Quasar et al Elder a-27-E	Feb. 2, 1973	Feb. 13, 1973	4,030	Abandoned—dry.
3194	Quasar Mobil Flatbed d-57-D	Nov. 26, 1972	Dec. 17, 1973	4,350	Abandoned—dry.
3368	Quasar et al Grizzly a-3-A	Sept. 17, 1973	———	———	Drilling.
3180	Quasar et al Grizzly b-62-G	Aug. 31, 1972	Jan. 2, 1973	9,297	Dunlevy gas.
3181	Quasar Grizzly a-85-G	Aug. 31, 1972	Dec. 7, 1973	7,243	Finished drilling.
3233	Quasar et al Grizzly d-30-H	Dec. 11, 1972	June 22, 1973	4,028	Abandoned—dry.
3261	Quasar HB Phillips Wolverine c-32-K	Jan. 17, 1973	Nov. 12, 1973	9,156	Finished drilling.
3395	Quasar et al Oetco c-28-I	Dec. 16, 1973	———	———	Drilling.
3270	Quasar Oval 8-19-86-14	Jan. 13, 1973	Jan. 26, 1973	4,635	Abandoned—dry.
3274	Quasar Amoco Redeye d-69-D	Feb. 28, 1973	Mar. 8, 1973	3,470	Halfway gas.
3323	Quintana CanDel et al Hostil d-15-I	Jan. 31, 1973	Feb. 23, 1973	5,609	Abandoned—dry.
3347	SOC et al Fireweed a-29-D	Mar. 9, 1973	Mar. 19, 1973	4,415	Abandoned—dry.
3333	SOC et al Fireweed b-4-K	Feb. 27, 1973	Mar. 7, 1973	4,185	Dunlevy gas.
3356	SOC et al Fireweed b-10-D	Mar. 13, 1973	Mar. 21, 1973	4,274	Abandoned—dry.
3376	SOC et al Inga d-55-B	Aug. 23, 1973	Sept. 7, 1973	4,910	Dunlevy gas.
3392	SOC et al W Jeans d-11-F	Nov. 7, 1973	Nov. 24, 1973	4,495	Dunlevy gas.
3381	Scurry Ballinderry Cecil 6-14-84-18	Sept. 11, 1973	Oct. 3, 1973	3,695	Abandoned—dry.
3354	Scurry Ballinderry N Pine 6-21-85-18	Nov. 16, 1973	Dec. 5, 1973	5,970	Abandoned—dry.
3394	Scurry CanPlac Cecil 10-18-84-17	Oct. 20, 1973	Nov. 13, 1973	6,475	North Pine gas.
3364	Scurry CanPlac Eagle 6-22-84-18	June 22, 1973	July 14, 1973	6,120	Belloy oil.
3239	Scurry CanPlac Eagle 6-27-84-18	Jan. 10, 1973	Jan. 29, 1973	6,070	Belloy oil.
3370	Scurry CanPlac Eagle 6-34-84-18	July 22, 1973	Aug. 17, 1973	6,051	Belloy oil.
3382	Scurry CanPlac Eagle 16-28-84-18	Sept. 18, 1973	Nov. 9, 1973	6,071	Belloy gas.
3399	Scurry ML N Wilder 6-13-84-20	Nov. 25, 1973	Dec. 10, 1973	5,325	Abandoned—dry.
3406	Signal Dogrib a-7-L	Dec. 12, 1973	———	———	Drilling.
3346	Skye et al Fireweed b-22-H	Feb. 25, 1973	Mar. 10, 1973	4,070	Bluesky gas.
3296	TLI et al Grassy a-60-E	Jan. 25, 1973	Apr. 5, 1973	6,550	Abandoned—dry.
3176	TPPL et al Maple d-57-E	Jan. 10, 1973	Feb. 2, 1973	4,385	Abandoned—dry.
3332	TPPL et al W Inga 11-4-87-24	Dec. 2, 1972	Mar. 4, 1973	4,780	Abandoned—dry.
3325	Tenn Monsanto et al W Weasel d-73-C	Feb. 24, 1973	Mar. 2, 1973	3,855	Halfway oil.
3349	Tenn Monsanto W Weasel b-81-C	Mar. 5, 1973	Mar. 18, 1973	3,836	Multiple Bluesky and Halfway gas.
3367	Texcan Cache 6-22-88-22	Aug. 1, 1973	Aug. 17, 1973	5,033	Multiple Coplin and Halfway gas.
3353	Union et al Peejay b-2-E	Mar. 13, 1973	Mar. 26, 1973	3,905	Water injection.
3315	Union HB Aitken d-59-L	Feb. 9, 1973	Feb. 24, 1973	4,301	Abandoned—dry.
3310	Union HB Wildmint b-65-A	Feb. 6, 1973	Feb. 15, 1973	3,725	Halfway oil.
3309	Union HB Wildmint c-66-A	Feb. 17, 1973	Feb. 23, 1973	3,770	Water injection.
3400	Union Mason d-6-F	Nov. 14, 1973	Dec. 28, 1973	8,000	Abandoned—dry.

TABLE 21—WELLS DRILLED AND DRILLING, 1973—*Continued*

Well Authorization No.	Well Name	Date Spudded	Date Rig Released	Total Depth (Ft.)	Status at December 31, 1973
3252	Wainoco et al E Osborne b-64-I	Dec. 23, 1972	Jan. 6, 1973	4,215	Abandoned—dry.
3251	Wainoco et al Kyklo a-45-B	Jan. 20, 1973	Jan. 27, 1973	2,590	Abandoned—dry.
3249	Wainoco et al Kyklo c-12-I	Dec. 27, 1972	Jan. 7, 1973	2,160	Abandoned—dry.
3250	Wainoco et al Kyklo d-77-L	Jan. 10, 1973	Jan. 17, 1973	2,265	Abandoned—dry.
3248	Wainoco et al Lichen c-54-A	Dec. 21, 1972	Jan. 17, 1973	6,610	Abandoned—dry.
3304	Wainoco Flatrock 6-18-84-16	Jan. 26, 1973	Feb. 11, 1973	4,835	Multiple Halfway and Boundary Lake gas.
3396	Wainoco Francana Pluto 11-22-85-17	Nov. 2, 1973	Nov. 7, 1973	2,929	Abandoned—junked.
3404	Wainoco Francana Pluto All-22-85-17	Nov. 8, 1973	Nov. 30, 1973	5,989	Abandoned—dry.
3410	Wainoco et al Peejay d-42-D	Dec. 26, 1973	———	———	Drilling.
3369	Westcoast Phillips Dunedin c-20-I	July 31, 1973	Nov. 19, 1973	7,825	Abandoned—dry.
3397	Woods Wainoco Ashland Oak 6-7-86-17	Oct. 31, 1973	Nov. 24, 1973	4,369	Halfway oil.
3363	Woods Wainoco Ashland Oak 6-18-86-17	July 25, 1973	Aug. 13, 1973	4,215	Halfway gas.
3267	Woods Anadarko Siphon 6-5-87-16	Dec. 30, 1972	Jan. 10, 1973	4,530	Abandoned—dry.
3269	Woods Wainoco Oak 11-24-86-18	Jan. 9, 1973	Jan. 22, 1973	4,192	Halfway gas.

TABLE 22—OILFIELDS AND GASFIELDS DESIGNATED AT DECEMBER 31, 1973

Field	Date Designated	Date(s) Revised	Field Location	Pool(s)	Number of Wells capable of production	Discovery Well(s)	Pool(s) Discovered
Airport	Oct. 1, 1968		Tp. 83, R. 1, W6M	4, 5, 9		Pacific Airport 8-32-83-17 (3), gas	4
						Pacific Airport 12-34-83-17 (10), gas	9
						Pacific Airport 9-32-83-17 (97), gas	5
Aitken Creek	Feb. 15, 1960	Jan. 1, 1961 Oct. 1, 1963 Apr. 1, 1971	N.T.S. 94-A-13	3 3	10 —	Union Aitken Creek b-42-L, oil *Union HB Aitken d-57-L, gas*	3 3
Balsam	Dec. 31, 1971	Mar. 31, 1972	N.T.S 94-H-2	2, 9	3	Union HB Balsam d-77-H, gas	9
						Ipex Cox Hamilton Balsam d-47-H, oil	9
						Union HB Balsam b-56-H, gas	2
Bear Flat	*Oct. 1, 1969*		*Tp. 84, R. 20, W6M*	6	2	*Monsanto Bear Flat 7-16-84-20, oil*	6
Beatton River	Aug. 7, 1959	Jan. 1, 1962 Apr. 1, 1971	N.T.S. 94-H-2	9	16	Triad Beatton d-60-J, gas	9
						Triad Beatton River b-38-J, oil	9
Beatton River West	Aug. 7, 1959	Jan. 1, 1962 Oct. 1, 1964 Apr. 1, 1969 July 1, 1970 Jan. 1, 1971	N.T.S. 94-z-w	2	15	Triad West Beatton River d-39-K, oil	2
Beaverdam	Apr. 1, 1966		N.T.S 94-A-16	9	3	Tenn Sun Beaverdam d-37-L, gas	9
						Tenn Beaverdam d-38-L, oil	9
Beaver River	Jan. 1, 1971	Oct. 1, 1971	N.T.S 94-N-16, 95-C-1	14	5	Pan Am Beaver River d-73-K, gas	14
Beavertail	*Apr. 1, 1970*		*N.T.S 94-A-15*	*3, 9*	4	Pacific Sinclair Beavertail d-71-C, gas	*3, 9*
Beg	July 1, 1961	Jan. 1, 1962 Apr. 1, 1962 July 1, 1962 Apr. 1, 1963 Apr. 1, 1964	N.T.S. 94-B-16, 94-G-1, 94-G-8	5, 9	30	Pacific et al Beg b-17-K, gas	5
						Pacific et al Beg d-10-G, gas	9
Beg West	Apr. 1, 1962	Oct. 1, 1963	N.T.S. 94-G-1	5	3	Pacific et al W Beg a-19-F, gas	5
Bernadet	Oct. 1, 1963		Tp. 87, 88, R. 24, 25, W6M	3	1	West Nat et al Bernadet 8-1-88-25, gas	3
Bivouac	Mar. 31, 1973		N.T.S. 94-A-13	11	2	ARCo Bivouac d-68-C	11
Blueberry	Feb. 7, *1958*	Dec. 22, 1958 Feb. 15, 1960 May 27, 1960 Oct. 1, 1961 Jan. 1, 1963	*N.T.S 94-A-12, 94-A-13* Tp. 88, R. 25, W6M	4, 5, 6, 9 11	34	West Nat et al Blueberry b-22-D, gas	9
						West Nat et al Blueberry b-32-D, gas	4
						West Nat et al Blueberry d-87-D, gas	5
						West Nat et al Blueberry a-61-L, gas	6
						West Nat et al Blueberry d-82-L, oil	11
Blueberry East	Dec. 22, 1958		N.T.S 94-A-13	5, 9, 11	2	West Nat et al E Blueberry b-38-C, gas	5, 9
						West Nat et al E Blueberry b-36-C, gas	11
Blueberry West	Feb. 7, 1958	July 1, 1961 Oct. 1, 1969	N.T.S. 94-A-12, 94-B-9, 94-B-16 Tp. 88, R. 25, W6M	4, 5	5	West Nat et al W Blueberry d-82-L, gas	4
						West Nat et al W Blueberry d-19-L, gas	5

TABLE 22—OILFIELDS AND GASFIELDS DESIGNATED AT DECEMBER 31, 1973—*Continued*

Field	Date Designated	Date(s) Revised	Field Location	Pool(s)	Number of Wells capable of production	Discovery Well(s)	Pool(s) Discovered
Boundary Lake	Oct. 30, 1956	Feb. 7, 1958 Aug. 7, 1959 Feb. 15, 1960 Jan. 1, 1961 Apr. 1, 1961 July 1, 1961 Jan. 1, 1962 Apr. 1, 1962 Oct. 1, 1963 Oct. 1, 1964 Jan. 1, 1965 Oct. 1, 1965 Jan. 1, 1966 Apr. 1, 1966	Tp. 84–87, R. 13, W6M Tp. 83–86, R. 14, 15, W6M	2, 3, 4, 5 8, 9	332	Pacific Boundary 8-15-85-14, gas and oil Pacific Boundary 12-10-85-14, gas Amerada Boundary 8-5-85-14, gas Texaco NFA Boundary L 6-6-85-14 (1), oil Sun Boundary Lake 6-23-85-14, oil Texaco NFA Boundary 16-31-86-13, gas	2, 4, 5 3 4 8 9 9
Boundary Lake North	Jan. 1, 1965	Apr. 1, 1966	Tp. 87, R. 14, W6M	9	4	Texaco NFA N Boundary 7-3-87-14, gas	9
Bubbles	Nov. 24, 1959	Feb. 15, 1960 May 27, 1960 Jan. 1, 1961	N.T.S 94-G-9, 94-H-4	5	10	Pacific Imperial Bubbles b-33-I, gas	5
Bubbles North	Dec. 31, 1971	Dec. 31, 1972	N.T.S. 94-G-8	9	3	Pac Imp N Bubbles d-95-B, gas	9
Buick Creek	Feb. 7, 1958	Aug. 7, 1959 Jan. 1, 1961 July 1, 1961 Oct. 1, 1963 Jan. 1, 1965 Apr. 1, 1970 Sept. 30, 1972 Dec. 31, 1972 June 30, 1973 Dec. 31, 1973	N.T.S 94-A-11, 94-A-14 N.T.S. 94-A-10, 94-A-15 Tp. 88, R. 19, W6M	2, 4, 6	40	MicMac et al Buick d-17-D, gas Texaco NFA Buick Creek d-98-I (1), gas Texaco NFA Buick Creek d-83-J (4), gas	2 4 6
Buick Creek North	Apr. 1, 1967		N.T.S. 94-A-14	3, 4	12	Pacific West Prod N Buick c-22-F, gas	3, 4
Buick Creek West	Feb. 7, 1958	Jan. 6, 1959 Feb. 15, 1960 Jan. 1, 1963 Dec. 31, 1973	N.T.S. 94-A-11, 94-A-14	3, 4, 5, 9, 11	14	Pacific West Buick Creek c-2-E (6), gas Pacific W Buick Creek c-83-K (13A), oil Pacific West Buick Creek b-78-C (2), gas Pacific West Buick Creek c-58-C (8), gas Pacific West Buick Creek b-23-E (1), gas Cox Union W Buick c-32-F	3 4 4 5 9 11
Bulrush	July 1, 1964	Apr. 1, 1965	N.T.S. 94-A-16	9	4	Union HB Sinclair Bulrush d-78-F, oil	9
Bulrush East	Apr. 1, 1967		N.T.S. 94-A-16	9	1	Dome Provo Co-op E Bulrush d-5-K, oil	9
Cabin	Apr. 1, 1970	Dec. 31, 1972	N.T.S. 94-P-5	9	5	West Nat Cabin a-19-G, gas	9
Cache Creek	Dec. 31, 1971	Dec. 31, 1973	Tp. 88, R. 22, W6M N.T.S. 94-A-H	6, 9	3	Texcan N Cache 6-28-88-22, gas	6, 9

Cecil Lake	lept. 30, 1972		Tp. 84, R. 17, 18, W6M	6	7	Scurry ML Cecil 6-31-84-17, gas — 6 Scurry ML CAEL Cecil 10-24-84-18, oil — 6
Charlie Lake	Jan. 1, 1961		Tp. 84, R. 18, W6M	3	1	Imp Pac Charlie 13-5-84-18, oil — 3
Clarke Lake	Feb. 15, 1960	May 27, 1960 Jan. 1, 1961 Apr. 1, 1962 Apr. 1, 1965 Apr. 1, 1966 Jan. 1, 1967 Apr. 1, 1967 July 1, 1967 July 1, 1968 July 1, 1969 July 1, 1970 Mar. 31, 1973	N.T.S. 94-J-9, 94-J-10, 94-J-15, 94-J-16	13	39	West Nat et al Clarke Lake c-47-J, gas — 13
Clarke Lake South	Oct. 1, 1968		N.T.S. 94-J-9	13	2	West Nat IOE S Clarke d-29-K, gas — 13
Crush	Apr. 1, 1968	July 1, 1968 Oct. 1, 1968	N.T.S. 94-A-16	9	9	Union et al Crush d-28-F, oil — 9
Currant	Oct. 1, 1965	Mar. 31, 1973 Dec. 31, 1973	N.T.S. 94-A-9, 94-A-16	9	10	Union HB Sinc Pac Currant d-37-C, gas — 9 Sinclair et al Currant d-17-C, oil — 9
Cypress	Dec. 31, 1971		N.T.S. 94-B-15	5	3	Security Cypress a-28-F, gas — 5
Dahl	Dec. 31, 1971		N.T.S. 94-H-7, 94-H-10	2	7	Tenn Cdn-Sup Dahl d-53-J, gas — 2
Dawson Creek	Feb. 7, 1958		Tp. 79, R. 15, W6M	1	2	Pac Sc Dawson Ck 1-15-79-15 (1), gas — 1
Eagle	Dec. 31, 1971	Mar 31, 1973 Sept. 30, 1973	Tp. 84, R. 18, W6M	10	5	Raines Eagle 11-29-84-18, oil — 10
Elm	Dec. 31, 1971		N.T.S 94-H-7	9	2	BO & G et al Elm d-83-C, gas — 9 Bralorne et al Elm b-62-C, oil — 9
Evergreen	Dec. 31, 1971		N.T.S 94-H-2	9	2	CDR Sun Evergreen d-54-J, gas — 9
Farrell Creek	Jan. 1, 1968		N.T.S. 94-A-5, 94-B-8 Tp. 85, R. 26, W6M Tp. 86, R. 26, W6M	6, 9	5	Ft St John Petroleums Farrell a-9-L, gas — 9 CanDel et al Farrell a-41-I, gas — 6
Fireweed	Dec. 31, 1972		N.T.S. 94-A-13, 94-A-14	2, 4, 5, 11	14	West Nat et al Fireweed c-A1-H, gas — 11 Union Fireweed d-53-G, gas — 4 CDR Fireweed d-31-G, gas — 5 Sierra et al Fireweed a-43-H, gas — 2
Flatrock	July 1, 1971	Oct. 1, 1971 Sept. 30, 1972 Dec. 31, 1972	Tp. 84, R. 16, 17, W6M	9	8	Champlin Flatrock 10-9-84-16, gas — 9 Wainoco et al Flatrock 6-13-84-17, oil — 9
Fort St. John	Aug. 22, 1956	Feb. 7, 1958 Feb. 15, 1960 Jan. 1, 1961 Oct. 1, 1968 Apr. 1, 1969	Tp. 83, R. 18, 19, W6M	4, 5, 6, 9, 10	29	Pacific Ft St John A3-29-83-18 (31), gas — 4 Pacific Ft St. John 14-15-83-18 (7), gas — 5 Pacific Ft St. John B3-29-83-18 (52), gas — 6 Pacific Ft St John 3-14-83-18 (9), oil — 6 Pacific Ft St John 1-20-83-18 (30), gas — 9 Imp Pac Ft St John 9-19-83-19 (45), oil — 10 Pacific Ft St John 14-21-83-18 (4), gas — 10

TABLE 22—OILFIELDS AND GASFIELDS DESIGNATED AT DECEMBER 31, 1973—*Continued*

Field	Date Designated	Date(s) Revised	Field Location	Pool(s)	Number of Wells capable of production	Discovery Well(s)	Pool(s) Discovered
Fort St. John Southeast	Feb. 7, 1958		Tp. 82, 83, R.17, W6M	4, 5, 9, 10	15	Pacific Ft St John SE 10-31-82-17 (80), gas	4
						Pac Ft St John SE A4-10-83-17 (55), gas	5
						Pac Ft St John SE 10-33-82-17 (22), gas	9
						Pac Ft St John SE 4-10-83-17 (12), gas	10
Grizzly	Dec. 31, 1971		N.T.S. 93-I-15	4	2	Gray Oil PRP NW Grizzly c-25-A, gas	4
Grizzly North	Dec. 31, 1973		N.T.S. 93-I-15	4	1	Quasar et al Grizzly b-62-G, gas	4
Gundy Creek	Feb. 7, 1958	Jan. 6, 1959	N.T.S 94-B-16	5, 6	5	West Nat Gundy Creek b-69-A, gas	6
						West Nat Gundy Creek c-80-A, gas	5
Halfway	Dec. 22, 1958		Tp. 86, 87, R. 25, W6M	5, 6	4	West Nat et al Halfway 5-1-87-25, gas	5
						West Nat et al Halfway 8-11-87-25, gas	6
						West Nat et al Halfway 14-11-87-25, oil	6
Helmet	Dec. 31, 1971		N.T.S. 94-P-7	13	2	PPC Chevron et al Helmet b-11-K, gas	13
Highway	Feb. 7, 1958		N.T.S 94-B-16	4, 5, 11	6	West Nat et al Highway b-3-I (1), gas	4
						Pacific Highway b-25-I (1), gas	5
						Pacific Highway a-90-I (4), gas	11
	Jan. 1.196,	Apr. 1, 1968 July 1, 1968 Oct. 1, 1968 Jan. 1, 1969 Apr. 1, 1969 July 1, 1970 Oct. 1, 1970 Jan. 1, 1971 July 1, 1971 Dec. 31, 1972	Tp. 85, R. 23, W6M Tp. 86, R. 23, 24, W6M Tp 87, R. 23, 24, W6M Tp. 88, R. 23, 24, W6M N.T.S. 94-A-12 N.T.S. 94-A-13	5, 6, 7	80	Cdn-Sup et al Inga 10-25-88-24, oil	7
						Hunt Sands Pac Imp Inga 7-16-86-23, oil	5
						Texaco Inga 6-25-87-24, oil	6
						Pacific Inga 6-29-86-23, gas	5
						Tenn Cdn-Sup et al Inga 13-7-88-23, gas	7
Inga North	Dec. 31, 1971	Nov. 24, 1959 Feb. 15, 1960	N.T.S. 94-A-12, 94-A-13	7	3	Pioneer Cabot N Inga d-51-K, gas	7
Jedney	Aug. 7, 1959	Jan. 1, 1961 Apr. 1, 1961 Apr. 1, 1963 Oct. 1, 1963	N.T.S. 94-G-1.944-3	3, 5, 9	42	Pacific Imperial Jedney a-95-C, gas	3
						Pacific et al Jedney b-88-J, gas	5
						Pacific Imp Jedney d-99-J, gas	9
Jedney West	July 1, 1964		N.T.S. 94-G-1, 94-G-8	5, 9	1	Pacific et al W Jedney b-84-K, gas	5, 9
Julienne Creek	Apr. 1, 1971		N.T.S. 94-G-1, 94-G-2	9, 5	4	Sinclair Julienne Ck a-50-D, gas	5, 9
Kobes-Townsend	Dec. 22, 1958	Feb. 15, 1960	N.T.S. 94-84.94-B-9	4, 6, 9, 11	13	Pacific Kobes a-3-A (4), gas	4
						Pacific Kobes a-94-I (1), gas	6, 9
						Pacific Townsend a-20-H (A-1), gas	11

Kotcho Lake	Apr. 1, 1962	Apr. 1, 1967 June 30, 1972 Apr. 1, 1971 Dec. 31, 1972 Dec. 31, 1973	N.T.S. 94-I-14, 94-P-3	4, 8	13	West Nat Kotcho Lake c-67-K, gas — 13
Kotcho Lake East	Dec. 31, 1973		N.T.S. 94-I-14	13	4	West Nat Kotcho Lake d-39-J — 13
La Garde	July 1, 1970		Tp. 87, R. 15, W6M	4, 8	2	Texaco NFA La Garde 7-21-87-15, gas — 4 Texaco NFA La Garde 10-29-87-15, gas — 8
Laprise Creek	Feb. 15, 1960	Jan. 1, 1961 Apr. 1, 1961 Apr. 1, 1963 Jan. 1, 1964 Apr. 1, 1964 Mar. 31, 1972 Dec. 31, 1972	N.T.S. 94-G-8, 94-H-4, 94-H-5	5	47	Dome-Basco Laprise Ck a-35-H, gas — 5
Laprise Creek West	July 1, 1962		N.T.S. 94-G-8	5	2	Dome CDP C & E Laprise c-82-G, gas — 5
Louise	Dec. 31, 1972		N.T.S. 94-P-3, 94-P-4	13	2	Placid Louise c-80-L, gas — 13
Milligan Creek	Feb. 7, 1958	Aug. 7, 1959 Feb. 15, 1960 Jan. 1, 1961 Apr. 1, 1962 July 1, 1963 Jan. 1, 1970 Apr. 1, 1970	N.T.S. 94-H-2	3, 9	29	Union HB Milligan Creek d-73-G, oil — 9 Union HB Milligan d-62-G, gas — 3 Whitehall et al Milligan d-75-G, gas — 9
Moberly Lake	Jan. 1, 1969	Apr. 1, 1969	Tp. 82, R. 22, W6M	6	2	JBA Moberly 10-15-82-22, oil — 6
Montney	Feb. 7, 1958	Jan. 6, 1959 Jan. 1, 1962	Tp. 87, R. 18, W6M Tp. 86, 87, R. 19, W6M	3, 6, 9	4	Pac Sunray Montney 16-32-86-19 (3), gas — 3 Pac Sunray Montney 14-36-86-19 (2), gas — 6 Pac Sunray Montney 14-31-86-19 (5), gas — 9
Nettle	Apr. 1, 1966		N.T.S 94-H-7	3	5	Union KCL ROC Nettle d 67 A, oil — 3 Union KCL ROC Nettle d-76-A, gas — 3
Nig Creek	Aug. 7, 1959	Feb. 15, 1960 Jan. 1, 1961 Apr. 1, 1961 Jan. 1, 1962 Apr. 1, 1962 Apr. 1, 1965 July 1, 1965 Apr. 1, 1966 Dec. 31, 1973	N.T.S. 94-A-13, 94-H-3, 94-H-4	5	30	Texaco NFA Nig Creek a-79-B (1), gas — 5 Texaco NFA Nig d-87-A, oil — 5
Nig Creek West	Oct. 1, 1971		N.T.S. 94-H-4	5	2	Fargo Nig Creek c-19-C, gas — 5
North Pine	Oct. 1, 1968	Oct. 1, 1969	Tp. 85, R. 18, W6M	6	2	Texaco N Pine 6-15-85-18, oil — 6 Pacific et al N Pine 6-27-85-18, gas — 6
Oak	Dec. 31, 1972	Mar. 31, 1973 Dec. 31, 1973	Tp. 86, 87, R. 18, W6M	9	5	Woods Wainoco Oak 6-34-86-18, gas — 9 Woods Wainoco Ashland Oak 6-7-86-17, oil — 9
Osprey	Apr. 1, 1966	Apr. 1, 1970	N.T.S. 94-A-15	9	6	Pacific SR CanDel Osprey d-4-J, oil — 9 Tenn Osprey d-13-L, gas — 9

TABLE 22—OILFIELDS AND GASFIELDS DESIGNATED AT DECEMBER 31, 1973—*Continued*

Field	Date Designated	Date(s) Revised	Field Location	Pool(s)	Number of Wells Capable of Production	Discovery Well(s)	Pool(s) Discovered
Parkland	Feb. 7, 1958	July 1, 1963 June 30, 1972 May 27, 1960 Jan. 1, 1961 Jan. 1, 1962 Apr. 1, 1962 July 1, 1965 Oct. 1, 1965	Tp. 81, R. 15, 16, W6M	12	4	Pacific Imp Parkland 6-29-81-15, gas	12
Peejay	Feb. 15, 1960	Jan. 1, 1966 Apr. 1, 1966 July 1, 1966 Oct. 1, 1966 Apr. 1, 1967 July 1, 1967 Jan. 1, 1968	N.T.S. 94-A-15, 94-A-16	9	106	Pacific SR West Cdn Peejay d-52-L, gas Pacific Sinclair Peejay d-39-E, oil	9 9
Peejay West	Jan. 1, 1963	Dec. 31, 1973	N.T.S. 94-A-15	9	2	Pacific SR West Cdn W Peejay d-54-G, oil Baysel SR Can Del Peejay West d-83-G, gas	9 9
Peggo	Dec. 31, 1971		N.T.S. 94-P-7	13	2	Midwest Chevron Peggo d-65-A, gas	13
Petitot River	Apr. 1, 1961		N.T.S. 94-P-12, 94-P-13	13	3	West Nat Petitot River d-24-D, gas	13
Redeye	Mar. 31, 1973		N.T.S. 94-H-10	9	2	Pan Am Redeye d-89-D, gas	9
Red Creek	Feb. 7, 1958	Aug. 7, 1959 Feb. 15, 1960 Jan. 1, 1963 Apr. 1, 1963 Jan. 1, 1964 Oct. 1, 1964 Oct. 1, 1965	Tp. 85, R. 21, W6M N.T.S. 94-A-10	6, 9	2	Pacific Red Creek 5-27-85-21 (36), gas	6, 9
Rigel	Oct. 1, 1962	Jan. 1, 1967 July 1, 1967 July 1, 1968 Oct. 1, 1968 Jan. 1, 1969 July 1, 1969 Apr. 1, 1970 Jan. 1, 1971 Dec. 31, 1973	Tp 87, 88, R. 16, W6M Tp 87, 88, R. 17, W6M Tp. 87, 88, R. 18, W6M Tp. 88, R. 19, W6M	4	63	Monsanto Rigel 6-13-87-17, oil Imp Fina Rigel 4-27-88-17, gas	4 4
Rigel East	Dec. 31, 1971		Tp. 88, R.16, W6M	9, 4	3	Texaco NFA E Rigel 13-26-88-16, gas Texaco NFA E Rigel 10-12-88-16, gas	9 4
Shekilie	Dec. 31, 1971		N.T.S. 94-I-16	13	2	Pacific Shekilie b-24-A, gas	13
Sierra	Oct. 1, 1969		N.T.S. 94-I-14	14	2	Socony Mobil Sierra c-78-C, gas	14

Siphon	Apr. 1, 1971	Oct. 1, 1971 Dec. 31, 1971 Mar. 31, 1972 June 30, 1972 Dec. 31, 1972	Tp. 86, 87, R. 16, W6M	4, 5, 6, 9	19	Pacific West Prod Siphon 7-34-86-16, gas Pacific et al Siphon 11-27-86-16, gas	4 5, 6, 9
Stoddart	Jan. 6, 1959	Feb. 15, 1960 Apr. 1, 1965 Jan. 1, 1966 Apr. 1, 1967 Apr. 1, 1968 Apr. 1, 1969 Oct. 1, 1969 July 1, 1970 Jan. 1, 1971 Mar. 31, 1972	Tp. 85, R. 18, 19, 20, W6M Tp. 86, R. 19, 20, W6M	6, 10	21	Pacific Stoddart 4-24-86-20 (85), gas Uno-Tex et al Stoddart 10-31-85-19, oil Chaut Dunbar Stoddart 11-23-85-19, oil	10 10 6
Stoddart West	Apr. 1, 1964	July 1, 1970 Jan. 1, 1971 Apr. 1, 1971 Dec. 31, 1972	Tp. 86, R. 20, 21, W6M Tp. 87, R. 20, W6M	9, 10	9	Pacific W Stoddart 6-22-86-20, gas Pacific W Stoddart 11-10-86-20, gas	9 10
Sunrise	Feb. 7, 1958	Jan. 1, 1961 Apr. 1, 1965 Oct. 1, 1969 Jan. 1, 1971 Mar. 31, 1973	*Tp. 78, R. 16, W6M* Tp. 79, R. 16, 17, W6M	*1*	12	*Pacific Sunrise 10-7-79-16 (3), gas*	1
Thetlaandoa	Dec. 31, 1973		N.T.S. 94-P-6	11	2	Amoco et al Thetlaandoa c-34-L	11
Tsea	Dec. 31, 1971		N.T.S. 94-P-5, 94-P-12	13	2	Texaco NFA Tsea b-68-K, gas	13
Two Rivers	Apr. 1, 1969		Tp. 83, R. 16, W6M	5, 6, 9	3	Champlin Two Rivers 10-5-83-16, gas Champlin et al Two Rivers 6-9-83-16, gas	6 5, 9
Velma	Dec. 31, 1972		N.T.S. 94-H-8	2, 6	5	GraMic Forest Buttes Velma d-15-E, gas GraMic et al Velma b-70-C, gas	2 6
Wargen	Dec. 31, 1971	Mar. 31, 1972	N.T.S. 94-H-6	2, 3	3	Imp Pac Sunray Wargen c-58-C, gas Pacific et al Wargen d-37-C, oil	2 3
Weasel	Apr. 1, 1966	Apr. 1, 1967	N.T.S. 94-H-2, 94-A-15	5, 9	23	Tenn Ashland Weasel d-35-B, oil Sinclair Pacific Weasel d-93-J, gas Pacific Sinclair Weasel d-50-A, gas	9 5 9
Weasel West	Apr. 1, 1971	Mar. 31, 1972 Mar. 31, 1973	N.T.S. 94-H-2	9	5	Tenn et al W Weasel d-71-C, oil	9
Wilder	Jan. 1, 1971		Tp. 83, R. 19, W6M	4, 9, 10	4	Amerada Pac Wilder 11-17-83-19, gas Wainoco Woods Wilder 7-30-83-19, gas	9, 10 4, 9
Wildmint	Jan. 1, 1962	July 1, 1962 Jan. 1, 1963 Apr. 1, 1964 Jan. 1, 1966	N.T.S. 94-A-15, 94-H-2	9	27	Union HB Wildmint d-46-A, oil Tenn Wildmint d-4-A, gas	9 9
Willow	July 1, 1963	Apr. 1, 1970	N.T.S. 94-H-2	3, 9	4	Union HB Willow b-10-H, gas Union HB Willow d-20-H, oil	9 3

TABLE 22—OILFIELDS AND GASFIELDS DESIGNATED AT DECEMBER 31, 1973—*Continued*

Field	Date Designated	Date(s) Revised	Field Location	Pool(s)	Number of Wells Capable of Production	Discovery Well(s)	Pool(s) Discovered
Wolf	Apr. 1, 1967		N.T.S. 94-A-15	9	6	Baysel Sinclair Wolf d-93-B, oil Baysel Sinclair Wolf d-3-G, gas	9 9
Yoyo	Apr. 1, 1965	Jan. 1, 1967 Apr. 1, 1967 Jan. 1, 1968 Oct. 1, 1970 July 1, 1971	N.T.S. 94-I-13, 94-I-14	13, 14	15	West Nat et al Yoyo b-24-L, gas West Nat et al Yoyo b-29-I, gas	14 13

Numerical list of pools:

1. Lower Cretaceous Cadotte sandstone.
2. Lower Cretaceous Bluesky sandstone.
3. Lower Cretaceous Gething sandstone.
4. Lower Cretaceous Dunlevy sandstone.
5. Triassic Baldonnel carbonate (includes Baldonnel A and B of Fort St. John area).
6. Triassic Charlie Lake sandstone and carbonate.
7. Triassic Inga sandstone.
8. Triassic Boundary Lake carbonate.
9. Triassic Halfway sandstone.
10. Permian Belloy carbonate.
11. Debolt carbonate.
12. Upper Devonian Wabamun carbonate.
13. Middle Devonian Slave Point carbonate.
14. *Middle Devonian Pine Point carbonate.*

TABLE 23—NUMBER OF CAPABLE AND OPERATING WELLS AT DECEMBER 31, 1973[1]

Field and Pool	Oil Wells		Gas Wells	
	Capable	Operating	Capable	Operating
Aitken Creek—Gething	6	3	4	3
Balsam—				
Bluesky	—	—	1	—
Halfway	1	—	1	—
Field totals	1	—	2	—
Bear Flat—North Pine	2	1	—	—
Beatton River—Halfway	15	11	1	—
Beatton River West—Bluesky	12	10	—	—
Beaverdam—Halfway	1	—	2	—
Beaver River—Nahanni	—	—	5	4
Beavertail—				
Gething	—	—	3	2
Halfway	—	—	1	—
Field totals	—	—	4	2
Beg—				
Baldonnel	—	—	14	9
Halfway	—	—	16	13
Field totals	—	—	30	22
Beg West—Baldonnel	—	—	3	—
Bernadet—				
Gething	—	—	1	—
Mississippian	—	—	2	—
Field totals	—	—	3	—
Blueberry—				
Dunlevy	—	—	7	4
Baldonnel	—	—	4	—
Blueberry	—	—	2	—
Halfway	—	—	1	—
Debolt	19	18	—	—
Field totals	19	18	14	4
Blueberry East—				
Baldonnel	—	—	1	—
Debolt	—	—	1	—
Field totals	—	—	2	—
Blueberry West—				
Dunlevy	—	—	2	—
Baldonnel	—	—	2	2
Field totals	—	—	4	2
Boundary Lake—				
Bluesky	—	—	2	1
Gething	—	—	2	2
Dunlevy	1	—	1	—
Baldonnel	—	—	6	4
Cecil	2	2	—	—
Boundary Lake	309	283	—	—
Basal Boundary Lake	—	—	1	1
Halfway	6	4	1	—
Field totals	318	289	13	8
Boundary Lake North—Halfway	—	—	4	—
Bubbles—Baldonnel	—	—	10	7
Bubbles North—Halfway	—	—	3	—
Buick Creek—				
Bluesky	—	—	8	2
Dunlevy	1	—	31	20
Cecil	—	—	1	—
Field totals	1	—	40	22
Buick Creek North—				
Gething	—	—	4	1
Dunlevy	—	—	8	4
Field totals	—	—	12	5

[1] Each zone of a multiple completion is counted as a well.

TABLE 23—NUMBER OF CAPABLE AND OPERATING WELLS AT DECEMBER 31, 1973[1]—*Continued*

Field and Pool	Oil Wells		Gas Wells	
	Capable	Operating	Capable	Operating
Buick Creek West—				
Dunlevy	2	—	9	5
Baldonnel	—	—	2	1
Halfway	—	—	1	—
Confidential	—	—	1	—
Field totals	2	—	13	6
Bulrush—Halfway	4	3	—	—
Bulrush East—Halfway	1	—	—	—
Cabin—Slave Point		—	5	—
Cache Creek—				
Coplin	—	—	2	—
Halfway	—	—	1	—
Field totals	—		3	—
Cecil Lake—				
Cecil	—	—	1	—
North Pine	2	2	3	—
Halfway	—	—	1	—
Field totals	2	2	5	—
Charlie Lake—Gething	1	—	—	—
Clarke Lake—Slave Point	—	—	39	26
Crush—Halfway	8	6	1	—
Currant—Halfway	5	3	5	—
Cypress—Baldonnel	—	—	3	—
Dahl—Bluesky	—	—	7	—
Dawson Creek—				
Dunvegan	—	—	1	—
Cadotte	—	—	1	—
Field totals	—	—	2	—
Eagle—				
Belloy	4	2	—	—
Confidential	1	1	—	—
Field totals	5	3	—	—
Elm—Halfway	1	—	1	—
Evergreen—Halfway	—	—	2	—
Farrell Creek—				
Charlie Lake	—	—	2	2
Halfway	—	—	3	1
Field totals	—	—	5	3
Fireweed—				
Bluesky	—	—	2	—
Dunlevy	—	—	7	—
Baldonnel	—	—	2	—
Debolt	—	—	3	—
Field totals	—	—	14	—
Flatrock—				
Siphon	—	—	1	—
Boundary Lake	1	1	1	—
Halfway	—	—	5	3
Field totals	1	1	7	3
Fort St. John—				
Dunlevy	—	—	2	—
Baldonnel	—	—	12	6
Pingel	4	2	1	—
Halfway	—	—	7	5
Belloy	1	—	2	2
Field totals	5	2	24	13
Fort St. John Southeast—				
Dunlevy	—	—	1	—
Baldonnel			2	2
Siphon		—	1	—
Pingel			1	—
Halfway	—	—	5	2
Belloy	—	—	5	1
Field totals			15	5

[1] Each zone of a multiple completion is counted as a well.

TABLE 23-NUMBER OF CAPABLE AND OPERATING WELLS AT DECEMBER 31, 1973[1]—*Continued*

Field and Pool	Oil Wells		Gas Wells	
	Capable	Operating	Capable	Operating
Grizzly—Dunlevy	—	—	2	1
Grizzly North—Dunlevy	—	—	1	—
Gundy Creek—				
Baldonnel	—	—	4	—
Blueberry	—	—	1	—
Field totals	—	—	5	—
Halfway—				
Baldonnel	—	—	2	—
Charlie Lake	1	—	1	—
Field totals	1	—	3	—
Helmet—Slave Point	—	—	2	—
Highway—				
Dunlevy	—	—	1	—
Baldonnel	—	—	4	—
Debolt	—	—	1	—
Field totals	—	—	6	—
Inga—				
Baldonnel	1	—	3	—
Inga	69	53	6	1
Field totals	70	53	9	1
Inga North—Inga	—	—	3	—
Jedney—				
Gething	—	—	1	—
Baldonnel	—	—	19	16
Halfway	—	—	22	18
Field totals	—	—	42	34
Jedney West—Halfway	—	—	1	—
Julienne Creek—				
Baldonnel	—	—	2	1
Halfway	—	—	2	2
Field totals	—	—	4	3
Kobes-Townsend—				
Dunlevy	—	—	3	2
Charlie Lake	—	—	6	3
Halfway	—	—	2	2
Debolt	—	—	2	1
Field totals	—	—	13	8
Kotcho Lake—Slave Point	—	—	12	6
Kotcho Lake East—Slave Point	—	—	3	—
LaGarde—				
Dunlevy	—	—	1	—
Boundary Lake	—	—	1	—
Field totals	—	—	2	—
Laprise Creek—Baldonnel	—	—	47	33
Laprise Creek West—Baldonnel	—	—	2	—
Louise—Slave Point	—	—	2	—
Milligan Creek—				
Gething	—	—	3	1
Halfway	25	17	1	—
Field totals	25	17	4	1
Moberly Lake—Charlie Lake	2	—	—	—
Montney—				
Gething	—	—	1	—
Cecil	—	—	1	—
Halfway	—	—	2	—
Field totals	—	—	4	—
Nettle—				
Gething	3	—	1	—
Halfway	—	—	1	—
Field totals	3	—	2	—

[1] Each zone of a multiple completion is counted as a well.

TABLE 23—NUMBER OF CAPABLE AND OPERATING WELLS AT DECEMBER 31, 1973[1]—*Continued*

Field and Pool	Oil Wells		Gas Wells	
	Capable	Operating	Capable	Operating
Nig Creek—Baldonnel	1	1	29	22
Nig Creek West—Baldonnel	—	—	2	—
North Pine—North Pine	—	—	2	1
Oak—				
Cecil	—	—	1	—
Halfway	—	—	5	—
Field totals	—	—	6	1
Osprey—Halfway	3	1	1	—
Parkland—				
Belloy	—	—	2	—
Wabamun	—	—	2	2
Field totals	—	—	4	2
Peejay—Halfway	101	75	4	—
Peejay West—Halfway	2	—	2	—
Peggo—Slave Point	—	—	2	—
Petitot River—Slave Point	—	—	3	—
Red Creek—				
North Pine	—	—	1	—
Halfway	—	—	1	—
Field totals	—	—	2	—
Redeye—Halfway	—	—	2	—
Rigel—				
Bluesky	—	—	3	1
Dunlevy	7	4	54	26
Field totals	7	4	57	27
Rigel East—				
Dunlevy	—	—	2	—
Halfway	—	—	1	—
Field totals	—	—	3	—
Shekilie—Slave Point	—	—	2	—
Sierra—Pine Point	—	—	2	2
Siphon—				
Dunlevy	—	—	5	5
Baldonnel	—	—	4	—
Siphon	—	—	5	2
Halfway	—	—	5	4
Field totals	—	—	19	11
Stoddart—				
Cecil	1	1	—	—
Belloy	4	4	16	14
Field totals	5	5	16	14
Stoddart West—Belloy	—	—	8	4
Sunrise—				
Paddy	—	—	2	—
Cadotte	—	—	10	1
Field totals	—	—	12	1
Thetlaandoa—Mississippian	—	—	2	—
Tsea—Slave Point	—	—	2	—
Two Rivers—				
Baldonnel	—	—	1	—
Siphon	—	—	1	1
Halfway	—	—	1	1
Field totals	—	—	3	2
Velma—				
Gething	—	—	3	—
"A" Marker	—	—	2	—
Field totals	—	—	5	—
Wargen—				
Gething	2	—	1	—
Field totals	2	—	1	—

[1] Each zone of a multiple completion is counted as a well.

TABLE 23—NUMBER OF CAPABLE AND OPERATING WELLS AT DECEMBER 31, 1973[1]—*Continued*

Field and Pool	Oil Wells		Gas Wells	
	Capable	Operating	Capable	Operating
Weasel—				
Baldonnel	—	—	1	1
Halfway	19	15	3	—
Field totals	19	15	4	1
Weasel West—				
Bluesky	—	—	1	—
Halfway	5	2	—	—
Field totals	5	2	1	—
Wilder—				
Halfway	—	—	2	2
Belloy	—	—	2	—
Field totals	—	—	4	2
Wildmint—				
Bluesky	—	—	1	1
Halfway	23	10	3	—
Field totals	23	10	4	1
Willow—				
Gething	1	1	1	—
Halfway	—	—	2	1
Field totals	1	1	3	1
Wolf—Halfway	4	4	1	—
Yoyo—				
Slave Point	—	—	1	—
Pine Point	—	—	14	10
Field totals	—	—	15	10
Other areas—				
Cadotte		—	2	—
Notikewin	—	—	1	—
Bluesky	2	—	11	—
Gething	—	—	3	—
Dunlevy	—	—	5	—
Baldonnel	—	—	26	—
Inga	—	—	1	—
Charlie Lake	—	—	1	—
Siphon	—	—	1	—
Coplin	1	—	4	1
Pingel	—	—	2	—
"A" Marker	—	—	1	—
Halfway	5	1	32	—
Permo Carboniferous	—	—	4	—
Belloy	1	—	5	—
Mississippian	—	—	1	—
Upper Kiskatinaw	—	—	2	—
Lower Kiskatinaw	—	—	1	—
Debolt	—	—	10	—
Banff	—	—	2	—
Jean Marie	—	—	1	—
Slave Point	—	—	24	1
Sulphur Point	—	—	3	—
Pine Point	—	—	5	—
Confidential	—	—	11	—
Area totals	9	1	159	2
Totals	693	542	858	325

[1] Each zone of a multiple completion is counted as a well.

TABLE 24—MONTHLY CRUDE-OIL PRODUCTION BY FIELDS AND POOLS, 1973

(Quantities in barrels.)

Field and Pool	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
Aitken Creek—													
Gething	31,187	33,668	35,992	35,270	36,061	34,260	29,603	30,945	34,358	33,715	31,425	33,706	400,190
Gething[1]	1,966	2,554	2,838	2,624	2,849	2,829	2,477	2,668	2,665	2,881	2,800	2,785	31,936
Field totals	33,153	36,222	38,830	37,894	38,910	37,089	32,080	33,613	37,023	36,596	34,225	36,491	432,126
Bear Flat—North Pine	3,814	2,837	3,880	165	2,400	4,138	3,676	3,451	3,385	3,583	3,441	3,469	38,239
Beatton River—Halfway[1]	30,098	29,694	30,080	28,394	33,130	29,282	26,969	31,001	30,800	29,291	29,876	32,645	361,260
Beatton River West—Bluesky	17,896	8,016	13,395	13,731	13,922	5,458	10,372	13,548	16,266	17,695	22,418	23,596	176,313
Beaverdam—Halfway[1]	71	8	123	85	82	53	76	75	82	44			699
Blueberry—													
Dunlevy[1]	23	18	21	23	22	24	22	14	20	22	37		246
Debolt	44,306	38,324	42,010	41,365	45,168	41,161	33,391	37,902	33,365	42,326	43,525	45,254	488,097
Field totals	44,329	38,342	42,031	41,388	45,190	41,185	33,413	37,916	33,385	42,348	43,562	45,254	488,343
Boundary Lake—													
Cecil	2,883	2,805	2,663	2,238	2,249	1,720	1,704	1,585	1,509	1,000	1,997	1,738	24,091
Boundary	772,548	686,140	757,434	712,712	735,193	707,657	718,780	723,207	688,874	700,088	663,905	677,726	8,544,264
Halfway	8,003	6,775	5,816	5,993	6,407	5,377	6,793	7,106	6,618	5,016	5,745	5,240	74,889
Field totals	783,434	695,720	765,913	720,943	743,849	714,754	727,277	731,898	697,001	706,104	671,647	684,704	8,643,244
Buick Creek—													
Dunlevy	593	512	526	184	359	395	384	471	262	497	335	375	4,893
Dunlevy[1]	1,207	1,432	1,460	124	362	480	872	980	1,404	1,146	1,221	1,373	12,061
Field totals	1,800	1,944	1,986	308	721	875	1,256	1,451	1,666	1,643	1,556	1,748	16,954
Bulrush—Halfway	3,868	2,086	3,541	3,769	4,796	3,863	3,873	2,195	2,601	4,480	3,028	4,261	42,361
Cecil Lake—Cecil	8,366	8,304	9,794	254	4,946	5,960	6,333	6,101	5,836	5,377	5,611	5,700	72,582
Crush—Halfway	28,241	30,825	33,427	31,850	32,033	28,023	27,159	29,488	31,158	29,067	30,592	27,840	359,703
Currant—Halfway	13,994	13,713	14,151	19,044	18,215	21,034	20,769	22,698	12,899	12,800	11,796	8,645	189,758
Eagle—													
Belloy								1,332	6,891	5,603	7,132	5,025	25,983
Confidential						4,217	4,276	7,317	7,575	7,862	7,106	8,646	46,999
Field totals						4,217	4,276	8,649	14,466	13,465	14,238	13,671	72,982
Flatrock—													
Boundary	604	503	616	52	712	582	529	474	426	538	350	182	5,568
Halfway	1,010	2,156	3,351		786	2,131	2,727	1,946	1,289	241			15,637
Field totals	1,614	2,659	3,967	52	1,498	2,713	3,256	2,420	1,715	779	350	182	21,205
Fort St. John—Pingel	5,361	6,088	6,668	4,973	4,952	5,394	4,935	4,835	5,455	6,052	5,502	5,521	65,736
Inga—Inga	308,505	280,562	309,105	240,265	261,068	256,689	260,976	229,363	235,692	237,906	235,030	232,106	3,087,267
Jedney—													
Baldonnel[1]	66	139	96	102	89	33			171	143	121	107	1,067
Halfway[1]	29	60	41	42	39	14			3	43	66	57	394
Field totals	95	199	137	144	128	47			174	186	187	164	1,461

Milligan—Halfway	182,775	173,904	189,844	174,324	186,067	185,350	186,712	178,574	167,318	169,544	151,888	169,634	2,115,934
Nig Creek—Baldonnel	844	813	842	638	646	786	753	750	708	728	708	723	8,939
Oak—Halfway[1]											402	527	929
Osprey—Halfway	4,523	3,188	2,129	4,016	2,010	1,715	1,781	1,615	1,743	3,223	3,957	2,784	32,684
Peejay—Halfway	277,199	254,139	276,199	280,138	279,140	257,099	257,847	260,505	251,119	246,048	233,241	245,474	3,118,148
Rigel—													
Dunlevy	5,399	4,222	5,176	497	2,437	3,005	4,352	4,457	4,229	4,432	3,348	5,691	47,245
Dunlevy[1]	43	32	33	3									111
Field totals	5,442	4,254	5,209	500	2,437	3,005	4,352	4,457	4,229	4,432	3,348	5,691	47,356
Siphon—													
Dunlevy[1]	511	433	498	542	496	473	414	465	376	308	167	72	4,755
Siphon[1]	262	347	790	333	409	347	326	94			34	35	2,977
Halfway[1]	2,158	1,647	1,405	391	938	1,529	1,273	1,161	1,176	1,027	1,641	1,681	16,027
Field totals	2,931	2,427	2,693	1,266	1,843	2,349	2,013	1,720	1,552	1,335	1,842	1,788	23,759
Stoddart—													
Cecil	459	1,223	702			91	323		604	354	343	337	4,436
Belloy	3,143	2,889	2,876	1,067	2,644	2,984	2,712	3,523	3,122	3,162	2,973	2,980	34,075
Field totals	3,602	4,212	3,578	1,067	2,644	3,075	3,035	3,523	3,726	3,516	3,316	3,317	38,511
Stoddart West—Belloy[1]	3,159	2,788	3,620	3,669	3,725	3,403	3,388	4,222	3,564	3,743	3,539	3,477	42,297
Two Rivers—Siphon[1]	800	594	672	648	565	585	628	478	532	628	621	597	7,348
Weasel—Halfway	75,514	78,788	92,507	85,828	65,000	82,802	92,101	72,709	85,669	90,454	99,573	98,217	1,019,162
Weasel West—Halfway	4,375	2,325	2,320	2,034	2,163	1,994	1,986	1,399	920	10,097	10,371	9,224	49,208
Wildmint—Halfway	62,083	50,415	66,440	61,122	62,359	56,948	56,154	55,961	52,461	54,551	46,972	46,368	671,834
Willow—													
Gething	2,004	1,886	2,140	2,008	2,032	1,887	1,883	1,757	1,903	2,486	1,713	1,665	23,364
Halfway[1]	241	237	233	241	217	135	215	125	215	191	190	218	2,458
Field totals	2,245	2,123	2,373	2,249	2,249	2,022	2,098	1,882	2,118	2,677	1,903	1,883	25,822
Wolf—Halfway	4,266	3,057	3,373	3,424	3,790	3,118	3,882	3,994	3,640	5,701	6,023	6,272	50,540
Other areas—													
Coplin	81	114	44										239
Coplin[1]									305	1,272	726	876	3,180
Halfway												248	248
Field totals	81	114	44						305	1,273	726	1,124	3,667
Totals—													
Crude	1,903,942	1,729,971	1,917,041	1,755,355	1,810,685	1,755,120	1,773,735	1,740,209	1,698,695	1,733,917	1,669,924	1,711,292	21,199,886
Field condensate	10,536	10,289	11,830	8,827	9,793	9,905	9,691	10,282	10,513	11,449	11,565	11,805	126,485
Total crude and equivalent	1,914,478	1,740,260	1,928,871	1,764,182	1,820,478	1,765,025	1,783,426	1,750,491	1,709,208	1,745,366	1,681,489	1,723,097	21,326,371

[1] Condensate.

TABLE 25—MONTHLY NATURAL GAS PRODUCTION BY FIELDS AND POOLS, 1973

(Volumes in MSCF at 14.65 psia and 60°F)

Field and Pool	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Aitken Creek—Gething	244,852	302,829	333,320	302,680	327,884	295,565	290,444	302,528	318,498	333,510	320,089	323,805	3,696,004
Beaverdam—Halfway	54,993	31,964	72,557	58,833	68,080	24,728	37,781	44,841	45,717	13,261			452,755
Beaver River—Nahanni	6,869,197	6,336,860	6,848,212	6,890,708	6,680,147	6,331,572	5,260,524	3,515,010	2,029,285	2,570,804	2,432,501	2,386,876	58,151,696
Beavertail—Gething	298,201	269,417	285,213	299,368	297,717	271,941	272,101	229,846	247,957	208,866	266,171	265,039	3,211,837
Beg—													
Baldonnel	295,199	298,709	324,848	322,225	270,582	266,633	288,611	273,036	219,238	272,515	331,910	313,138	3,476,644
Halfway	406,965	358,806	391,582	384,306	302,540	240,635	333,474	337,660	326,470	352,794	256,237	344,754	4,036,223
Field totals	702,164	657,515	716,430	706,531	573,122	507,268	622,085	610,696	545,708	625,309	588,147	657,892	7,512,867
Blueberry—													
Dunlevy	54,822	58,459	82,251	59,037	66,699	52,863	58,668	55,104	93,098	85,614	70,482	70,488	807,585
Halfway								56,911	44,291	61,081	2,363		164,646
Field totals	54,822	58,459	82,251	59,037	66,699	52,863	58,668	112,015	137,389	146,695	72,845	70,488	972,231
Blueberry West—Baldonnel	72,855	61,223	60,853	4,061	50,524	45,906	47,389	36,705	27,398	25,903	75,932	90,137	598,786
Boundary Lake—													
Bluesky	12,449	9686	12,462	4,888	1,371	4,922	8,096	7,227	1,012	3,470	5,713	4,150	75,446
Gething	17,646	16,243	50,353	12,533	12,177	22,367	54,104	70,088	23,618	54,818	64,094	55,671	439,712
Baldonnel	98,997	81,594	115,962	95,453	95,749	93,039	86,842	84,546	53,656	103,868	91,581	103,855	1,105,142
Basal Boundary	15,612	14,055	16,936	14,375	12,476	13,414	14,977	17,033	9,531	14,162	16,642	14,284	173,497
Field totals	144,704	121,578	195,713	127,249	121,773	133,742	164,019	178,894	87,817	176,318	178,030	177,960	1,807,797
Boundary Lake North—Halfway	3,894	39,297	31,027										74,218
Bubbles—Baldonnel	301,332	269,333	277,134	160,091	271,840	172,375	387,708	319,966	315,474	247,027	264,813	281,720	3,268,813
Buick Creek—													
Bluesky	77,162	71,490	79,034	62,288	62,556	41,548	13,022	9,828	43,490	66,036	57,761	69,925	654,140
Dunlevy	1,026,576	1,033,838	1,105,843	822,083	897,364	812,536	708,019	901,443	1,112,192	996,553	1,099,261	1,191,339	11,707,047
Field totals	1,103,738	1,105,328	1,184,877	884,371	959,920	854,084	721,041	911,271	1,155,682	1,062,589	1,157,022	1,261,264	12,361,187
Buick Creek North—													
Gething	25,882	21,645	22,112	19,768	20,569	24,057	8,841	15,274	17,951	21,045	23,664	23,954	244,762
Dunlevy	215,872	190,880	202,068	189,149	202,848	190,466	75,863	150,165	184,167	186,979	184,896	185,067	2,158,420
Field totals	241,754	212,525	224,180	208,917	223,417	214,523	84,704	165,439	202,118	208,024	208,560	209,021	2,403,182
Buick Creek West—													
Dunlevy	184,591	180,877	184,483	170,491	179,945	240,846	71,960	114,889	162,240	184,807	199,814	198,885	2,073,828
Baldonnel	9,912				21,173	15,901	4,681	13,656	10,797	11,254	10,084	8,853	106,311
Field totals	194,503	180,877	184,483	170,491	201,118	256,747	76,641	128,545	173,037	196,061	209,898	207,738	2,180,139
Clarke Lake—Slave Point	11,166,823	9,204,782	11,206,123	10,765,327	9,435,850	8,549,371	8,084,259	10,553,146	10,887,354	11,497,026	11,377,447	11,561,516	124,289,024
Farrell Creek—													
Charlie Lake	81,243	62,839	73,341	65,197	49,994	53,012	56,721	1,538	46,528	53,092	65,576	78,590	687,671
Halfway	42,299	35,688	33,948	53,368	27,365	10,874		44,849	43,527	41,303	38,707	37,573	409,501
Field totals	123,542	98,527	107,289	118,565	77,359	63,886	56,721	46,387	90,055	94,395	104,283	116,163	1,097,172

Fort St. John—													
Baldonnel	167,707	155,775	148,578	171,349	172,903	79,067	53,347	144,760	162,587	169,442	161,100	162,122	1,748,737
Halfway	103,781	94,861	94,404	85,321	89,232	67,819	71,551	75,340	74,533	80,914	91,980	98,665	1,028,401
Belloy	30,923	27,201	21,907	24,430	21,578	10,883	15,602	28,083	28,385	27,628	28,306	29,375	294,301
Field totals	302,411	277,837	264,889	281,100	283,713	157,769	140,500	248,183	265,505	277,984	281,386	290,162	3,071,439
Fort St. John Southeast—													
Baldonnel	54,294	14,546	52,549	48,868	21,669	18,616	50,666	53,481	50,539	55,976	53,053	54,885	529,142
Halfway	62,560	19,432	59,743	55,882	21,918	23,133	52,338	49,597	54,176	61,633	62,126	59,398	581,936
Belloy	98,701	26,068	92,831	112,576	45,223	34,553	94,171	78,692	83,562	121,086	103,150	104,917	995,530
Field totals	215,555	60,046	205,123	217,326	88,810	76,302	197,175	181,770	188,277	238,695	218,329	219,200	2,106,608
Grizzly—Dunlevy									10,087	46,888		68,034	125,009
Grizzly North—Dunlevy				21,283	61,556	1,239		8,923	71,061	79,355			243,417
Inga—Inga	350,972	314,858	353,077	358,835	333,293	309,920	343,891	398,785	405,448	360,474	373,034	420,160	4,320,747
Jedney—													
Baldonnel	764,086	698,358	732,541	748,389	796,903	630,920	632,867	336,965	587,955	761,168	703,042	684,862	8,078,056
Halfway	668,521	530,789	624,169	614,911	557,422	484,661	510,318	301,328	461,613	595,718	563,684	615,006	6,528,140
Field totals	1,432,607	1,229,147	1,356,710	1,363,300	1,354,325	1,115,581	1,143,185	638,293	1,049,568	1,356,886	1,266,726	1,299,868	14,606,196
Julienne Creek—													
Baldonnel	20,466	22,913	24,100	5,689	25,874	17,071	25,427	19,457	22,485	7,190	16,244	17,188	224,104
Halfway	93,285	77,641	82,409	78,023	81,846	72,460	73,755	68,018	66,646	65,130	67,592	66,685	893,490
Field totals	113,751	100,554	106,509	83,712	107,720	89,531	99,182	87,475	89,131	72,320	83,836	83,873	1,117,594
Kobes-Townsend—													
Dunlevy	27,403	22,167	25,553	25,520	29,975	27,726	25,334	16,460	21,856	20,723	20,588	21,055	284,360
Charlie Lake	44,804	41,333	46,286	46,842	50,553	40,064	209,929	47,041	40,107	45,244	50,998	48,635	711,836
Halfway	283,650	261,432	284,873	262,040	256,040	229,967	129,896	259,724	195,873	251,063	293,069	260,572	2,968,199
Debolt	83,720	75,007	83,674	81,184	82,493	79,610	82,377	76,478	70,985	71,358	78,564	76,284	941,734
Field totals	439,577	399,939	440,386	415,586	419,061	377,367	447,536	399,703	328,821	388,388	443,219	406,546	4,906,129
Kotcho Lake—Slave Point	452,812	571,958	527,446	843,149	1,065,426	183,785		231,190	519,993	705,274	721,825	669,333	6,492,191
Laprise Creek—Baldonnel	2,192,026	2,139,597	2,370,872	2,159,573	2,001,708	1,723,465	1,755,325	1,739,999	1,765,538	2,177,714	2,345,416	2,430,810	24,802,043
Milligan—Gething	2,497	1,064	674	630	386	247	816	1,410	2,270	139	1,494	5,507	17,134
Nig Creek—Baldonnel	1,285,849	1,089,774	1,167,592	1,155,588	1,243,349	1,116,355	996,993	1,183,704	1,225,584	1,225,553	1,189,662	1,290,424	14,170,427
North Pine—North Pine	31,885	27,861	34,267	40,517	27,197		13,097	4,499	36,546	39,367	39,822	38,902	333,960
Oak—Halfway											134,986	140,750	275,736
Parkland—Wabamun	400,803	357,093	395,359	391,830	367,252	257,628	366,064	424,511	405,982	420,959	402,243	407,073	4,596,797
Rigel—													
Bluesky	17,882	16,208	17,556	17,378	17,801	17,207	14,606	16,162	16,790	17,271	16,136	16,313	201,310
Dunlevy	2,010,461	1,782,133	1,789,628	1,879,197	1,867,013	1,811,832	1,670,723	1,628,194	1,722,358	1,844,267	1,755,850	1,808,010	21,569,666
Field totals	2,028,343	1,798,341	1,807,184	1,896,575	1,884,814	1,829,039	1,685,329	1,644,356	1,739,148	1,861,538	1,771,986	1,824,323	21,770,976
Sierra—Pine Point	1,809,867	1,589,891	1,708,751	1,806,742	1,685,506	1,271,753	1,870,216	2,022,965	2,226,323	2,206,842	2,209,763	2,268,066	22,676,685
Siphon—													
Dunlevy	799,504	764,878	811,896	763,895	724,247	723,035	746,554	703,810	754,194	760,976	694,482	735,342	8,982,813
Siphon	114,944	121,672	129,969	27,036	104,153	115,981	109,873	105,570	110,662	115,031	124,173	127,497	1,306,561
Halfway	317,745	284,354	320,445	143,466	213,572	274,217	257,970	226,476	215,201	244,394	263,729	264,789	3,026,358
Field totals	1,232,193	1,170,904	1,262,310	934,397	1,041,972	1,113,233	1,114,397	1,035,856	1,080,057	1,120,401	1,082,384	1,127,628	13,315,732

TABLE 25—MONTHLY NATURAL GAS PRODUCTION BY FIELDS AND POOLS, 1973—*Continued*
(Volumes *in* MSCF at 14.65 psia and 60°F)

Field and Pool	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Stoddart—Belloy	1,147,182	1,018,108	1,135,958	1,166,269	1,061,531	446,126	720,540	1,004,907	1,024,672	1,087,384	1,071,608	1,076,223	11,960,508
Stoddart West—													
Halfway	33,024	58,672	52,111	1,959	17,567	3,423	18,222						184,978
Belloy	279,827	283,074	382,834	300,201	308,307	219,432	190,198	281,233	283,287	287,445	322,962	317,524	3,456,324
Field totals	312,851	341,746	434,945	302,160	325,874	222,855	208,420	281,233	283,287	287,445	322,962	317,524	3,641,302
Sunrise—Cadotte	26,674	21,109	27,728	17,081	10,480		12,405	12,078	16,583	17,060	16,865	18,238	196,301
Two Rivers—													
Siphon	44,156	38,092	41,450	41,657	29,683	43,645	41,309	34,966	36,672	37,378	35,741	37,302	462,051
Halfway	194,634	173,293	186,474	176,614	68,443	65,132	112,641	175,852	181,833	183,632	174,354	185,795	1,878,697
Field totals	238,790	211,385	227,924	218,271	98,126	108,777	153,950	210,818	218,505	221,010	210,095	223,097	2,340,748
Wilder—Halfway	273,104	263,978	270,692	255,248	218,457	178,073	160,940	166,588	278,877	279,534	297,181	312,481	2,955,153
Wildmint—Gething	9,929	8,889	1,418	8,419	8,465	8,203	7,567	7,292	7,178	6,439	6,723	7,009	87,531
Willow—Halfway	188,581	186,829	191,786	177,630	170,991	88,421	151,864	92,162	155,212	157,705	138,780	126,339	1,826,300
Yoyo—Pine Point	6,550,715	5,681,955	5,014,541	5,111,748	5,234,209	4,683,130	5,267,441	6,645,620	6,068,451	7,319,827	7,028,735	7,383,836	71,990,208
Other areas—													
Coplin									234,426	719,581	579,721	318,136	1,851,864
Slave Point	207,377	275,405	265,696	307,392	47,713			291,791	312,865	342,984	314,305	308,004	2,673,532
Field totals	207,377	275,405	265,696	307,392	47,713			291,791	547,291	1,062,565	894,026	626,140	4,525,396
Totals	42,823,725	38,086,782	41,381,499	40,290,590	38,497,384	33,133,370	33,020,918	36,119,400	36,272,884	40,423,534	39,808,724	40,691,165	460,549,975

TABLE 26—SUMMARY OF DRILLING AND PRODUCTION STATISTICS, 1973

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Well authorizations—													
Issued	35	30	8	———	1	3	9	6	5	12	22	30	161
Cancelled	1	4	1	1	———	———	1	1	———	———	2	———	11
Wells spudded	45	33	18	———	———	3	7	5	5	12	4	23	165
Rigs operated (during month)	44	41	36	15	10	11	11	13	13	17	23	31	62[1]
Rigs operating (at month's end)	36	32	14	10	8	7	10	9	10	14	14	23	———
Development footage	35,571	69,296	62,059	11,204	———	———	8,650	17,703	13,658	20,865	35,305	34,768	309,079
Exploratory outpost footage	57,404	48,239	62,432	7,292	———	19,028	6,120	11,371	———	3,695	22,253	20,272	258,106
Exploratory wildcat footage	48,825	53,238	51,308	14,240	21,237	22,653	———	12,322	8,140	16,388	16,981	42,236	307,568
Total footage drilled	141,800	170,773	175,799	32,736	21,237	41,681	14,770	41,396	21,798	40,948	74,539	97,276	874,753
Wells abandoned	22	22	21	4	2	3	1	3	1	3	8	9	99
Service wells	———	2	1	———	———	———	———	———	———	1	———	———	4
Finished drilling wells	———	———	———	———	———	———	———	———	———	———	1	3	4
Oil wells completed	2	1	1	———	———	———	1	1	1	———	1	1	9
Producible oil wells	754	704	703	701	701	702	699	698	698	699	695	693	———
Producing oil wells	561	553	550	544	544	549	540	560	541	541	540	542	———
Production in barrels	1,903,589	1,729,971	1,920,087	1,755,652	1,810,665	1,755,386	1,773,742	1,737,541	1,698,952	1,733,997	1,658,884	1,711,292	21,189,758
Average daily production	61,406	61,785	61,938	58,522	58,409	58,513	57,217	56,050	56,632	55,935	55,294	55,203	58,075
Gas wells completed	10	13	15	1	———	1	1	4	3	3	4	2	58
Producible gas wells	819	823	834	846	853	853	853	852	852	855	816	858	———
Producing gas wells	315	322	324	323	322	309	303	318	330	330	326	325	———
Production in MSCF[2]	43,074,162	38,310,947	41,665,646	40,316,381	38,499,640	33,142,822	33,029,390	36,150,202	36,475,339	40,680,104	40,067,479	41,035,570	462,447,682
Average daily production	1,389,489	1,368,248	1,344,053	1,343,879	1,241,924	1,104,761	1,065,464	1,166,136	1,215,845	1,312,261	1,335,583	1,323,728	1,267,614

[1] Rigs operated during 1973.
[2] Nonassociated gas production only.
NOTE—Each zone of a mutliple completion is counted as one well.

TABLE 27—MONTHLY SUPPLY AND DISPOSITION OF CRUDE OIL/PENTANES PLUS. 1973

(Quantities in barrels.)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Available Supply													
British Columbia production—													
Crude	1,903,589	1,729,971	1,920,087	1,755,652	1,810,665	1,755,386	1,773,742	1,737,541	1,698,952	1,733,997	1,658,884	1,711,292	21,189,758
Field condensate	10,596	10,289	11,830	8,827	9,793	9,905	9,691	10,282	10,513	11,413	11,565	11,805	126,509
Plant condensate	92,269	91,234	106,711	105,453	99,431	84,321	87,859	82,637	81,784	99,293	97,051	104,658	1,132,701
Alberta imports—crude and equivalent	10,327,393	9,462,528	10,463,323	10,218,164	9,269,957	8,774,254	10,875,602	11,015,079	9,455,639	9,800,591	10,613,464	11,725,810	122,001,804
Totals	12,333,847	11,294,022	12,501,951	12,088,096	11,189,846	10,623,866	12,746,894	12,845,539	11,246,888	11,645,294	12,380,964	13,553,565	144,450,772
Disposition													
Inventory change—													
Field	2,700	3,240	—8,665	1,017	11,033	5,628	1,127	—10,974	2,140	—279	3,719	4,247	2,196
Plant	—959	9,867	16,043	9,055	—14,267	4,805	—12,111	341	—2,627	—6,854	9,932	—2,190	11,035
British Columbia transporters	103,382	—211,591	—20,595	220,423	215,174	—713,946	—92,800	367,357	—298,563	272,709	—293,709	—59,032	—511,191
Miscellaneous—													
Pipe-line use	4,453	5,844	8,681	49,672	8,262	4,245	8,415	—5,154	9,631	10,338	52,052	14,052	170,491
Field losses and adjustments	—1,673	—6,345	—249	4,365	3,650	—434	469	60	—293	27	238	—7,587	—7,772
Plant losses and adjustments	—7,228	4,003	2,685	6,042	12,776	6,081	4,801	3,233	3,724	8,742	4,473	5,427	54,759
Transporters' losses and adjustments	28,817	7,377	16,717	—4,572	17,543	31,871	—3,045	—12,274	26,519	—11,904	—26,006	—17,694	53,349
Deliveries—													
To British Columbia refineries—													
British Columbia crude	1,727,363	1,865,270	2,015,561	2,011,640	1,931,620	2,273,917	1,973,713	1,874,341	1,602,251	2,087,317	1,777,623	1,808,428	22,949,044
Alberta crude	2,660,257	2,346,442	2,250,902	1,679,969	1,282,305	1,901,754	2,524,876	2,534,094	2,449,457	2,164,441	2,801,062	2,984,014	27,579,573
British Columbia condensate	63,260	44,917	25,641	49,908	45,122	46,635	53,032	38,621	75,590	64,557	38,962	55,551	601,796
Power generation in British Columbia									88,920				88,920
To Eastern Canada—													
British Columbia crude											7,165		7,165
Alberta crude											407,460	2,731,627	3,139,087
Export to United States—													
British Columbia crude	141,483	102,895	64,065	48,726	151,704	63,260	30,991	30,770	66,672	34,091	49,650	33,125	817,432
Alberta crude	7,527,950	7,135,801	8,240,678	8,057,749	7,723,324	6,947,250	8,213,211	8,132,001	7,260,499	6,806,513	7,173,099	5,709,602	88,927,677
British Columbia condensate	30,082	26,006	55,313	48,303	36,029	20,570	37,028	35,004		27,062	50,918	43,110	409,433
Field sales	3,053	737	150	50	52,818	26,800	42,137	40,442	5,097	32,848	43,684	45,933	293,749
Reporting adjustments	50,907	—40,441	—164,976	—95,151	—264,281	5,525	—34,950	—191,755	—42,129	155,686	280,642	204,952	—135,971
Totals	12,333,847	11,294,022	12,501,951	12,088,096	11,189,846	10,623,866	12,746,894	12,845,539	11,246,888	11,645,294	12,380,964	13,553,565	144,450,772

British Columbia Refineries													
Receipts—													
British Columbia crude	1,727,363	1,865,270	2,015,561	2,011,640	1,931,620	2,273,917	1,973,713	1,874,341	1,744,555	2,073,258	1,759,572	1,804,779	23,055,589
Alberta crude	2,660,257	2,346,442	2,250,902	1,679,969	1,282,305	1,901,754	2,524,876	2,534,094	2,549,192	2,232,830	2,851,184	3,057,251	27,871,056
British Columbia condensate	63,260	44,917	25,641	52,920	48,104	46,635	59,043	41,624	78,594	64,557	38,962	55,551	619,808
Alberta condensate	8,463	1,493	488	2,448	5,833	5,343	7,941	1,938	5,022	4,090	6,679	1,994	51,732
Alberta butane	14,609	11,380	7,393	3,232					2,850	10,714	15,479		65,657
Totals	4,473,952	4,269,502	4,299,985	3,750,209	3,267,862	4,227,649	4,565,573	4,451,997	4,380,213	4,385,449	4,671,876	4,919,575	51,663,842
Disposition													
Inventory changes	—50,484	215,154	3,928	—48,151	—13,626	—176,896	—1,384	—24,176	—34,271	—119,156	153,902	89,287	—5,873
Losses and adjustments	367	—814	—553	—141	—2,524	66	576	873	211,598	981	—404	—1,372	208,653
Refinery runs—													
British Columbia crude	1,773,002	1,628,579	2,088,460	1,989,512	1,845,079	2,500,491	2,008,609	1,839,186	1,640,397	2,042,215	1,837,920	1,747,679	22,941,129
Alberta crude	2,668,878	2,366,969	2,172,161	1,751,428	1,384,713	1,853,353	2,491,342	2,586,904	2,475,023	2,380,671	2,620,552	3,027,853	27,779,847
British Columbia condensate	63,260	44,917	25,641	49,908	45,122	46,635	59,043	41,624	75,590	64,557	38,962	55,551	610,810
Alberta condensate	4,320	3,317	2,955	4,421	9,098	4,000	7,387	7,586	9,026	5,467	5,465	577	63,619
Alberta butane	14,609	11,380	7,393	3,232					2,850	10,714	15,479		65,657
Total refinery runs	4,524,069	4,055,162	4,296,610	3,798,501	3,284,012	4,404,479	4,566,381	4,475,300	4,202,886	4,503,624	4,518,378	4,831,660	51,461,062

TABLE 28—MONTHLY SUPPLY AND DISPOSITION OF NATURAL GAS, 1973

(Volumes in MSCF at 14.65 psia and 60°F)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Available Supply													
British Columbia production—													
Wet gas	16,854,431	14,701,065	15,965,214	14,518,119	14,738,479	11,865,583	12,445,659	12,757,760	14,337,951	18,166,214	15,907,300	16,358,870	178,616,645
Dry gas	26,219,731	23,609,882	25,700,432	25,798,262	23,761,161	21,277,239	20,583,731	23,392,442	22,137,388	22,513,890	24,160,179	24,676,700	283,831,037
Associated gas	1,750,261	1,528,929	1,814,643	1,520,703	1,631,281	1,615,737	1,720,841	1,604,877	1,552,617	1,582,692	1,545,189	1,562,877	19,430,647
Less injected	314,911	312,258	386,843	355,233	410,438	370,067	363,450	318,046	340,585	427,054	371,062	416,480	4,386,427
Net British Columbia production	44,509,512	39,527,618	43,093,446	41,481,851	39,720,483	34,388,492	34,386,781	37,437,033	37,687,371	41,835,742	41,241,606	42,181,967	477,491,902
Imports—													
Alberta	41,914,805	37,986,240	41,820,223	39,479,060	38,556,032	36,514,160	36,892,061	38,516,101	37,434,044	40,841,242	39,099,365	41,687,669	470,741,002
Yukon													
Northwest Territories	3,385,193	2,914,165	3,218,762	3,065,487	3,138,065	2,916,034	2,945,774	2,640,494	2,417,074	2,835,326	2,758,908	2,822,762	35,058,044
Totals	89,809,510	80,428,023	88,132,431	84,026,398	81,414,580	73,818,686	74,224,616	78,593,628	77,538,489	85,512,310	83,099,879	86,692,398	983,290,948
Disposition													
Flared—													
Field	470,572	390,295	518,976	428,501	422,993	419,292	457,532	456,551	445,040	523,642	621,200	536,372	5,690,966
Plant—													
Residual gas	2,147	4,583	8,182	43,793	82,011	3,700		2,500					146,916
Natural gas	256	837		56	3,542	80,709	62,809	177,711	117,837	14,729	17,159	5,166	480,811
Gas-gathering systems	3,274	2,875	41,379	2,099	1,489	1,481			2,383	2,293	1,729	886	59,888
Fuel—													
Lease	258,896	250,583	291,080	269,174	318,367	254,040	246,483	237,615	337,924	352,204	283,195	256,071	3,355,632
Plant	1,595,169	1,555,876	1,641,963	1,575,818	1,491,927	1,372,187	1,583,163	1,391,166	1,390,044	1,586,514	1,683,198	1,703,889	18,565,114
Transporters	3,318,331	2,803,695	3,171,738	3,112,235	2,673,917	2,143,918	2,163,781	2,499,983	2,329,953	2,756,851	2,515,170	2,509,440	31,999,012
Line-pack changes—transporters	120,043	—34,522	21,356	26,313	137,060	117,267	—46,181	—225,747	326,605	57,077	48,881	98,720	646,872
Losses and metering difference—													
Field	884,866	460,380	319,926	37,352	419,345	—155,198	260,281	541,066	687,237	93,965	111,606	387,906	4,048,732
Gas gathering systems	14,660	3,705	—6,752	5,036	—1,857	6,418	—4,708	—20,282	6,819	—271	188	1,309	4,265
Gas plants	335,918	1,107,861	325,448	298,337	469,817	614,348	641,707	478,281	971,522	604,563	510,120	564,020	6,921,942
Transporters	116,124	110,699	273,235	2,930	104,033	85,520	249,655	289	53,560	75,764	90,628	—19,926	1,142,511
Processing shrinkage	4,419,855	3,942,613	4,237,861	4,186,951	3,911,441	3,508,978	3,484,558	3,898,605	3,798,499	4,220,987	4,312,846	4,397,705	48,320,899
Deliveries—													
British Columbia distributors—													
Northern	1,413,848	1,399,557	1,379,409	1,288,776	1,242,313	1,173,400	642,572	980,222	1,128,847	1,229,587	1,562,266	1,585,945	15,026,742
Interior	4,542,594	3,888,476	3,903,040	3,286,060	3,178,861	2,980,015	2,576,973	2,579,571	2,248,220	3,623,406	4,365,349	4,535,092	41,707,657
Lower Mainland	8,204,993	7,258,764	7,920,062	7,861,854	8,045,654	7,746,851	7,495,417	7,564,488	7,690,088	8,037,455	9,504,287	9,279,776	96,609,689
Export—													
British Columbia natural gas	24,257,338	21,779,861	24,621,184	24,110,642	22,696,919	18,647,670	19,212,136	21,221,474	19,881,600	23,620,540	20,995,108	21,115,749	262,160,221
Alberta natural gas	39,385,973	35,954,049	39,446,492	37,440,664	36,606,223	34,882,039	35,186,898	36,898,519	35,775,858	38,795,245	36,851,630	39,793,284	447,016,874
Reporting adjustments	464,653	—452,164	17,852	55,607	—389,475	—63,949	11,540	—88,384	346,453	—82,241	—367,681	—59,006	—606,795
Totals	89,809,510	80,428,023	88,132,431	84,026,398	81,414,580	73,818,686	74,224,616	78,593,628	77,538,489	85,512,310	83,099,879	86,692,398	983,290,148

Receipts—													
Natural gas	14,155,513	12,562,903	13,199,260	12,434,203	12,490,022	11,786,611	10,714,897	11,123,932	11,518,297	12,890,691	15,433,019	15,385,444	153,694,792
Gas from storage	95,481						8,110	7	8,181			3,911	115,690
L.P. gas	127,000	100,575	99,253	81,256	62,954	60,463	55,013	62,661	56,299	80,239	107,264	108,711	1,001,688
Disposition—													
Gas used in operations	46,209	35,641	41,731	51,310	7,498	9,285	5,688	22,368	24,002	34,448	36,546	53,603	368,329
Losses and adjustments	1,003,721	—1,505,352	—595,844	—928,265	—1,370,245	—569,758	—518,219	386,344	599,148	2,175,594	3,067,120	1,205,518	2,949,762
Line-pack changes	—14,836	—25,192	25,462	—6,665	8,091	4,808	—43,794	10,187	29,570	—45,868	19,108	55,123	15,994
Gas to storage		33,857	99,438	101,024	94,007	92,383				23,973	248		444,930
Sales—													
Residential	5,036,976	5,031,285	4,144,485	3,376,735	2,633,562	1,899,373	1,323,657	1,006,505	1,073,274	1,667,948	3,035,715	4,172,061	34,401,576
Commercial	3,593,706	3,624,868	3,278,571	2,409,024	2,356,125	1,436,486	1,291,421	1,004,161	1,225,679	1,561,029	2,674,423	3,216,742	27,672,235
Industrial	4,575,359	5,185,943	5,630,345	5,187,070	5,342,134	5,211,156	4,386,152	4,701,252	4,624,793	5,620,946	5,467,690	5,821,995	61,754,835
Electric power	136,859	282,428	674,325	2,325,226	3,481,804	3,763,341	4,333,115	4,055,783	4,006,311	1,932,860	1,239,433	973,024	27,204,509
Total sales	13,342,900	14,124,524	13,727,726	13,298,055	13,813,625	12,310,356	11,334,345	10,767,701	10,930,057	10,782,783	12,417,261	14,183,822	151,033,155
Value to distributors	9,949,590	10,426,736	10,058,289	8,293,618	7,108,576	6,654,629	6,048,016	5,764,312	5,953,181	8,197,808	9,007,340	11,551,080	99,013,175

TABLE 29—MONTHLY PRODUCTION AND DISPOSITION OF BUTANE, PROPANE, AND SULPHUR, 1973

(Quantities in barrels of 34.9722 Canadian gallons at 60°F)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Butane													
Production (bbl.)—													
Plant	50,538	53,802	63,814	58,750	64,130	61,672	57,613	42,790	58,154	59,201	55,074	60,398	685,936
Refinery	41,453	33,975	34,362	37,221	30,820	44,250	48,491	37,368	21,444	29,977	36,911	33,598	429,870
Opening inventory	12,509	14,483	14,070	18,653	18,229	12,972	12,474	14,799	15,034	10,290	10,759	13,949	168,221
Gasoline enrichment	19,950	19,105	17,112	10,699	11,169	11,064	8,882	5,155	9,969	28,595	22,720	22,136	186,556
Plant fuel	7,383	———	3,909	22,983	3,336	———	———	———	———	———	———	———	37,611
Losses and adjustments	———	———	———	748	———	———	1,875	2,201	325	4,980	2,320	2,895	13,848
Sales—													
British Columbia	60,556	66,957	70,763	62,443	84,511	93,772	92,278	72,567	74,048	55,134	63,755	64,876	861,660
Alberta	———	———	———	———	———	———	744	———	———	———	———	———	744
Export—U.S.A.	2,128	2,128	1,809	1,018	1,191	1,584	———	———	———	———	———	———	9,858
Total sales	62,684	64,585	72,572	63,461	85,702	95,356	93,022	72,567	74,048	55,134	63,755	64,876	867,762
Closing inventory	14,483	14,070	18,653	18,229	12,972	12,474	14,799	15,034	10,290	10,759	13,949	18,038	173,750
Propane													
Production (bbl.)—													
Plant	55,494	49,545	57,257	50,324	58,568	51,027	52,194	46,490	49,730	45,186	55,679	52,372	623,866
Refinery	46,000	42,387	44,521	44,372	32,393	35,233	43,714	43,013	38,733	46,507	45,407	39,884	502,164
Opening inventory	15,115	13,505	13,468	15,157	14,733	9,404	11,559	9,318	12,601	10,060	8,246	8,973	142,139
Plant fuel	———	280	1,476	272	———	———	———	———	———	———	———	———	2,028
Losses and adjustments	———	———	1	301	3	2	3	14	3	5,380	2	2	5,711
Sales—													
British Columbia	103,104	91,689	98,612	94,547	96,287	84,103	98,146	86,206	91,001	88,127	100,357	89,188	1,121,367
Export—													
Northwest Territories	———			———	———	———	———	———	———	———	———	———	
U.S.A.	———			———	———	———	———	———	———	———	———	———	
Offshore	———	———	———	———	———	———	———	———	———	———	———	———	———
Total sales	103,104	91,689	98,612	94,547	96,287	84,103	98,146	86,206	91,001	88,127	100,357	89,188	1,121,367
Closing inventory	13,505	13,468	15,157	14,733	9,404	11,559	9,318	12,601	10,060	8,246	8,973	12,039	139,063
Sulphur													
Production (long tons)	7,219	6,473	7,284	6,342	4,741	4,767	5,216	5,368	5,642	6,689	6,275	6,791	72,807
Opening inventory	95,105	101,297	105,804	111,257	108,117	106,047	103,440	103,408	106,618	107,953	109,268	111,134	269,448
Losses and adjustments	———	———	———	———	———	———	———	———	———	———	———	———	———
Sales—													
British Columbia	———	———	———	5,876	3,857	3,605	2,334	1,798	2,157	2,046	2,800	2,772	27,245
Export	1,027	1,966	1,831	3,606	2,954	3,769	2,914	360	2,150	3,328	1,609	1,388	26,902
Total sales	1,027	1,966	1,831	9,482	6,811	7,374	5,248	2,158	4,307	5,374	4,409	4,160	54,147
Closing inventory	101,297	105,804	111,257	108,117	106,047	103,440	103,408	106,618	107,953	109,268	111,134	113,765	1,288,108

TABLE 30—MONTHLY GROSS VALUES TO PRODUCERS OF CRUDE OIL, NATURAL GAS, NATURAL GAS LIQUIDS, AND SULPHUR, 1973

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	$	$	$	$	$	$	$	$	$	$	$	$	$
Crude oil	5,497,897	4,970,523	5,686,411	5,156,623	5,826,212	5,609,799	5,672,242	6,180,167	6,074,301	6,195,217	5,964,129	6,153,671	68,987,192
Natural gas	4,221,225	3,811,197	4,243,462	4,115,738	3,914,756	3,385,894	3,347,687	3,654,368	3,627,467	4,153,630	4,078,132	4,135,356	46,688,912
Products—													
Natural gas liquids[1]	57,608	46,314	55,667	54,050	52,389	51,008	51,517	51,667	46,434	49,218	52,624	60,006	628,502
Sulphur													
Total products	57,608	46,314	55,667	54,050	52,389	51,008	51,517	51,667	46,434	49,218	52,624	60,006	628,502
Total value	9,776,730	8,828,034	9,985,540	9,326,411	9,793,357	9,046,701	9,071,446	9,886,202	9,748,202	10,398,065	10,094,885	10,349,033	116,304,606

[1] Includes condensate, pentanes plus, propane, and butane, but does not include petroleum from Boundary Lake Gas Conservation Plant, which is included under crude oil sales values.

NOTE—This statement includes amendments received up to March 5, 1974.

TABLE 31—CRUDE-OIL PIPE-LINES, 1973

Company	Fields Served	Size and Mileage of Main and Lateral Lines		Pumping-stations		Present Capacity (Bbl./Day)	Gathering Mileage	Throughput (Bbl./Day)	Storage Capacity (Bbl.)
		Size (In.)	Mileage	Number	Capacity (Bbl./Day)				
Blueberry-Taylor Pipeline Co.	Aitken Creek, Blueberry	12¾	2.2	...	...	...	...	...	...
		8⅝	62.8	1	5,000	12,000	37.4	2,539	65,000
	Fort St. John	...	...	...	...	...	...	180	...
	Inga	6⅝	1.7	1	12,500	12,500	...	8,450	1,000
	Stoddart	...	...	...	...	...	...	116	...
Trans-Prairie Pipelines (B.C.) Ltd.	Beatton River, Beatton River West, Boundary Lake, Bulrush, Currant, Milligan Creek, Osprey, Peejay, Weasel, Wildmint, Willow, Wolf	4½	45.6	1	36,000	52,000[1]	84.6	58,060	160,000
		6⅝	24.3	2	45,000	45,000[2]	...	...	...
		8⅝	103.0			...	...	...	...
		12¾	39.0			...	...	...	...
Tenneco Oil & Minerals Ltd.	Inga	6⅝	3.2	...	...	...	...	...	...
		4½	8.7	1	10,000	10,000	13.9	4,000	...
		3½	2.0	1	1,600	...	...	...	...
Westcoast Petroleum Ltd.		12	505.0	12	70,000	70,000	...	54,625	586,000

[1] Boundary Lake.
[2] Terminal to Westcoast Petroleum Ltd.

TABLE 32—CRUDE-OIL REFINERIES, 1973

Name	Location	Type	Year of First Operation	Source of Crude	Crude-oil Capacity (Bbl. per Calendar Day)	Storage Capacity (Bbl.)	Cracking-plant Units	Cracking Capacity (Bbl. per Calendar Day)	Other Units
Chevron Canada Ltd.	North Burnaby	Comp.	1936	B.C. and Alberta	20,000	1,613,200	Catalytic-fluid	8,100	Catalytic polymerization, catalytic reformer, lube-oil blending plant, asphalt.
Gulf Oil Canada Limited	Kamloops	Comp.	1954	B.C.	5,900	650,000	Catalytic-fluid	1,900	Catalytic polymerization, catalytic reformer, distillate, desulphurization, merox.
Gulf Oil Canada Limited	Port Moody	Comp.	1958	B.C. and Alberta	30,000	1,625,000	Catalytic-fluid	8,480	Catalytic reformer, distillate, desulphurization, alkylation-sulphuric acid, naphtha, merox.
Imperial Oil Enterprises Ltd.	Ioco	SCA	1915	B.C. and Alberta	36,800	3,025,000	Catalytic-fluid	11,700	Catalytic polymerization, powerformer, toluene extraction, LPG plant.
Pacific Petroleums Ltd.	Taylor	Comp.	1960	B.C.	12,200	1,010,000	FCCU	4,400	H.F. alkylation, asphalt, pentane splitter, platformer, unifiner, HDS unit, DDS unit.
Shell Canada Limited	Shellburn	Comp.	1932	B.C. and Alberta	22,000	2,455,300	Catalytic-fluid	6,000	Catalytic polymerization, platformer, vacuum flashing, solvent fractionation, distillate hydrotreater, sulphur recovery.
Union Oil Company of Canada Limited	Prince George	SA	1967	B.C.	8,000	630,500		—	Unifiner, reformer, asphalt.

Symbols: SCA—skimming, cracking, asphalt; Comp.—complete.

TABLE 33—NATURAL GAS PIPE-LINES, 1973

Company	Source of Natural Gas	Transmission-lines		Compressor Stations		Present Daily Capacity (MSCF)	Gathering and Distribution Lines		Areas Served by Distributors
		Size (In.)	Mileage	Number	Horse-power		Size (In.)	Mileage	
British Columbia Hydro and Power Authority	Westcoast Transmission Co. Ltd.	30	38.9			513,600		,894.5	
		24	12.2						
		20	44.1						Lower Mainland of British Columbia.
		18	37.3						
		16	17.6						
		12	81.0						
Columbia Natural Gas Ltd.	Alberta and Southern Gas Co. Ltd.	8	56.1			85,500	8	1.7	Cranbrook, Fernie, Kimberley, Creston, Sparwood, Elk Valley, Skookumchuck, Elko, Elkford, and Yahk.
	Westcoast Transmission Co. Ltd.	6	70.4				6	3.3	
		4	22.8				4	9.2	
		3	27.6				3	19.9	
		2	0.5				2	38.4	
							1¼	50.8	
Gas Trunk Line of British Columbia	Beg field	—	—	1	1,000		16	27.4	To Westcoast Transmission Co. Ltd.
		—	—				6⅝	5.9	
	Boundary Lake field	—	—				16	31.4	
		—	—				6⅝	2.9	
	Jedney and Bubbles field	—	—	4	4,960		12¾	31.5	
		—	—				10¾	7.0	
	Laprise Creek field	—	—	1	2,160		12¾	23.8	
	Nig Creek field	—	—	1	1,800		16	28.3	
Inland Natural Gas Co. Ltd.	Westcoast Transmission Co. Ltd.	12	254.3	1	2,200	120,000	8	12.4	Mackenzie, Hudson Hope, Chetwynd, Prince George, Cariboo, North Okanagan, Okanagan, and West Kootenay areas.
		10	119.1	1	2,200		6	27.1	
		8	25.7				4	148.3	
		6	99.9				3	84.5	
		4	140.7				2	513.7	
		3	67.0				1½	20.7	
		2	69.2				1¼	158.2	
		1¼	3.5						
Northland Utilities (B.C.) Ltd.	Peace River Transmission Co. Ltd.	3	2.0			10,900	10	0.4	Dawson Creek, Pouce Coupe, and Rolla.
		2	0.4				8	1.6	
		1¼	3.2				6	2.7	
		—	—				4	12.1	
		—	—				3	5.4	
		—	—				2	24.8	
							1¼	15.9	
							¾	0.6	
Pacific Northern Gas Ltd.	Westcoast Transmission Co. Ltd.	10¾	274.4	2	3,150	54,000	6	2.5	Vanderhoof, Fraser Lake, Burns Lake, Smithers, Terrace, Prince Rupert, Kitimat, Houston, Fort St. James.
		8⅝	92.4				4	10.3	
		6⅝	36.0				3	17.1	
		4½	14.0				2	41.1	
		3½	43.7				1¼	30.8	
		2⅞	17.8				¾	20.6	
		2¾	22.6				½	0.1	
		1⅜	3.6	—					

Plains Western Gas & Electric Co. Ltd.	Westcoast Transmission Co. Ltd.	6	0.3				4	13.9	ort St. John, Taylor, Grandhaven, Charlie Lake, Airport.
		4	20.7				3	2.0	
		3	5.7				2½	1.5	
		2	2.0				2	42.0	
							1½	1.9	
							1¼	0.1	
							1	7.9	
							¾	2.2	
Union Oil Company of Canada	Milligan-Peejay system					55,000	10¾	22.1	o Westcoast Transmission Co. Ltd.
						39,300	8⅝	13.6	
						17,400	6⅝	7.1	
Westcoast Transmission Co. Ltd.	Alberta	26	32.5			215,000			
	Taylor-Willow Flats	30	76.6						
	Willow Flats-Huntingdon	30	570.3	13	63,640	1,360,000			
		36	462.1						
	Alaska Highway system		422.1				26	37.5	
							20	18.1	
							18	17.9	
							12¾	9.9	
	Beaver River	24	110.9			270,000			
	Blueberry West field						8⅝	6.7	
	Boundary Lake field						16	0.5	
	Bubbles field			1	660				
	Buick Creek field						10¾	5.6	
	Buick Creek East field						8⅝	6.6	
	Buick Creek West field			1	1,980		20	16.2	
	Clarke Lake field						16	8.2	
	Dawson Creek field						8⅝	5.4	
	Fort St. John field			1	1,980		18	7.8	
							10¾	0.9	
							8⅝	0.7	
	Fort St. John Southeast field		7.0				12¾	4.0	
	Fort Nelson plant	30	220.8	4	93,400	858,000			
	Chetwynd	36	44.5						
	Gundy Creek field						10¾	6.1	
	Kobes-Townsend field			1	6,000		12¾	18.9	
							8⅝	5.5	
	Kotcho Lake field						12	10.0	
	Laprise Creek field			1	3,160				
	Milligan-Peejay system						12	32.2	
	Montney field						4½	7.4	
	Parkland field						8⅝	6.6	
	Red Creek field			1	230		4½	2.9	
	Rigel field			1	6,800		12¾	9.6	
				1	1,400		10¾	10.3	
	Sierra field						12	6.8	
	Stoddart field			1	1,400		8⅝	6.3	

TABLE 34—GAS-PROCESSING PLANTS, 1973

Operator	Location	Fields Served	Plant Type	Year of First Operation	Plant Capacity MSCF/Day		Natural Gas	Residual Gas to—
					In	Out		
Amoco Canada Petroleum Company Limited	Units 68, 69, Block J, N.T.S. Map 94-N-16	Beaver River	Dehydration	1971	247	239.5		Westcoast Transmission Co. Ltd.
Imperial Oil Limited	SE. ¼ Sec. 2, Tp. 85, R. 14, W6M	Boundary Lake	Inlet separator, M.E.A. absorption treating, glycol absorption dehydration, combined refrigeration and oil absorption natural gas liquid recovery, distillation	1964	21	17	Pentanes plus, propane, butane	Westcoast Transmission Co. Ltd.
Mobil Oil of Canada Ltd.	Unit 91, Block D, N.T.S. Map 94-I-14	Sierra	Inlet separator, dry desiccant dehydration	1969	63.5	63		Westcoast Transmission Co. Ltd.
Pacific Petroleums Ltd.	Sec. 36, Tp. 82, R.18, W6M	All British Columbia producing gasfields except Parkland, Dawson Creek, Boundary Lake, Sierra, Clarke Lake, Yoyo, and Beaver River.	Inlet separator, M.E.A. treating dry desiccant, dehydration oil absorption, distillation	1957	500	460	Condensate, pentanes plus	Westcoast Transmission Co. Ltd.
Westcoast Transmission Co. Ltd.	NW. ¼ Sec. 10, Tp. 85, R. 14, W6M	Boundary Lake	M.E.A. absorption, dehydration	1961	9.4	8.9	Condensate	Westcoast Transmission Co. Ltd.
Westcoast Transmission Co. Ltd.	Unit 85, Block G, N.T.S. Map 94-J-10	Beaver River, Clarke Lake, Yoyo	Potassium carbonate, M.E.A. D.E.A. absorption, dehydration	1965	1,000	900		Westcoast Transmission Co. Ltd.

TABLE 35—SULPHUR PLANTS, 1973

Name	Location	Raw Material	Principal Product	Year of First Operation	Capacity (Long Tons per Day)
Canadian Occidental Petroleum Ltd.	Taylor	Hydrogen sulphide	Sulphur	1957	300

Inspection of Mines

CHAPTER 5

By J. W. Peek, Chief Inspector of Mines

CONTENTS

LIST OF DRAWINGS

COAL MINES REGULATION ACT

The *Coal* Mines *Regulation* Act was extensively amended in 1973 during the second session of the Legislature. The intent of the amendments was mainly to improve the regulation of the use of cranes, vehicles, diesel equipment, and of *technological* developments in open-pit mining. There were also some amendments to the regulations to improve clearances and controls on haulage and conveyerways underground. Finally, there were a series of amendments recognizing safety committees and unions and making it possible for Organized workers to take a more active part in safety programmes.

MINES REGULATION ACT

Extensive amendments were made to the Mines *Regulation Act* during the second legislative session. The major intent of the amendments was to keep safety legislation abreast of recent mining technological developments, particularly in areas of new types of explosives, hoisting, and self-propelled vehicles in use both

underground and on the surface. Amendments were. also made to make it possible for organized labour to take a more active part in safety programmes at mines and to give recognition to the workman category of miner.

FATAL ACCIDENTS

Seven fatal accidents occurred to persons employed at seven different mining operations. Of these seven accidents, one occurred at a coal-mining operation, two in connection with surface exploration, and the remaining four at metal-mining operations. Only one of the accidents happened underground and five involved the use of mobile equipment.

The following table shows the mines at which fatal accidents occurred in 1973, with comparative figures for 1972:

Company	Location	Number of Fatal Accidents	
		1973	1972
Baroid of Canada Ltd.	Spillimacheen	—	1
Brenda Mines Ltd.	Peachland	1	—
Cominco Ltd.	Kimberley	—	1
Giant Mascot Mines Limited	Choate	1	5
Giant Metallics Mines Limited	Sandon	—	1
Granduc Operating Company	Stewart	—	3
Granges Exploration Aktiebolag	50 miles southwest of Houston	1	—
Granisle Copper Limited	Granisle	1	—
Haste Mine Development Ltd.	Stewart	—	1
Kaiser Resources Ltd.—			
Balmer Hydraulic	Michel	—	1
Balmer North	Michel	—	1
Harmer Pit	Harmer Ridge	1	—
KRC Operators Ltd.	Revelstoke	—	1
Noranda Exploration Company, Limited	Nanika River	1	—
Similkameen Mining Company Limited	Princeton	1	—
Utah Mines Ltd.	Port Hardy	—	1
Western Mines Limited	Myra Falls	—	1
Totals		7	17

The following table classifies fatalities as to cause and location:

Cause	Number	Coal Mines		Mines Other Than Coal	
		Surface	Underground	Surface	Underground
Drowned	1	—	—	1	—
Fall of ground	1	—	—	—	1
Transportation—					
(a) Capsized vehicle	2	—	—	2	—
(b) Crushed by vehicle	3	1	—	2	—
Totals	7	1	—	5	1

A description of each fatal accident follows:

Peter Sykes, aged 41, married and employed as a heavy-duty truck-driver by Granisle Copper Limited at their McDonald Island property on Babine Lake,. died of a ruptured lung on February 15, 1973, subsequent to the truck he was driving sliding into Babine Lake.

As Granisle mine is on a small island, room for tailings storage is limited and they are beii deposited in Babine Lake between Starrett and McDonald Islands between two dams or 'causeways connecting these islands. The causeways are

constructed from waste rock and overburden removed while uncovering the ore. Currently the east causeway of No. 2 tailings dam is being increased in width and height preparatory to increasing No. 2 pond storage capacity.

During day shift of February 15, 14 loads of waste had been dumped on the causeway and on the afternoon shift a bulldozer was being used to spread the material and to push it over the edge of the dump. The dumping operation continued on the afternoon shift and at about 5 p.m. the truck being driven by Mr. Sykes passed the bulldozer and continued on to the south end of the causeway, about 100 yards from the tractor. No one observed the truck movements until it was seen to be sliding backward down the dump and into the lake. It is presumed the driver was turning around preparatory to dumping, and that he backed close to the edge of the dump where the waste had built up to a fairly steep angle (about 60 degrees) above the lake. It is believed that at this time part of the bank sheared to about its normal angle of repose (about 45 degrees). As the truck was on the sliding material it continued into the lake and under the ice.

After about 15 minutes, Sykes floated to the surface, was immediately removed and given artificial respiration, but did not respond to this treatment. He was removed to Burns Lake hospital where he was pronounced dead. It is believed his injury was possibly caused by being crushed by the truck or by rolling rocks as he endeavoured to escape.

Salvage divers reported the truck had slid down to a depth of about 50 feet and about 100 feet from the shoreline. It was noted the driver's door was unlatched and the window broken.

At the inquest held May 31 at Granisle the jury's verdict was that Peter Sykes died February 15, 1973, as a result of the accident investigated by the jury. The jury determined his death was unnatural and accidental, and attached no blame to anyone. The jury recommended:

"(1) that dormant areas of dumps be inspected by the superintendent before being reactivated.

"(2) that the shiftboss should inspect the dumps in use at the beginning of his shift.

"(3) that material used on dumps should contain a higher percentage of rock than that used at the time of the accident."

The inspector investigating the accident was of the opinion that the steepened dump bank was confined to the zone above lake level and could be attributed to frost action. He therefore recommended several changes to the "Safe Dumping Regulations" established at Granisle mine. These included requiring the dump ridge or safety berm to be at least 2 feet high, and unless trucks are dumping at the established berm, the rear wheels shall not approach closer than 15 feet from the dump edge. Other changes included increasing the length of the active dump and in defining the extent to which the lake ice shall be broken at dumps.

William Joseph Szliske, aged 21 years, and employed as a dumpman at the Harmer open pit of Kaiser Resources Ltd., was instantly killed on June 7, 1973, when run over by the left front wheel of an empty 200-ton Lectra Haul truck.

Szliske was, on the day of the accident, on afternoon shift, and was at the Harmer No. 2 dump where he was directing trucks backing up to the waste dump. He directed one truck into dumping position and then walked across in front of this truck from left to right to direct a second truck into position to the right of the first truck. As soon as the second truck commenced dumping he was returning across in front of the first truck when it started moving. He was knocked down run over by the left front wheel and died almost instantly from injuries received.

The driver of the first truck had no way of knowing the dumpman was passing in front as the dumpman was too close to the big truck. At that moment the shift foreman, who was approaching, signalled the truck-driver to stop, which he did immediately.

It is not known why Szliske passed back in front of the first truck, but he may have been going over to a crew bus parked to the left of the first truck and in which Szliske had a pair of gloves and a can of pop.

The inquest was held in Sparwood on June 20, 1973, and the jury's verdict was as follows:

"We, the jury find that William Joseph Szliske died on June 7, 1973, at approximately 9.10 pm on Harmer #2, by being run over and crushed by a 200-ton truck. We find that death was accidental with no blame attached to anyone."

The District Inspector subsequently directed all open-pit operators in his district to ensure that where dumpmen are employed there is some positive means of signalling between dumpmen and truck-drivers, and that trucks are not to move away from the dump unless directed to do so by the dumpman.

Gordon Stuart Hood, aged 23 years, single and employed as a geologist by Noranda Exploration Company, Limited in the Nanika River area, 50 miles southwest of Houston disappeared while engaged in silt sampling on July 4, 1973. It is supposed Mr. Hood drowned in Nanika River while endeavouring to cross from a river bar to the east bank. He had been landed by helicopter onto the bar.

On the evening of July 3, 1973, the supervisor of the deceased indicated to Mr. Hood he desired a silt survey traverse to be made on the east side of the river. Landing and pick-up points were indicated on the east side of the river. En route to the landing point on the morning of July 4, Mr. Hood decided to change the two points chosen the previous night. He decided to land on a river bar and asked for a pick-up on the west side of Nanika River. On landing on the river bar the helicopter pilot asked Hood if he thought he could safely cross the river and Hood advised he thought he could, so the pilot left without further observation. Although the missing man was aware he would have to cross the river, he failed to equip himself with a life-jacket from the camp supply.

When Hood failed to appear at the prearranged pick-up point, a search was made of the bar on which he had been landed. His tracks indicated he had gone to the north end of the bar and then returned to the south end where he attempted to cross to the east bank of the river. Helicopter sweeps were made of his intended route of travel until darkness that evening. The following day extensive ground and air searches were started, commencing from Hood's point of entry into the river and downstream to Morice Lake and also upstream to Kidprice Lake. Several surveying items carried by Hood were discovered that day in the river downstream from the bar. Intensive daily searches continued until July 18 and a further 11 traverses by foot or by helicopter were made from July 21 to August 10. Frequent helicopter sweeps were made until October 4 when a ground search located several items of personal clothing on a bar about 3 miles below the bar where Hood entered the river. Extensive old tracks of an animal, probably a bear, were found at this location also.

It is supposed Mr. Hood lost his footing while crossing the river as it was at a fairly high level. It is also supposed he drowned and his body lodged underwater on the bar where his clothes were found. When the flood-water level receded the body would be exposed and could presumably be removed by animals.

The inquest was held in Houston, November 15, 1973, and the jury's verdict was as follows:

"Gordon Hood died on or about 4 July 1973 and that death was unnatural and accidental with no blame attached to any of the parties." The jury also recommended: "Exploration crews consist of two men, one of whom is experienced."

The District Inspector advised it was his opinion the accident occurred due to inexperience on the part of the deceased and on the part of the helicopter pilot in that both failed to recognize a dangerous situation. He also suggested expanding the jury's recommendation as follows:

"It is recommended that two men, one of whom is experienced, be used on all exploration work where helicopter support is involved and also in cases where remote or potentially hazardous terrain make supervision of communication difficult." His recommendation to forward this suggestion to operating and exploration companies has been carried out.

He further recommended a length of light nylon rope be supplied to all exploration crews. The Chief Inspector has forwarded the recommendations of the inquest jury and that of the Inspector to all prospecting companies.

Alexander Albert Pop (Popove), age 50, married, and employed as service-truck operator by Similkameen Mining Company Limited at Ingerbelle mine, died on August 29, 1973, from injuries received when crushed between a grader he was servicing and the fuel truck he operated.

The truck was equipped with a hydraulic motor drive for the fuelling pump and an engine, auxiliary-accelerator control at the back end of the truck. It was also equipped with a lock plate to insure the gear-shift lever could not move from the neutral position during fuelling.

Operational procedures established for the use of the fuelling pump were to stop the truck, and place the gear-shift lever in the neutral position; swing the lock plate over to keep the gear-shift lever in neutral; accelerate the engine to insure the vehicle did not move (as it would do if not in neutral); set the parking brakes; place the wheel chocks; go to the rear of the truck, reel off the hose and place the hose nozzle in the vehicle being fuelled; return to the rear of the truck to open the fuel valve and accelerate the engine to speed the pumping action. It was determined that on the day prior to the accident Mr. Pop was under observation as a trainee fuel-truck operator for a period of six hours. It was believed he was capable and understood the job.

Evidence presented at the inquest indicated that a grader had stopped for fuelling about 8 to 10 feet behind the fuel truck. Pop got out of the truck without having accelerated the engine, did not place the wheel chocks but went to the rear of the truck and accelerated the engine from the rear control. He then pulled out the hose and was walking toward the grader when the truck suddenly started to back up. Pop was pinned between the truck and grader. The grader operator, on seeing the accident, quickly jumped into the truck, shifted the lock plate, and moved the truck forward. Pop fell to the ground, was subsequently treated by the first aid attendants and was taken by ambulance to the hospital where the attending doctor pronounced Pop dead on arrival. The post-mortem investigation indicated Pop had a blood alcohol content rating of 0.04.

A subsequent examination of the fuel truck indicated the gear-shift lever could be blocked in reverse position as readily as in neutral with the locking plate and that a 4 to 10-second delay could occur before the engine power train overcame parking-brake resistance.

It would appear the operator had inadvertently left the engine in reverse before leaving the cab, and by not using the wheel chocks he had failed to prevent or arrest any motion which the truck might have developed.

At the inquest held in Princeton on November 7, 1973, the jury came to the following verdict:

"We, the Jury, find:

"Concerning the death of Alexander Albert Pop which occurred between 8:05 a.m. and 8:20 a.m., August 29, 1973 as a result of an accident on the property of Similkameen Mining Co. Ltd. at which place death did occur.

"Cause of death was severe crushing between two vehicles that is a fuel truck and grader.

"We find death was accidental resulting from operator's error coupled with unsafe locking device installed on gear shift.

"We recommend:

(A) *Fool proof locking device on gear shift*
(B) Parallel fueling positions
(C) Pumping controls side mounted
(D) Enforce regulations on wheel block placements."

Harold Herbert Engels, aged 34 years, single, and employed as a mucking-machine operator at the Pride of Emory mine of Giant Mascot Mines Limited, died from injuries received from a fall at the mine on September 28, 1973.

On the day of the accident Engels and a partner were working in 2766 bulldoze chamber slushing ore from the Chinaman 2600 stope and down 193 ore pass raise. On the day of the accident Engels and his partner had bulldozed hung-up rocks four times between the start of the shift at 4 p.m. and 7 p.m. This was accomplished by tying different amounts of explosives to bulldoze sticks inserted into the throat of the drawpoint and detonated there. The concussion induced the hung-up rock to fall.

Because of poor initial fragmentation of the ore in the stope, it had been necessary to set off four separate concussion blasts in the drawpoint in order to endeavour to bring down hung-up ore. At about 7 p.m., and contrary to operating instructions, Engels entered the throat of the drawpoint with a bulldoze charge of six sticks of 1¾ by 16-inch 75-per-cent Forcite attached to a 12-foot 6-inch bulldoze stick. Engels, carrying this charge, crossed the grizzly without having his safety belt and rope attached, and climbed up into the throat of the drawpoint. Engels' partner watched him climb up until his feet disappeared from view about the brow of the drawpoint. The partner advised he then heard what he thought was small rocks falling, following which Engels came sliding down head first out of the throat and down through the grizzly to fall down 193 ore pass raise. As Engels did not utter any sound during this time it is altogether possible he had been knocked unconscious by the falling rocks.

The partner immediately went for help and, subsequently, two men descended the ore pass by using ropes. They brought Engels up in a stretcher. To minimize the danger of falling rocks from the hang-up in 2600 stope, planks were laid across the grizzly to cover the opening while the two rescuers were in the ore pass, however a further hazard existed as part way down the ore pass a raise entered from another stope in which a hung-up condition existed at its throat also. Engels was being taken from the mine when the doctor arrived and pronounced Engels to be dead.

An inquest was held in Hope on December 17, 1973, at which the jury returned the following verdict:

"We, the Jury, having been duly empanelled find that Harold Herbert Engels died at approximately 7:00 p.m. on September 28, 1973 at or about the 2766 Bulldoze Chamber level at Giant Mascot Mines near Hope, B.C. of a fractured skull and subdural hemorrhage.

"This accidental death was caused as a result of Mr. Engels' negligence in not adhering to Standard Safety Mines Regulations by going beyond the collar of the drawpoint in this mining area."

Floyd David Cunningham, aged 31 years, married, and employed by Shepard Enterprises Ltd. as diamond-drill foreman at the Bergette prospect of Granges Exploration Aktiebolag, 2 miles west of Sibola Peak, 50 miles south-southwest of Houston, died instantly on October 9, 1973, from head injuries received when crushed by the canopy of the tractor he was driving.

Mr. Cunningham, an experienced tractor driver, was descending on the road to the camp and decided to take a shortcut. The shortcut took him across glacial ice sloping downhill about 2 to 10 degrees. He began to experience difficulties in manœuvring, so attempted to turn the tractor around but the tractor, being equipped only with normal track grousers, slid about 70 feet and dropped about 10 feet at a roadcut bank. The tractor landed on its side, during which time Cunningham was crushed by the canopy. The tractor then rocked back to a normal attitude. Cunningham was thrown out and fell under the canopy as it descended to the ground when the tractor was on its side. As visibility was satisfactory at the time, it was believed Cunningham misjudged the slope of the ice and the ability of the tractor to travel on it.

At the inquest held in Houston on November 5, 1973, the following verdict was made by the jury:

"We, the jury, having been duly impanelled, find that Floyd David Cunningham, of Kamloops, aged 31, died on 9th day of October, 1973, at or near Houston as a result of head injuries due to being crushed between a Cat and ice pack. We find that this death was unnatural and that it was accidental. We attach no blame to any person in connection with the death. We recommend that equipment owners ensure that adequate safety equipment is installed, for example, canopy screens, ice lugs, when their equipment is working on remote mining operations."

Gabriel William White, aged 45 years, single, and employed as a 100-ton Unit-Rig truck-driver by Brenda Mines Ltd. at Brenda mine, died on October 20 as a result of injuries sustained when he backed the truck he was operating over the low-grade ore stockpile.

During the early part of White's shift he stopped three or four times to talk to the operator of a bulldozer whom he advised that he (White) felt as if he was drunk and that he was taking valium pills by doctor's prescription because of a nervous condition. It was noted also that White staggered as he walked. White also reported he had difficulty in staying awake.

At about 10 a.m. a witness saw the truck back over the dump berm, somersault, and then roll down the dump about 150 feet, stopping on its left side. First aid attendants reached White with minimum delay, and took him by ambulance to the hospital, where he was pronounced dead on arrival. His injuries included a fracture of the chest, internal bleeding of the lungs, and a fracture of the skull. Death was attributed to hæmorrhage shock. A blood analysis indicated an alcohol content of 0.06 per cent.

An inquest was held in Summerland on November 14, 1973, at which the jury reached the following verdict:

"We, the Jury, having been duly empanelled find that Mr. Gabriel W. White of Kelowna, aged 45, died on October 20, as a result of cause of death. [sic]

"We find that this death was accidental due to misjudgement.

"We find that no blame attached to any other party.

"We recommend that any person who is on medication of sedative nature be reported from doctor to management."

It is to be noted that section 23, Rule 280 (*b*), of the *Mines Regulation Act* states as follows:

"No person shall be employed if his ability to work safely is impaired, by any means, to such a degree that he endangers his own safety or that of another person."

It is also to be noted that the relationship between a doctor and patient is considered to be personal and therefore a doctor would not be obliged to comply with the final recommendation.

FATAL ACCIDENTS AND ACCIDENTS INVOLVING LOSS OF TIME

There were seven fatal accidents and 771 accidents in which compensation was paid reported to the Department. These were investigated and reported on by the Inspector of Mines.

The following three tables classify these accidents as to cause, occupation, and parts of the body injured. The accidents that occurred in the coal-mining industry are reported separately from those occurring in all other types of mining operations. The fourth table lists all fatal and compensable accidents which occurred in lode and coal mines over a 10-year period, and relates these accidents to the number of men employed.

Accidents Causing Death or Injury Classified as to Cause

	Coal Mines		Mines Other Than Coal	
	Number of Accidents	Percentage of Total	Number of Accidents	Percentage of Total
Atmosphere	5	2.2	18	3.3
Explosives	—	—	2	0.4
Falls of ground	16	7.4	53	9.6
Falls of persons	79	35.7	138	25.1
Lifting and handling material	29	13.1	54	9.8
Machinery and tools	47	21.3	156	28.4
Transportation	28	12.6	52	9.4
Miscellaneous	17	7.7	77	14.0
Totals	221	100.0	550	100.0

Accidents Causing Death or Injury Classified as to the Occupation of Those Injured

Occupation	Coal Mines		Mines Other Than Coal	
	Number of Accidents	Percentage of Total	Number of Accidents	Percentage of Total
Underground—				
Chutemen	—	—	8	1.4
Haulagemen	10	4.5	45	8.2
Miners	10	4.5	180	32.7
Helpers	—	—	15	2.7
Timbermen and facemen	16	7.2	14	2.5
Mechanics (electricians, supplymen, welders, pipefitters, etc.)	12	5.4	34	6.2
Miscellaneous	18	8.2	5	0.9
Surface—				
Mechanics, electricians, repairmen, etc.	58	26.3	88	16.0
Mill and crusher workers	1	0.5	68	12.4
Carpenters	2	0.9	4	0.7
Miners and drillers	3	1.4	41	7.5
Vehicle drivers	43	19.4	17	3.1
Surveyors, labourers, construction, etc.	34	15.4	25	4.6
Miscellaneous	14	6.3	6	1.1
Totals	221	100.0	550	100.0

Accidents Causing Death or Injury Classified as to the Parts of the Body

Location	Coal Mines		Mines Other Than Coal	
	Number of Accidents	Percentage of Total	Number of Accidents	Percentage of Total
Eyes	16	7.2	33	6.0
Head, face, and neck	8	3.6	38	6.9
Trunk	58	26.2	155	28.2
Upper extremities	51	23.3	143	26.0
Lower extremities	72	32.5	147	26.7
General	16	7.2	34	6.2
Totals	221	100.0	550	100.0

Compensable[1] and Fatal Accidents Related to Persons Employed in Coal and Mines Other Than Coal

Year	Number of Accidents[2]		Number of Persons Employed		Frequency per 1,000 Persons	
	Coal	Other	Coal	Other	Coal	Other
1964	134	547	713	5,400	188	101
1965	116	559	649	5,522	179	101
1966	97	739	614	7,210	158	102
1967	92	688	457	6,716	201	102
1968	73	682	553	9,254	132	74
1969	93	725	700	9,633	133	75
1970	172	860	1,275	11,622	135	74
1971	196	737	1,457	10,684	135	69
1972	227	771	1,985	11,231	114	69
1973	294	817	2,216	11,495	133	71

[1] Subsequent to April 1, 1972, a compensable accident has been determined as being an accident where the injured man is not able to work the next or any subsequent working-day because of the injury received. Prior to that date an accident was determined as an injury causing a loss of more than three days' work. The statistics since that date are therefore not directly comparable with those of previous years.

[2] These totals are submitted by the Workmen's Compensation Board as having occurred in the mining industry operations.

DANGEROUS AND UNUSUAL OCCURRENCES

One hundred and forty-eight dangerous and (or) unusual occurrences were reported as required by sections 9 and 10 respectively of the *Mines Regulation Act* and the *Coal Mines Regulation Act*. Sixteen of these were recorded at coal-mining operations and the balance from all other types of mining activity. Of the 148 occurrences recorded, 99 happened on the surface and 49 underground.

In summary, 61 involved the use of vehicles, mainly haulage and pickup trucks, and the incidents related to vehicles running out of control, collisions, backing over dumps, and running off roads. Twenty-six fires were recorded, and of the 11 which occurred underground, five involved the use of vehicles. Thirteen incidents occurred involving the use of explosives, and 10 in connection with the use of electricity. Seven hoisting incidents were reported, and six where individuals were caught in or between machinery. Five unusual occurrences were recorded involving falls of rock and three in which dump slumps, tailings spills, and crane-boom failures were recorded. The remainder were of a miscellaneous nature.

On January 1 a fire in the concentrate drier at an open-pit mining operation released sulphur dioxide fumes in the drier building.

On January 2 at an open-pit mine a ruptured hydraulic line on a Lectra Haul truck sprayed hydraulic fluid over a hot exhaust manifold. The fluid ignited and the fire severly damaged the vehicle.

On January 3 a pickup truck at an underground mining operation rolled over after the left front wheel broke through the snow at the edge of the road.

On January 5 a personnel vehicle being operated between an underground mine and its local community drove off the road when the left front wheel dropped through the snow on a curve. It is possible that in both this and the previous incident snow-ploughing had masked the road edge.

On January 9 three men working underground failed to properly guard the area where three drift rounds were being blasted. The blasting certificates of two of the three workmen involved were suspended.

On January 10 an explosion occurred in an underground jaw crusher when a large piece of ore was being crushed. It is presumed the ore contained explosives that had not detonated during normal blasting operations. The crusher operator was not injured, although he was close to the crusher.

On January 12 an underground workman reported that, as he was walking along a drift, a concussion wave, smoke, and water were suddenly ejected from an unmarked diamond-drill hole during a blasting operation in a nearby drift heading. On investigation it was found the location of this drill hole had not been plotted on the mine plans.

On January 13 an underground scooptram operator reported that while mucking out a development round he twice encountered burning Cilgel explosives. A 1 by 8-inch stick was discovered burning in the drift between the loading and dumping points while another was observed in the muck pile. An investigation discovered several sticks of Cilgel were on the ground between the muck pile and the dump, but it could not determine how they came to be there other than having dropped from the scooptram while mucking out a round in which a missed hole had occurred. It could not be determined, either, what ignited them. It was suggested it may have occurred after being exposed to the hot diesel exhaust. While this ignition source is possible it is highly improbable this occurred.

On January 14 at an open-pit mine an electrician was slightly injured when the truck he was driving went off the road and rolled approximately 160 feet in snow. It was believed the driver was driving too fast for the condition of the road, and after hitting a rock in the wheel track he was unable to recover control before driving over the edge.

On January 17 at an underground mine the service cage operating in a shaft stuck twice, just below a shaft station, because of inadequate clearances between the cage and the guides. The guides were planed to increase clearance and the cage operated satisfactory past that point. The following day the cage stuck about 350 feet lower in the shaft and the cable kinked after about 475 feet had been reeled out. On investigation, slight damage had been done to the cage. This was repaired, and the guides planed and aligned to permit unobstructed operation.

On January 18 the hoisting rope of the south side skip compartment in a shaft was damaged. Damage followed when an improper signal was given by a shaftman to the hoist operator. Unknown to the hoistman the shaft bonnet was being used by the shaft crew, and when the skip was moved the bonnet came into contact with the dumping yoke. The bonnet being inadequately secured to the shaft cable, slid some 12 to 18 inches down the hoist rope, resulting in a broken strand and some superficial damage. The recommendations to avoid future mishaps were that when

the shaft inspection bonnet is being used the hoistman shall be advised, and the shaftboss shall be present until he is satisfied the work being done is satisfactory.

On January 20 an underground workman was severely bruised when caught between a locomotive and a derailed 15-ton muck car. The injured man was endeavouring to re-rail a car using a piece of steel, instead of by using car jacks as required in operating procedures.

On January 23 a fire in an underground main haulage tunnel was caused by oil spilling from fuel tank cars being ignited by sparks falling from the pantograph of the electric locomotive. Investigation revealed the fuel tanks had been overfilled with no room being left for temperature expansion. The pressure built up in the fuel tank causing a fine spray of fuel to be emitted from the pressure relief valves. Efforts to prevent recurrence of this type of hazard were to require fuel cars to be located at the tail end of the supply train, and during filling, the tanks shall not be filled within 1 foot of the top of the capped opening. Also the suggestion was made that the locomotive used for hauling flammable or explosive materials be equipped with two pantographs.

On January 25 at an open-pit concentrator a fire in the concentrate drier released sulphur dioxide fumes in the drier building.

On January 26 at an aggregate producing plant a workman had his right arm severed just below the shoulder when his arm was caught in the head pulley of a conveyer. The workman was applying salt to the conveyer-belt to inhibit ice from forming on the pulley. The workman failed to observe established operating procedures in applying the salt.

On January 29 at an open pit a workman had completed loading boulders with explosive in preparation for secondary blasting. The boulders had previously been drilled to a depth of half their thickness. On making his final check he found a small piece of explosive which had not been loaded into a hole. Upon inserting this piece of explosive into the hole, small white crystals resembling ammonium nitrate prills were discovered around the collar of the hole. An immediate ignition of the explosive charge occurred upon tamping with the loading stick. There was a sound similar to a child's cap gun, followed by a small volume of white smoke. Upon investigation it was found that some of the remaining unused sticks of explosives were dry and partly hollow. It was thought that the explosive sticks were the end of a batch, and the air contained in the hollow portion may have contributed to the spontaneous ignition during loading under pressure of the stick. The actual cause of this incident was, however, not conclusively determined.

On February 2 a Telecruiser Mobile Crane was on clean-up and salvage work near a dock in the tailings pond at an open-pit mining operation. The crane was parked off the access road on a 5-per-cent slope. Upon lifting a length of pipe, the crane house was swung and came in contact with an overhead high-voltage power-line. Two phases of the line were short circuited, resulting in the tripping out of the circuit-breaker at the switch house. The operator stated he felt the crane house move and tried to apply the house brake. This brake is used only for parking. After contacting the power-line the operator swung the house away from the line and lowered the pipe. The conclusion following investigation was that the crane house swung due to the off-level position it was in prior to the lift. There were no injuries.

On February 13 at an open pit a 2,300-volt trailing cable was damaged while the power unit was being moved. The cable was pinched and developed a short circuit across all three phases. The fault continued to arc, during which time efforts were made to enter the power unit, where a fire had developed in the main alter-

nator. Investigation indicated the overload protection did not function. Recommendations made were to ensure the overload relays are correctly adjusted; to introduce the use of cable carriers, with sufficient slack cable being provided; and to shut down the power unit prior to relocation.

On February 22 a fire occurred on a scooptram underground when a hydraulic hose was cut by a falling rock, causing a fine spray of hydraulic fluid to be ignited by contact with an electrical short circuit which resulted from damaged head lights. The operator was able to obtain help quickly and the fire was extinguished before the rubber tires caught fire. The operator received second-degree burns to his hands and a first-degree burn to the left side of his face. It was recommended that all hydraulic fluid shall be nonflammable.

On February 22 at an open-pit minesite an International TD-25 and a 950 loader were doing minor ground excavation to the bank of the river when the dozer made contact with and ripped a hole in a buried high-pressure natural gas pipe-line. The escaping gas ignited and the dozer operator, together with two other company employees, suffered injuries. The operator was hospitalized with relatively severe burns. The fire was extinguished shortly after the gas was turned off. Extensive damage was caused to the TD-25 dozer while the 950 loader was completely destroyed. Recommendations made were that a survey of all underground utilities be made and an accurate plan plotted, and such a plan shall be consulted prior to authorizing any ground excavation.

On February 26 at a limestone-quarrying operation the driver of a loaded 35-ton Euclid truck sustained left shoulder injuries after jumping out of the truck when it ran out of control down a 30-per-cent grade after a rear axle fractured. The truck travelled out of control for about 200 feet and halted within a distance of about 20 feet after running into a pile of gravel. It is apparent the truck was operating on a grade greater than that for which the braking capabilities had been designed.

On March 2, when the operator of a Unimog backed out of an underground level and down a ramp, he found he had no control of the vehicle. His passenger and he managed to jump clear of the vehicle. The Unimog continued down the ramp for a distance of 150 feet, coming to rest against a loose muck pile. Inspection revealed excessive wear of the front brake shoes and drums. To prevent any further incident of this type, brake shoes and brake drums are to be inspected at regular intervals.

On March 3 a Haulpak truck went off the road and over the bank at an open-pit mine. The driver was uninjured and only superficial damage to the steering was sustained by the truck. Investigation indicated visibility at the time was excellent; the driver was driving on the wrong side of the road and also driving carelessly, in that he was too close to the snow bank. Records indicated this driver had been involved in two previous accidents, although no blame had been attached. In this instance, however, he was discharged. Following further investigation by the Safety Committee, recommendations were made for a training instructor to use this incident as an example.

On March 5 at an open-pit mine a Terex R-35 rear dump truck, while in the dump position, came in contact with and severed a 4,160-volt power-distribution line. The severed power-line remained alive, and the plant electrician, with assistance from a high-voltage-line crew, was required to cut off the power and repair the line. Following the accident, all dumping was forbidden in the area, line fuses have been installed, and the power-line flagged with fluorescent tape. All supervisors have been instructed in the use of line disconnects, and all operating crews

have been instructed to remain in their vehicles should a similar situation again arise.

On March 8 at an underground mine two men became nauseated by blasting gases in the scram drift they were driving. It was believed the muckpile they were scraping was not sufficiently wet nor was it being adequately ventilated.

On March 12 at an underground mine the main powder magazine was broken into by persons unknown, and a considerable amount of explosives, detonators, and primacord was stolen. Entry to the magazine was made via the door, the padlock having been removed. The local RCMP detachment was notified and investigated the incident.

On March 16 a Unimog stalled on an underground ramp. The operator proceeded to restart the engine by moving the fan blade. When the engine did start, the vehicle began to roll down the ramp and continued for 150 feet, hitting the wall near a ventilation door. The operator stepped clear of the vehicle uninjured, the Unimog suffered minor damage. Investigation revealed the braking system to be in good order, and the emergency brakes were automatically applied at the moment of engine stall; however, the operator took the unit out of gear, and failed to apply the parking brakes. Upon restarting the engine, the emergency brakes were released as the air pressure increased, and the vehicle then proceeded to roll down the ramp unretarded.

On March 17 a fire occurred underground when the compressor on a scooptram overheated and ignited oil which had dripped onto the compressor. The fire was promptly extinguished by the operator. This incident could have been avoided if the drip pan had been in place.

On March 18 an accident occurred underground when a scooptram operator attempted to stop in order to change direction. The unit failed to slow down, and then hit the rock wall. Investigation revealed that the brakes, both service and emergency, were found to be in working order, but it was concluded that an accumulation of debris found jammed under the brake pedal did not allow the pedal to function properly.

On March 19 at an underground mine a rock fall of approximately 400 tons occurred in the travelway in an area that had been rock bolted with 8-foot bolts, screened, and strapped. The caved area extended into a sheared zone above the rock bolts. No one was injured and it is presumed the caving occurred between shifts.

On March 24 there was an unusual occurrence at an open-pit mine when a fire occurred behind the cab of a service truck. The shifter and leadhand were at the scene almost immediately and used a total of seven chemical extinguishers without any visible sign of effect upon the fire because of the intensity of the heat. The fire truck was called, but by the time it arrived the fuel tank had exploded and the truck was engulfed in flames. Since there was 500 gallons of diesel fuel in the tank, the shiftboss ordered a load of waste be dumped on the burning truck. This was done, and the danger of the fire spreading was eliminated. After the investigation of the incident it was recommended that the exhaust stacks extending up beyond the roof of the cab be installed with cooling mufflers on any service trucks, and a minimum of two 10-pound dry chemical extinguishers be externally mounted on all fuel and service trucks. Also all service-truck drivers be instructed in fire-fighting and required to perform shift check-out of the fuel tank and exhaust systems.

On March 26 at an underground mine two men became nauseated in the raise heading they were driving. It is believed the atomizer was located too far from the raise face at the time of the last blasting.

On March 29 at the powerhouse of an underground mining operation a fire in the valve house caused about $1,000 damage. It is believed the ground return of a welding machine in use in the powerhouse caused an arcing between the mill water-line to which it was attached and some conductor in the building wall through which it passed. It was recommended that any future welding being done in the powerhouse should be done while using the electric power outlet provided in that area and that the fire protection provided in the powerhouse be improved.

On April 2 a cage hung up in the shaft of an underground mining operation. The incident was caused as a result of the guide timbers swelling subsequent to being wetted on the week-end.

On April 12 an unusual incident occurred at an open-pit mine dump in an area where wet overburden had been dumped. A truck with a mixed load of rock and overburden was backing into dumping position when the rear wheels settled as the toe of the dump face slumped. The wet overburden had been dumped three weeks previously and outwardly appeared to be stable. The immediate area was closed to dumping pending stabilization of the dump.

On April 18 at an underground mine an electric motor starter switch blew up in the surface compressor room while it was being thrown by a mechanic. The mechanic received flash burns to his face and the back of his left hand. Inspection revealed a burned switch with excessive arcing having occurred across the top of the fuse caps. The actual cause of the arcing remains unexplained; however, the fuse holder was an old design of which previous incidents of this type of failure have been recorded. It was recommended that this old style of switch be replaced with an improved type of fuse switch and that electrical repairs be performed only by persons qualified to do so.

On April 22 at an open-pit mine a valve in the tailings disposal system malfunctioned, causing the tailings pipe to rupture and a tailings spill into a nearby lake. The valve was repaired and the tailings drainage system revised to avoid future spills in the area.

On April 29 at an open-pit coal mine the driver of a loaded 100-ton Lectra Haul truck was slightly injured after the truck ran out of control at a corner, drove through a small berm and down a 50-foot steep incline, at the bottom of which it capsized. Investigation indicated a steering failure because the steering ram had disconnected.

On April 30 the south skip in a shaft of an underground mine was double loaded after the skip door tripping mechanism had failed to function because of too low air pressure. Although the installation was television monitored, the unloading failure was not observed. The investigation subsequent to the incident recommended modifying the control circuitry to insure the necessary air pressure for operating the skip door tripping mechanism. It was also recommended closer attention be given to the television monitor and instructions issued that in the event of double loading the skip is not to be moved until the load is lightened to its designed loading.

On May 3 at an underground mine the first stage of a two-stage fan failed when the jack-shaft bearing overheated and the shaft bent, thus causing the fan blades to break off. It was recommended that thermostats, complete with pyrometers, be installed on all pillow bearings. It was noted this control had been installed but was not correctly adjusted.

On May 4 at an open-pit mine an inexperienced driver of a Lectra Haul truck backed into another similar vehicle in the truck parking area preparatory to a change of shift. Parking area procedures have been revised to avoid having trucks back in when the driver's view is obstructed.

On May 6 at an open-pit mine four braces in the lower boom section of a dragline were damaged when an inexperienced operator pulled the bucket into the boom. The operator was intending to set the bucket down for normal greasing, but on noting a parked tractor in line of travel he hoisted the bucket but forgot he had the drag engaged. After investigation it was recommended that only authorized personnel are permitted to operate the dragline; that all equipment in the vicinity must be parked outside the swing radius of the dragline, and that any damage to a dragline shall be considered as being of important concern requiring the machine to be stopped and the supervisor notified.

On May 8 at the camp of an underground mine five electric blasting caps bundled together with lead wire were found cached under some tin sheets under the kitchen. No conclusions were reached as to when or why the caps were hidden.

On May 8 at an open-pit operation the driver of a loaded 200-ton Lectra Haul truck backed over the edge of a haul road while placing surfacing material on the road. An investigation indicated the steering and brakes were in satisfactory condition. The cause of the incident was attributed to driver error and the steepness of the grade on which the vehicle was operating.

On May 9 at an underground mining operation an electrical short circuit caused a fire on a post near a chute in 41-188 stope. The fire was extinguished without incident.

On May 9 at an underground mining operation the operator of the King Nipper diesel-driven haulage vehicle fell off the vehicle and onto the ramp when the driver's seat, to which he was secured with a safety belt, broke from its supporting rod. At the same time the fail-safe braking system failed to function, thereby permitting the vehicle to creep forward. It was recommended that the seat be attached to the frame with support brackets and the support rod of galvanized pipe be replaced with one made from black iron pipe. It was also recommended that the fail-safe mechanism be made serviceable and that vehicle drivers shall be again instructed to report all unsatisfactory operating conditions.

On May 16 at an underground mining operation a truck was dumping a load of gravel near the main transformer substation when the raised truck box came too close to the high-voltage overhead wire. The electric power arced about 12 to 18 inches from the power-line to the truck box and from the vehicle to the ground. The power supply was interrupted by the safety switchgear and the driver climbed unhurt to the ground.

On May 18 at an underground mining operation a man was slightly injured by falling rock in a stope as he was inspecting backfilling being done in the stope. The area that caved had been scaled about two weeks previously and no mining had been done since that time; however, as the ground was fractured, it is presumed it loosened during the intervening period. When the caving condition was first noticed an attempt was made to retreat, but the wet sandfill hampered rapid movement.

On May 22 an explosion occurred in the hospital dressing-room at an underground mining operation. The explosion involved a number of glass bottles containing mixed chemicals on top of a glass cabinet. The chemicals involved were in two solutions having the following listed compositions. Catgut was being stored in test tubes in three to five jars which were filled with the second solution.

96 per cent isopropyl alcohol	90 per cent isopropyl alcohol
1 per cent formaldehyde	0.7 per cent diethylethomolamine
0.05 per cent sodium nitrate	0.1 per cent sodium nitrate
0.05 per cent diethylethomolamine	water g.s. ad 100 per cent
water g.s. ad 100 per cent	

It is believed that somehow the diethylethomolamine lost its effectiveness and permitted oxidation to occur and the subsequent explosion of the sodium nitrate.

On May 24 at an open-pit mining operation the right front wheel of a loaded 85-ton Lectra Haul truck fell off as the truck was proceeding upgrade to the primary crusher. The cause of the failure was not determined, but it is possible the tire rim was not correctly seated.

On May 25 at an underground mine a miner approached a working place where he knew another miner was intending to do some blasting. On reaching the working place, and on seeing the other miner, a shot detonated, knocking both him and the other miner down. He immediately directed his helper, who was accompanying him, to retreat and then ran into the blasting area, picked up and carried out the other miner, who was injured. They had travelled only a short distance before two more holes exploded. The rescuer's action undoubtedly saved the injured man's life, whose injuries included a broken arm, a damaged knee, facial and arm cuts, and considerable loss of blood. The blaster had experienced difficulties in lighting the fourth fuse, and had remained too long in the blasting area.

On June 2 the 60-foot boom of a P&H mobile crane failed and collapsed while endeavouring to raise a 14-ton load. The crane boom was at an angle of inclination of 80 degrees and at an operating radius of about 10 feet. It was determined the incident was due to equipment misuse in that the load-chart rating for the particular project indicates a zero safe loading.

On June 6 at an underground mine a small fire occurred in the controller of an electric locomotive subsequent to its having been cleaned with varsol which had not dried.

On June 6 at an underground mine the driver of a scooptram lost control of his vehicle while proceeding downramp. The scooptram struck a ventilation door and momentarily pinned a workman to the wall. The accident was attributed to operator inexperience and possible inadequate or unserviceable brakes.

On June 7 at an underground mine the man-deck of the north side skip in a shaft was filled with ore when the deck came unfastened and dropped down while ore was being hoisted. The ore was removed without incident, and it was recommended that the man-deck be removed during muck-hoisting operations.

On June 13 at an underground mining operation an employee received second-degree burns to his hands when engulfed in hot, dusty air issuing from a drawhole in a hot muck stope area. A few seconds after a blast had detonated, a large run of muck occurred in the stope, causing a violent ejection of the extremely hot atmosphere contained in the stope.

On June 14 at an underground mine a welder was slightly burned when a fire occurred at the oxygen gauge of the oxyacetylene welding outfit he was using. The gauges and hoses were apparently in good condition and the cause of the accident was attributed to the possibility of oil or grease on the gauge.

On June 18 a shaft cage suddenly dropped about 4 feet as the cagetender was stepping into it. The cagetender fell to the floor and sustained abrasion injuries to his left knee. The accident was due to improper operating procedures in that the hoistman had not fully set both brakes after receiving the "man on" (3-bell) signal.

On June 24 a driller received burns to his face and left ear when the oil reservoir tank of an airtrac drill compressor exploded. It is believed the thermostat control on the by-pass switch diverting lubricating oil to the cooler failed to function after the engine reached operational temperature, thus permitting the oil temperature to rise to its flash point.

On June 26 at an underground mining operation two men were slightly injured in a shaft when the compressed airline burst as they were clamping a patch over a leak hole in the 8-inch pipe.

On June 27 an unusual occurrence was the finding of some cartridge explosives behind a drawer and against the wall of a closet in a bunkhouse. It was not determined how the explosives came to be placed where located.

On June 29 at an underground mine a load-haul-dump unit capsized on a road. The driver found the brakes would not hold the vehicle on the steep grade down which it was descending and directed it into the bank where it overturned. Examination indicated a burst hydraulic line in the braking system.

On June 29, because of an air leak in the braking system and because of a sticking clutch pedal, a Unimog truck ran away and capsized on an underground ramp.

On July 1 a premature explosion of several loaded holes occurred in a draw hole and subsequently in another draw hole underground. The holes being loaded were in an area of spontaneous heating in broken ore where it was believed the rock temperatures in the holes would not exceed 150°F; however, an attempt was made to cool the rock with water. Temperatures taken after flushing did not exceed 142°F and loading was completed in the first drawpoint and was almost completed in the other drawpoint when a detonation occurred in the first drawpoint. The area was evacuated and apparently subsequently the remaining loaded holes in both drawpoints detonated due to overheating. It is recommended closer control be exercised in recording the rock temperatures and that no blasting be done where the rock temperatures exceed 150°F.

On July 5 a fire started underground on the exhaust manifold of a Wagner 20-ton ore carrier. An investigation showed a faulty cap on the fuel tank had permitted fuel oil to leak onto the hot exhaust manifold where it ignited.

On July 7, because of a broken brake-line, a Chevrolet 4 x 4 truck was unable to stop on a downgrade until it ran into a gate, where minor collision damage occurred. The driver had neglected to apply the parking brake.

On July 8, while descending the main haulage ramp, the engine of a 100-ton truck stalled and the driver forgot to engage the emergency steering system. The vehicle was almost stopped with the service brake, but with the driver being unable to steer, the truck continued to the road edge where it slid over the edge and rolled down a 39-foot embankment, landing upside down. It could not be determined what caused the engine to stall.

On July 12 a fire occurred at an electrical distribution switch on the outside of an office building. It is believed the fire resulted from a short circuit due to an insulation fault and probably an accumulation of limestone dust which assisted in producing a flash over.

On July 13 an unusual incident was recorded concerning a fire on a scooptram brake drum. At the end of afternoon shift the vehicle was being parked when the driver noticed and extinguished a small fire on the brake drum. It was determined that the driveline emergency brake had been set up too tight, thus causing the heels of both brake shoes to rub the brake drum. The area became hot enough to cause residual oil and grease in the area to ignite.

On July 17 an explosion occurred when the operator of a drilling jumbo drilled into the socket of a lifter. It was determined the miner had not properly washed and examined the face for missed holes.

On July 28 the brakes on a pickup truck failed as it was descending a ramp and in endeavouring to avoid running over the dump the driver turned the vehicle

so sharply that it rolled onto its side. On investigation it was found the front brake-line was torn off but that the rear brakes were functional. As the driver only applied the brakes once it is possible the brake-fluid level was low, but the brakes should have responded to pedal pumping.

On July 30 a pickup truck was run into and damaged by a 100-ton truck in front of which it had been parked. The large vehicle was moved ahead by its driver who was unaware of the small vehicle being in front of his truck.

On July 30 an unusual incident occurred to two workmen while greasing the south compartment cable in a shaft. The two men were standing on a work platform held into position in the shaft by a cable attached to a tugger which was used to raise and lower the platform. This cable had been improperly led from the tugger hoist across the north compartment and to the platform in the south compartment. As the north and south cages were in counterbalance position, the north cage rose and struck the tugger cable as the lubricating was being done on the sinking south cable. As the north cage struck the cable the platform was suddenly raised and one man was thrown off into the shaft station while the other man was trapped behind the door. The tugger cable then snapped and released the man behind the door.

On July 31 a workman was severely injured when a bolt fired from an explosives-actuated gun entered his chest and passed through his body. The gun had been returned to the tool crib after use and was apparently left loaded. The tool-crib operator, rather than opening the breach to determine if the gun was loaded, pushed the muzzle against a ⅜-inch plyboard wall and pulled the trigger. The bolt with which the gun had been loaded passed through the wall and struck a workman on the other side of the wall. Instructions were issued that the use of explosive-actuated tools must be done in compliance with the pertinent Workmen's Compensation Board Regulations.

On August 2 an inexperienced and unauthorized driver drove the garbage truck off the garbage dump road. The truck ran down the steep hillside and overturned on the flat below. The authorized driver who was seated on the passenger side sustained two crushed vertebræ. Seat belts were not being worn.

On August 8 the driver of a haulage contractor's truck drove off the road and in so doing received multiple lacerations and a broken left ankle as the truck rolled over and down the hillside. The driver reported the engine had stopped and steering ability was lost. The investigation completed indicated the engine was stopped, the gear shift in neutral, and the brakes were overheated. The vehicle recorder indicated the possibility that the truck was being operated at a speed in excess of that posted for the road.

On August 10 a small fire occurred underground in the air filter and connecting hoses of a scooptram while it was in operation. The cause of the fire was considered to have been heat generated by the compressor igniting a build-up of fine carbonaceous dust in the air filter. It was decided to service that part of the equipment at more frequent intervals.

On August 15 a miner was carrying a case of explosives past the top of a raise when he released his hold on the guard rope to readjust his hold on the box of explosives. While doing this he lost his footing and fell down a distance of 50 feet on his stomach into water that had accumulated in the 45-degree inclined raise. The workman had untied his safety rope before picking up the explosives.

On August 15 the driver of an underground scooptram lost control of the vehicle and rammed a drift wall without damage to the vehicle. About three hours later he was about to pass through a ventilation door and stated he had pulled the door control cord but that the scooptram commenced to creep forward. He also

said he put the vehicle in reverse gear and dropped the bucket, but the scooptram continued downgrade, striking the door and damaging the door frame. The investigation of the incident revealed that the brakes were "red hot" at the time of the incident and that no other faulty condition existed about the vehicle. It would appear the incident was attributable to driver error.

On August 20 an electrician suffered second-degree burns to his face, arms, and body from an arc flash in the main circut-breaker cubicle when, contrary to safe operating procedures, he endeavoured to check the voltage across the main contacts with a hand-held meter. In order to do this he blocked open the mechanical disconnect shutters which would normally shield the 13,800-volt power supply. The powerhouse superintendent also received second-degree burns to his hands while assisting in removing the electrician from the cubicle, which was extensively damaged.

On August 22 the driver of a 100-ton truck fell asleep while driving. The vehicle left the haulage road and struck a rock embankment, thus causing considerable damage to the left front suspension and steering assembly.

On August 23 as the bucket of a large power shovel was being swung around for servicing it struck a 100-ton truck parked in an area near the shovel where the operator's vision was interrupted.

On August 24 an underground scooptram being driven down ramp in second gear ran out of control when the operator thought the engine had stalled. The vehicle continued down ramp until it struck a truck en route up the ramp. The scooptram stopped but the truck then ran back and struck a wall. The investigation completed indicated the scooptram was travelling down too fast and in an incorrect gear. It also revealed a low level of transmission fluid, which resulted in inadequate clutch braking through the transmission. The recommendations of the investigating committee were for improved driver training and for the installation of a block signal system to regulate vehicular traffic.

On August 24, considerable damage was done to a pit drill by a boulder of approximately 10 tons mass which fell from the pit face during a rainstorm. The boulder rolled about 64 feet across the berm width before striking the drill.

On August 27 a 120-ton truck left the road while backing into a dumping position. The truck rolled down a 16-foot bank and came to rest upside down. The driver, who had not fastened his seat belt, was thrown from the cab and suffered a fractured vertebra and a cut on the back of the head. The accident was attributed to endeavouring to manœuvre the truck in confined circumstances on unstable fill which slumped under the truck wheels.

On September 1 a supervisor parked a pickup truck too close to a 120-ton truck where the driver of the latter could not see it. The driver of the pickup endeavoured to move it when he saw the large truck backing. He was unable to do so as the pickup became stuck in the mud and was backed into by the large vehicle.

On September 6 an inexperienced operator of a D-6 tractor was taking it downstream on a river bank when he began driving it on a sidehill too steep to maintain control. The tractor backed down hill until it ran over a stump, when it rolled over and down the hillside a distance of 350 feet where it stopped on its side. The cab of the tractor was equipped with roll-over bar protection and withstood at least three and a half rolls onto the structure. The driver sustained multiple abrasions, lacerations, and bruises when he remained at the controls. These may have been avoided if he had used the seat belt in the tractor.

On September 6 the driver of a Michigan 175A front-end loader sustained a fractured left femur and an injured left hand when he lost control of the vehicle as it was being driven down the road. The vehicle ran off the road on a curve where the road grade is 16 per cent. The investigation indicated the driver was unaware of the use of the travelling braking pedal rather than the operating pedal, which automatically put the engine out of gear when used.,

On September 11 the driver, of a 100-ton truck suffered minor facial and shoulder injuries when the truck he was driving capsized while unloading. The investigation indicated the stockpile dump had been undercut by a loader feeding the crusher. When-the loaded truck approached the berm edge the berm collapsed. It was recommended care be exercised to ensure no dumping be done at the berm when the slope is unstable. In such cases the unloading should be done away from the edge and then be bulldozed over it.

On September 18 the wail of an emergency storage pond at an open-pit operation failed while filled with thickener, concentrate sludge, thus permitting the escape of concentrate; sands, and water into the nearby river:.

On September 19 a miner was cleaning off a raise bulkhead subsequent to a blast when the plank on which he was standing broke; The miner dropped about 4 feet before his safety rope stopped his fall.

On September 19 at an open-pit mine the driver of a 50-ton truck, when leaving the pit and while making a left turn onto the haul road, swung wide: and hit a soft shoulder. The truck toppled off the road and rolled about 50 feet down the road embankment. As it was raining at the time it is possible the haulage, road was slippery.

On September 21 a fire occurred involving the centre laminated "wind post" support beam at the south end of the clean coal storage building. It is believed the fire was started by sparks or hot slag from acetylene burning operations while installing a ventilation pipe. The fire was quickly extinguished.

On September 25 at an open-pit mine the driver of a pickup truck while driving at night drove off a drill road and over a knoll which he had not seen. The truck stopped when it hit another road about 20 feet below. The driver suffered rib fractures and the passenger was bruised.

On September 26 on an exploration property a diamond driller received injuries when struck in the back by a chuck wrench in the drill chuck when the machine was accidentally put into gear.

On September 27 a Dart loader, while pushing coal into the storage area, dropped into a cavity formed in the pile where it had been undermined from below by the loading of railway cars. The operator was not injured.

On September 27 a 100-ton truck, while backing at an angle to the -dump berm, drove tbe right rear' wheels through the berm. The driver got off the truck to investigate and While' so doing the dump edge settled and the truck rolled over and down the dump. The incident occurred at the beginning of a shift and the driver had riot waited for the dump attendant to arrive to direct dumping procedures.

On September 27 a fully loaded 120-ton truck left the road when steering failed after a high-pressure hydraulic hose ruptured. Emergency steering was selected and brakes applied, but a power pole was struck and snapped before., the vehicle was stopped. It was found that the hose had come free from its bracket and rubbed on a filter housing until it wore the hose thin enough to rupture. As the truck was ascending a 2-per-cent grade, and travelled 120 feet after the hose ruptured, it would appear that driver reaction time in switching to emergency

steering or applying brakes was somewhat slower than anticipate& However, as the accident occurred at 6.27 a.m. on graveyard shift, the delay might be attributable to driver fatigue.

On October 3 a mot&ail was assisting another cleaning a muck car, and when finished he attempted to climb back into the rear locomotive. While doing this he directed the operating motorman to move the front motor, but as he was not completely within the cab his left heel became jammed between the locomotive frame and the dump guide rollers, and lie then fell to the ground. His heel was so severely crushed that his foot was amputated at the ankle.

On October 8 in the sample feed section of the thermal dryer of a coal processing plant a labourer received first- and second-degree bums to. the face and head When a flash fire occurred. It is believed the fire was caused by a particle of smoldering coal issuing from the rotary valve of the discharge of the thermal dryer gate igniting a cloud of dry coal dust issuing from the valves at the base of the cyclones. The procedures adopted to minimize the possibility of recurrence of this type of incident during shutdown or standby operations are to open the hot coal gate, lock out the rotary valves, inspect the drying chamber for any burning before restarting, and endeavour to prevent a build-up of coal dust.

On October 9 a scooptram tipped into an underground transfer raise when about to dump a load of ore. An investigation indicated the accident may have been attributed to slippery road conditions and driver error. The brakes were found to be in satisfactory working condition.

On October 9 a crusherman's helper suffered bruised muscles on his left arm when it was caught between the impact idlers on a conveyer-belt and a chute as he was attempting to clean spilled muck off the table under the belt.

On October 12 the driver of an empty 50-ton truck lost control while descend? ing a steep, icy mine road having several switchbacks. As the truck reached the bottom switchback it began to slide forward, indicating its velocity was greater than the transmission speed. When the driver endeavoured to correct the skidding, the rear end slued forward' and caused the truck to slide off the road. The truck travelled about 250 feet down the 'hillside and was extensively damaged, but the driver was uninjured. The accident was attributed to the icy road, conditions and to driver inexperience.,

On October 15 at an open-pit mine the mast of a 45-R drill failed and twisted. No person was injured and the cause of the accident was attributed to the fracturing of the right-band hinge pin of the mast.

On October 16 at an open-pit mining operation a repairman had his left heel run over by the pickup truck he had been driving. He was unaware the truck had a broken parking brake cable, but had placed a rock behind one of the front wheels when he stopped. On leaving he noticed the truck was moving backward so attempted to jump back in to stop it but was knocked off when the truck struck a conveyer gallery. The left rear wheel rode up onto his left heel.,

On October 16 at an open-pit coal mining operation the newly trained driver of a caterpillar tractor was slightly injured when he rolled the tractor over when the vehicle rode. up on some hard rock while making a final clean-up on a coal seam.

On October 17 an industrial garbage collector's truck overturned at the garbage dump at an underground mining operation. The truck overturned as it was backing down a slight grade and being turned at the same time. An unbalanced load on an uneven road surface, coupled with the turning action, swung the centre of gravity outside the wheel line, thus causing the truck to slowly roll over without damage to the truck or injury to the driver..

On October 17 at an open-pit mining operation the tower of a 40-R drill fell while being raised to a vertical position. The accident was attributed to the failure of the hoisting cable, which, on examination, showed signs of considerable abuse, which no doubt caused its failure.

On October 24 a power outage occurred at an open-pit mining operation. While the cause of the outage was not determined it was believed to have been as a result of a short circuit developed by an elevated truck dump box in an area where road construction was in progress adjacent to a transmission-line.

On October 27 a loaded 50-ton truck ascending a slight grade lost traction and stopped on the icy, snow-covered road between the open pit and the crusher. The driver tried to ascend again but the truck commenced sliding backward down the road. He endeavoured to back into the bank to stop the vehicle, but while he was doing this the front end slued across the narrow road and dropped over the road edge. The driver jumped out but the co-driver remained in the cab when the vehicle capsized into the deep snow. The co-driver was bruised but no damage was done to the truck, which was cushioned in the snow. It was believed that improved driver instruction in assessing driving conditions would avoid repetition of similar incidents.

On October 27 a crew bus at an open-pit mining operation was damaged by a loader which backed into it. The driver of the loader was unaware the bus was stopped behind his vehicle and had not checked to see if the area was clear.

On October 29 a pickup truck overturned on the tailings dam road of an open-pit operation after the driver struck a crusher mantle protecting a valve at the side of the road. The driver said the accident occurred as a result of him momentarily taking his eyes off the road along which he was driving.

On October 31 an empty 13-ton dump truck drove off the road to an underground mining operation as the truck was descending a narrow road to the mine plant. The truck passed an automobile parked at the side of the road, but failed to pull to the left at a narrow section, went off the road, and rolled over.

On November 4, two workmen at an open-pit mining operation sustained first-, second-, and third-degree frost burns from liquid propane escaping from a tank from which they had inadvertently removed a check valve while endeavouring to install another valve.

On November 4, two loaded 50-ton haulage trucks collided head on on an open-pit road. The extensive damage done to the vehicles was due to carelessness and inattention, because one vehcile was being driven on the wrong side of the road, but visibility was good.

On November 7 a concentrate truck and trailer slid off a mine haulage road during a heavy snowstorm. No one was injured and the incident was attributed to slippery road conditions.

On November 9 an empty 30-ton Euclid truck being driven down an 18-per-cent grade at an open-pit mining operation lost traction in fresh snow, turned sideways, and upset without injury to the driver. The accident was attributed to slippery road conditions.

On November 13 a loaded 30-ton Euclid truck being driven down an 18-per-cent grade at an open-pit mining operation drove off the road. The truck rolled over and down a 20-foot embankment, and landed upright on its wheels. The road had been covered with from 3 to 6 inches of loose gravel. The accident was attributed to the road being unsatisfactory for winter use.

On November 14 a fall of approximately 350 tons of rock occurred in part at the side of a ramp in an inactive area at an underground mining operation. The fall occurred in an area of known shearing weakness.

On November 15 an empty 65-ton haulage truck skidded on a freshly snow-covered icy road surface on entering the mine haulage road. The truck slid over the road edge and down a 16-foot embankment. No injuries were received by the two men in the truck and only minor equipment damage resulted. The accident cause was believed to have been through driver error in travelling too fast on an icy road that should have been sanded.

On November 15 the headache ball of a 40-ton mobile crane swung into an energized overhead power-line. The grounding shut off the power through protective circuitry without damage to equipment or injuries to anyone. The incident was attributed to operator inexperience, because he was booming up while the unit driver was moving the vehicle.

On November 18 an unusual occurrence was recorded at an open-pit mining operation when a small spill of tailings occurred from an emergency spill pond. The spill was attributed to drainage seepage reopening two inadequately blocked culverts used during the construction of the impoundment.

On November 19 at an open-pit mining operation the bottom boom section of a 25-ton mobile crane failed while raising a load of approximately 15 tons. The investigation made indicated the crane was not level and that the load being lifted was not immediately under the boom, thus giving rise to a side loading on the crane.

On November 21 a Marion large-diameter-hole drill at an open-pit mining operation was extensively damaged by fire. It was believed the fire was caused by the ignition of methanol fumes in the drill cabin. It is believed the thermostat on the house-heater relay ignited the fumes.

On November 23 at an open-pit mining operation, a blaster suffered contusion to his right thigh when struck by a flying rock when he failed to take adequate cover after initiating a blast. He was about 500 feet from the scene of the blast.

On November 24 a portion of the main waste dump at an open-pit mining operation sloughed. The sloughing, which extended over a length of 50 feet and a depth of 25 feet, was attributed to a foundation failure in an old gully containing soft surface gravels. Consulting soil mechanics engineers were called to investigate the stability of this dump.

On November 25 a fire destroyed two bunkhouses at the camp of an open-pit mining operation. The cause of the fire was not known but its extent was no doubt attributable to delayed and inadequate fire-fighting services which have since been improved.

On November 26 a ¾-ton truck parked close behind a tractor which was bull-dozing snow from the side of a building. The tractor operator, being unaware of the truck being behind him, backed into it and caused extensive damage to the front end of the truck.

On November 28, subsequent to a gas leak being detected at the main shut-off valve at the guard house at an open-pit mine and gas bubbling up through sewer water, a rupture was found in the main gas supply-line to the mine. The line was excavated and repaired without incident.

On November 28, and again on December 1, fires occurred in the fan chamber of an underground mine air-heating plant. Repairs were made after the initial fire, and on restarting the fan a second fire occurred. It was determined to have been caused by overheating in the uptakes of the induced draft fan of one of the boilers where a section of baffle plate had corroded away or burned out. The high tem-

perature gases of combustion passed directly to the stack gas system and ignited soot in the immediate area of the opening.

On November 29 a workman received multiple bruises when pinched between a railway car of concentrates and the cover of the winch he was using to move the car. He was attempting to climb onto the car to set the brakes while the car was moving. The winch cover is being redesigned to reduce its hazard potential and railway cars will be delivered with the brakes at the rear of the cars.

On December 1 at an underground mine the driver of a supervisor's crummy lost control of the vehicle when it struck a rock or lump of ice when passing a crew bus. The crummy broke through the snow bank at the road edge and plunged about 10 feet down the mountain side. The cause of the accident was believed due to the driver's lack of familiarity with winter driving conditions.

On December 1 a workman suffered first- and second-degree burns when his hand came into contact with the energized terminals of a power cable male connector. The incident was attributed to incorrect work procedures and an improper connector being used.

On December 1 the operator of a backhoe capsized his vehicle into the sump he was cleaning because the forward propel foot pedal stuck to the floor and would not release. The extended loading bucked prevented the vehicle from submerging, but the operator was flipped out into the sump water. It is believed a small stone may have jammed the pedal.

On December 1, while dumping fill on an open-pit access road, a truck backed over the road edge. The truck rolled down about 10 feet and capsized. The driver was not injured and the accident was attributed to a slump failure of the unconsolidated material on which the truck operated.

On December 2, about 10 tons of mono-methyl-amine nitrate solution was spilled on an open-pit waste dump. The leak occurred from the holding tank after its supporting base failed. The chemical was to be used for manufacturing water-gel explosives. The ground around the tank was immediately flushed with water, which was diverted into the main tailings pond. The chemical is nontoxic but may encourage algæ growth. It is believed the rate of drainage to the pond will be slow inasmuch as the chemical is in a solid state at temperatures below 85°F. Continuous monitoring of the pond water will be maintained to determine if any further action will be necessary.

On December 3 an electrical short circuit resulting in an explosion occurred in a distribution system at a 4,160-volt outdoor switchhouse of an open-pit mine. The investigation made indicated the possibility of a loose pothead connection, which caused the pothead compound to overheat and blow upward into the switchhouse. This resulted in a short circuit and explosion.

On December 6 an underground load-haul-dump unit went out of control while descending a ramp. In endeavouring to halt the vehicle, the operator found the hydraulic brakes did not function and the emergency brake lever broke off in his hand. He finally stopped the vehicle by steering it into the ramp wall. The driver received neck injuries and it was found that a broken hydraulic fitting under the inspection plate under the main control cylinder was the cause of the initial brake failure. It was believed a loose rock under the cylinder had forced the inspection plate far enough down to break the fitting.

On December 7, two workmen employed at an underground mining operation took, without authorization, a ¾-ton pickup truck and proceeded to drive from the mine camp to the nearest settlement. En route the truck was driven off the road, rolled over several times in the snow, and came to rest about 250 feet below

the road. The two men, both of whom were under the influence of alcohol, sustained only minor injuries, but the truck was extensively damaged.

On December 11 a slump occurred at the edge of an open-pit waste dump while a truck was dumping its load. The slumping material dropped the rear wheels about 22 feet below the road level. This left the truck sitting on the wheels and the end of the upraised box.

On December 12, two 120-ton trucks collided during a snowstorm on an open-pit mine dump when the empty vehicle travelling downgrade was unable to stop on the icy road. The empty truck slid sideways into the loaded stationary truck. The accident was believed to have been caused by restricted vision due to the snowstorm and icy road conditions.

On December 12 a crew-cab truck and a Kenworth truck collided on a curve on the main road to an underground mining operation. Lack of winter driving experience and the failure to maintain good radio contact were instrumental in causing this accident.

On December 13 the driver of a truck at an open-pit mining operation sustained crushed muscle injuries when pinned by another vehicle against her truck as she was making service checks. The proper use of brakes and wheel chocks by the service-truck operator could have avoided this incident.

On December 13 a miner at an underground mine received bruises to his body when a rock of approximately 500 pounds mass rolled over him after he dislodged the rock, using a bulldoze stick at a drawpoint. The accident was attributed to improper work procedures as the hang-up should have been dislodged with an explosive concussion shot.

On December 16 at the concentrator of an underground mining operation an 8-inch fluid discharge-line separated at a coupling. The escaping liquid spilled over switchgear installed below and caused the short circuiting at two switch boxes. Arcing and some burning developed before the current in them was interrupted. Simultaneously, short circuiting occurred in the main bus bar section.

On December 19 at an underground mining operation a miner was found to be using a drill steel to tamp explosives in a drill hole. He received a two-day work suspension and a two-week suspension of his blasting certificate.

On December 22 at an open-pit mining operation, an empty 100-ton truck failed to negotiate a small turn and slid into a loaded 100-ton truck approaching from the opposite direction. Minor damage was done to both vehicles. The cause of the accident was believed attributable to a slippery road surface, poor visibility because of fog, and to driver error.

The underground fire which commenced in November 1972 in broken sulphide ore in a metal mine continued to burn throughout 1973. The fire was confined to an isolated pillar surrounded by waste backfill and collapsed hangingwall rock. Ore was drawn from the area until the high temperatures and clinkering of the ore rendered it impossible to continue. At that time most of the drawpoints were sealed with concrete seals to cut off the oxygen being supplied and thereby reduce the sulphur dioxide gas being produced. The fire was believed to have been spontaneous in origin, but the physical conditions which created it are not clearly understood, although it has been indicated free sulphur may be a principal agent.

PROSECUTIONS

Three prosecutions were instituted under the *Mines Regulation Act* and none under the *Coal Mines Regulation Act*.

On October 18 the superintendent of the Spillimacheen operation of Baroid of Canada Ltd. was charged with failure to comply with section 23, Rule 265 (*e*) (i) of the *Mines Regulation Act* in that he permitted a Euclid R-30 truck to be used at the mine when the vehicle was not equipped with an adequate emergency braking system capable of stopping and holding the fully loaded vehicle on the maximum operating grades present. At the Court hearing on November 19 a plea of guilty was made, and a fine of $500 was imposed.

On November 13, two shiftbosses at an underground mining operation were charged with failure to comply with section 23, Rule 93 (*b*) (1) (D) of the *Mines Regulation Act* for unlawfully permitting a diesel engine to be operated underground without a fan being in use to assist the natural ventilation in supplying air to that area. The hearing was heard on December 18 when the case was dismissed when the prosecution was unable to demonstrate that natural ventilation was indeed being supplied, while it was accepted that the main fans were giving some assistance to the ventilation.

On November 19, Driftwood Mines Ltd. was charged with failure to comply with sections 10 (1) and 11 (2) of the *Mines Regulation Act* in that they respectively failed to give notice to the Inspector of their commencement and cessation of activity on their Harvey Mountain property, and that they failed to submit a report of reclamation as required. On request of the defendant the case was adjourned until January 22, 1974; however, prior to that date, they entered pleas of guilty on both charges, and were assessed fines of $100 on each charge.

BLASTING CERTIFICATE SUSPENSIONS

One blasting certificate suspension was awarded for a violation of a blasting procedure provision as contained in the *Mines Regulation Act.*

On December 19 a miner was found using a piece of drill steel to load explosives into a drill hole. The miner was disciplined by being awarded a two-day work suspension, and a two-week suspension from blasting duties.

ELECTRICAL-MECHANICAL

An Electrical Inspector has directed the inspection of electrical equipment since 1946 in the mining industry and since 1954 in the oil industry. Since 1966, a Mechanical Inspector has assisted in the inspection of all mechanical equipment installed in any type of mine or quarry.

Electrical and mechanical reports, as presented by V. E. Dawson, Senior Inspector, Electrical-Mechanical, follow:

ELECTRICAL

During 1973, electrical power usage continued to show increase, mainly due to such recent operations as Gibraltar, Lornex, Similkameen, and Island Copper, all of which are now in production. The Silver Queen mine of Bradina Joint Venture, and the Mount Copeland mine of King Resources Company suspended operations.

Two major fires occurred during January 3 and 4, 1974, at two Canadian mining properties, one of which was in British Columbia, the suspected cause receiving considerable attention throughout industry.

Investigations revealed that in both incidences the attribution to fire spread was the burning of the outer polyvinyl chloride (P.V.C.) jacket of the Teck power cable.

The outer P.V.C. jacket is rated fire retardent and self-extinguishing by Canadian Standard Association C22.2, No. 131; however, it has been found that this material will sustain combustion under certain conditions when laid in cable trays or confined spaces.

In addition to burning, the P.V.C. material will produce dense smoke and toxic gases, which greatly add to difficulties of fire-fighting.

Recommendations suggesting practical steps to be taken to avoid future occurrence of fires of this type were circulated by the Department of Mines and Petroleum Resources to the operating mines in this Province.

Recently studies have been undertaken and reports received from various authorities concerning the subject of induced voltages in the grounding conductors of mining trailing cables of the shielded (SHD-GC) and nonshielded (G-GC) constructions. In both types of cable the insulated pilot wire ground check for the continuous ground monitoring circuit replaces one of the ground conductors in the cable interstice, with a consequent increase in the size of the remaining two grounding conductors.

This change in construction has caused an electrical imbalance which results in an induced voltage on the grounding conductors. In cases where this voltage is sufficiently high and solid contact is made with other equipment at or closer to reference ground, sparking can occur if the energy released in this type of open sparking reaches a high enough level. This could produce a hazard in a gaseous atmosphere.

This phenomena has raised cause for concern, particularly with regard to the common use of mobile electrical equipment, such as continuous miners used in conjunction with rubber-tired shuttle cars in underground coal mines, where only certified permissible explosion-proof electrical equipment may be used.

Laboratory tests using cable inductances and a PTB cadmium disk apparatus with an 8.3 per cent ± 0.2 per cent mixture of methane and air, have found that incendive sparks have been produced at current levels varying from 1.2 to 1.5 amperes or 1.0 volt induced on the machine being sufficient to produce such an incendive spark. The Department of Mines and Petroleum Resources has therefore restricted the use of trailing cable of the imbalance type for the use in underground coal mines, unless modified in accordance with the Department's recommendations.

The following table gives the kilovolt-ampere capacity of mining-company-owned plants at metalliferous mines and the approximate amount of power generated in 1973:

Prime Mover	Generator Kva. Capacity	Kilowatt-hours Generated
Diesel engines	34,427	46,347,100
Hydro	8,290	41,502,488
Steam	30,000	97,088,520
Totals	72,717	184,938,108

The electric power purchased from public utilities and from the generating division of Cominco Ltd. amounted to 2,079,844,604 kilowatt-hours. This amount, added to that produced by privately owned plants, totalled 2,264,782,712 kilowatt-hours.

A general analysis of the connected load at operating mines during 1973 was as follows:

Equipment	Horsepower
Hoists and overhead trams	7,067
Scraper hoists	7,205
Electric shovels	20,548
Electric rock drills	5,525
Electric mucking-machines	
Mine fans	14,070
Mine pumps	7,231
Rectifiers and M.G. sets	10,144
Air compressors	27,207
Sink-float plant	1,744
Crushing plant	32,328
Grinding equipment	215,805
Concentrating equipment	51,901
Magnetic separators	204
Conveyers	22,145
Mill pumps	44,388
Fresh-water pumps	36,459
Reclaim-water pumps	19,350
Workshops	7,150
Miscellaneous	19,758
Total	550,229

One battery locomotive was used for underground haulage at an industrial-mineral operation.

Track haulage systems used 62 battery, 96 trolley, and 15 diesel locomotives.

In 1973, electric power was used at 60 structural-material and industrial-mineral mines and quarries. Power was produced by company-owned plants at nine of these operations. The kva. capacity of company-owned plants and the amount of power generated and purchased was as follows:

	Kilowatt-hours
Diesel-driven generators, kva. capacity, 13,352—	
Generated	35,068,714
Purchased	26,712,500
Total	61,781,214

A general anaylsis of the connected load is as follows:

Equipment	Horsepower
Hoists and aerial trams	288
Scraper hoists	170
Fans	640
Pumps	289
Rectifiers and M.G. sets	13
Air compressors	418
Electric shovels	520
Electric drills	140
Washing plant	521
Drying plant	2,189

Equipment	Horsepower
Crushing plant	11,721
Conveyers	6,833
Milling	9,115
Screens	1,849
Pumps	2,415
Workshops	571
Miscellaneous	3,570
Total	41,262

At coal-mining properties, electric power was used in two open pits, two underground mines, and three coal-processing plants. Also, continued underground feasibility operations were conducted at the Sukunka Coal Project, Chetwynd.

The distribution of the connected load at collieries in 1973 was as follows:

Equipment	Horsepower	
Surface—		
Air compressors	4,230	
Draglines	7,700	
Electric shovels	19,680	
Electric drills	4,225	
Conveyers	9,566	
Hoists	270	
Haulage		
Coal breakers	880	
Coal washing	3,208	
Coal screening	3,075	
Pumping	23,776	
Coke production		
Ventilation	2,515	
Miscellaneous	12,946	
Total		92,071
Underground—		
Ventilation	280	
Pumping	220	
Air compressors	200	
Continuous miners	2,200	
Shuttle cars	1,010	
Loaders	270	
Conveyers	1,025	
Hoists	50	
Miscellaneous	99	
Total		5,354
Total surface underground		97,425

The following graph and table show tbe power consumption in kilowatt-hours in mining operations since 1962:

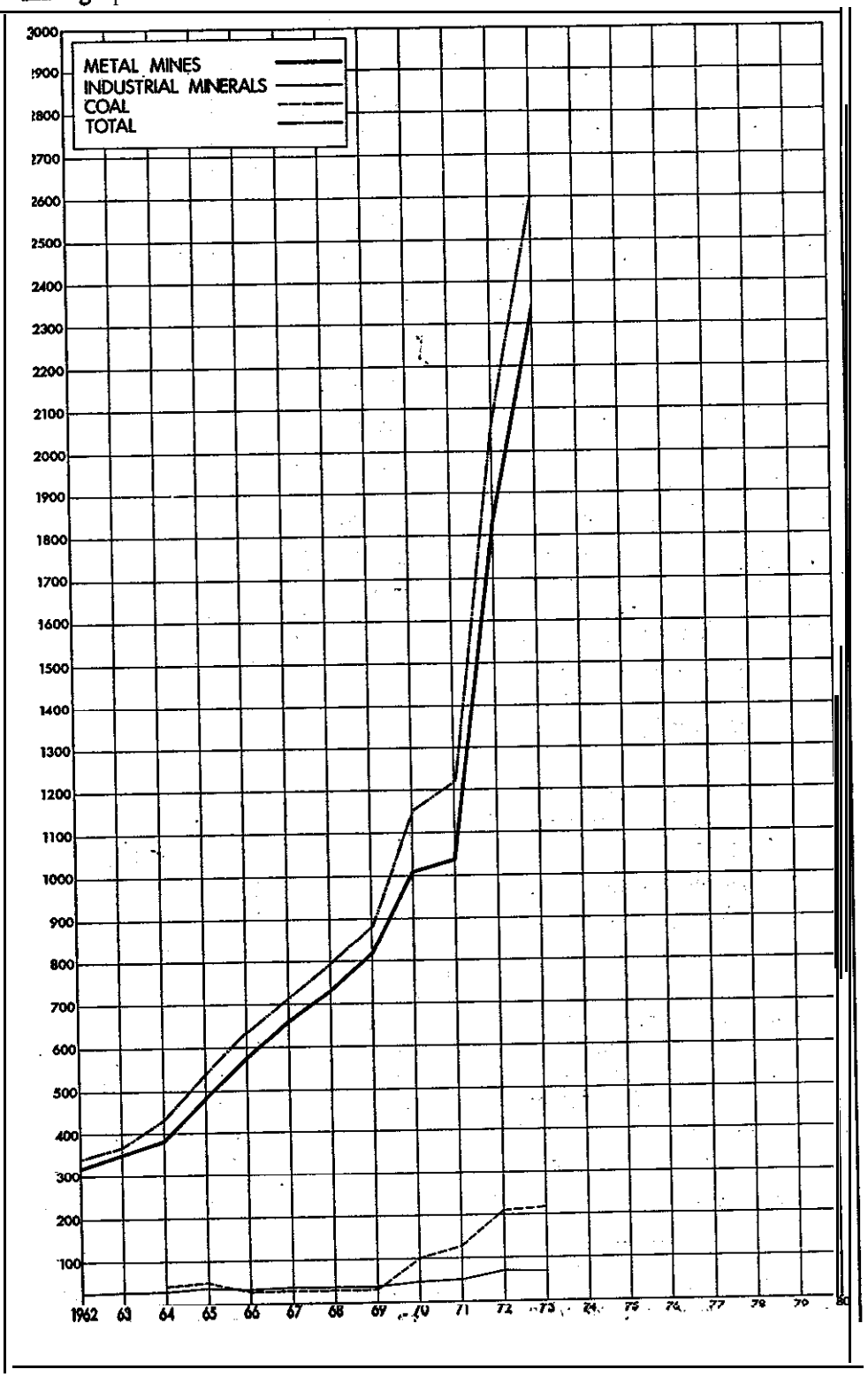


Figure 7. Annual consumption of power in kilowatt-hours, 196273.

Annual Consumption of Power (in Kilowatt-hours)

Year	Metal Mines	Industrial Minerals	Total	Coal	Grand Total
1962	324,638,348	23,262,091			347,900,439
1963	345,296,000	23,321,875			368,677,875
1964	373,279,423	26,460,100	399,739,523	31,160,152	430,899,675
1965	467,654,500	32,010,923	499,665,423	40,915,890	540,581,313
1966	573,345,458	35,081,797	608,427,255	22,503,551	630,930,806
1967	660,924,689	31,719,975	692,644,664	22,730,640	715,375,304
1968	730,193,710	37,978,960	768,172,670	26,690,100	794,862,770
1969	809,729,000	37,675,440	847,404,440	36,658,450	884,062,890
1970	1,010,755,603	47,274,704	1,058,030,307	96,430,894	1,154,461,201
1971	1,037,369,400	49,458,734	1,086,828,134	132,404,380	1,219,232,514
1972	1,824,145,302	67,882,738	1,892,028,040*	205,104,600	2,097,132,640
1973	2,264,782,712	61,781,214	2,326,563,926	219,886,220	2,546,450,146

* Corrected.

MECHANICAL

Underground Diesel Equipment

During 1973, 61 new diesel permits were issued to cover the underground operation of diesel-powered equipment. At the end of the year a total of 572 permits had been issued since the introduction of individual permits in 1968.

A summary of the diesel-powered equipment put into use during the year is as follows:

Diesel Equipment	Number of Permits Issued	Total Horsepower
Locomotives	6	289
Load-haul-dump vehicles	4	2,570
Front-end loaders	2	650
Ore carriers	6	425
Tractors	5	9 4 2
Drilling jumbos	10	577
Service. and personnel vehicles	3'	,272
Graders .	2	121
Diamond drills	2	68
water pumps	1	7
Total	61	5,921

Only one approval was issued by the Department of Mines and Petroleum Resources during the year for a diesel engine not having been previously approved for underground use by any other recognized authority. The approval was based on the chemical analyses of exhaust-gas samples collected while the engine was being operated under varying conditions of load and speed on a dynamometer.

Approval Number	Date Approved	Engine Identification	Brake Horse-power	Minimum Ventilation Requirement
B.C. Dept. of Mines 1973–1	June 15, 1973	Hatz E79. 402 cc	7	(Cfm) 1,000

Several amendments, affecting the use of diesel-powered equipment underground, were made to the *Mines Regulation Act* and the Coal *Mines Regulation Act* during 1973. One of the new General Rules requires all hydraulic fluids used in underground equipment after January 1, 1975, to be of an accepted fire-resistant type. Although the use of fire-resistant &ids. has been strongly recommended for many years by our Department, there has not been any voluntary use of these safety fluids by either users or manufacturers.

The majority of the load-haul-dump vehicles used in underground operations contain between 50 and 100 gallons of hydraulic fluid which currently is flammable mineral oil. The potential hazard with the continued use of standard hydraulic fluids was again vividly demonstrated in February when a falling rock in an underground mine simultaneously ruptured a hydraulic hose and a headlight of a load-haul-dump machine and the escaping spray of fluid ignited.

Another amendment to the Mines *Regulation Act* and the Coal Mines *Regulation* Act required the installation of automatic fire-suppression equipment in all underground fuel-storage depots. These new rules should result in a significant improvement in mine fire-prevention programmes.

An Australian flameproof diesel-powered tractor, with the trade name "Rhins Mark IV," was put into service underground at the Sukunka Number 1 Colliery of Coalition Mining Limited. This vehicle was issued a coal mine approval certificate, Number USDA, dated March 2, 1973, by the certification officer of the Federal Department of Energy, Mines and Resources. This certification was granted, partly on the basis of an earlier New South Wales approval, Number MDA-DEX14, and partly as a result of inspection and testing carried out on the vehicle in Vancouver by the certification officer and members of, his staff.

The original condition of the vehicle when first tested was most disappointing. The exhaust temperature safety probe could not function correctly because it was surrounded by an excessive amount of metal which acted as a "heat sink." The safety shut-down for low water in the scrubber reservoir failed to function even when the reservoir and the scrubber were both drained empty. The reason for this failure was that. the float chamber was installed too low in relation to the water reservoir. There was no exhaust flame trap fitted originally to this machine, and yet the engine could be started without any water in the scrubber.

All of these weak points were corrected, including the installation of a flame trap in the exhaust, before the vehicle was certified for use underground.

A symposium on diesel-powered equipment in underground mining, sponsored by the United States Bureau of Mines, was attended on January 30 and 31, 1973, in Pittsburgh. Over 600 delegates from the United States, Great Britain; Canada, Sweden, and France attended this meeting where 20 papers were presented on the design, construction, and operation of diesel equipment in underground workings.

The United States Bureau of Mines personnel believe that a large-scale replacement of electrically powered face equipment in underground coal mines by diesel-powered equipment could result in increased safety.

A private meeting was arranged after the symposium for the Canadian delegates to meet with the United *States* Bureau of Mines? engineers. A great deal of interest was shown in Canadian experience with diesel equipment and a very useful exchange of ideas took place.

The following is a summary of all diesel-powered equipment operated underground during 1973:

Equipment	Number of Units Operated	Total Brake Horsepower
Locomotives	23	1,002
Load-haul-dump vehicles (Wagner scoop-trams, Eimco loaders, Joy transloaders, etc.)	85	9,386
Standard front-end loaders	7	1,513
Ore and waste carriers (scootcretes, dump trucks, etc.)	31	4,453
Tractors	11	1,343
Drilling jumbos	33	1,860
Graders	8	692
Service and personnel vehicles	47	2,377
Air compressors	1	197
Diamond drills	2	68
Scaling equipment	1	109
Concrete placing equipment	1	47
Welder	1	49
Mobile crane	1	75
Mobile slusher	1	109
Pump	1	7
Totals	254	23,287

The minimum total ventilation required for all the listed equipment was 2,914,000 cubic feet per minute, which results in an average ventilation requirement of 125 cubic feet per minute per brake horsepower.

Hoisting

A Denver Engineering Works, 50-horsepower, 36-inch diameter, single-drum hoist, with a maximum allowable rope pull of 3,500 pounds, was used to sink a 250-foot deep shaft at the Denero Grande property of Colt Resources Ltd.

The Crown shaft, Canadian Ingersoll Rand, 300-horsepower, 72 by 54-inch, double-drum hoist at the Bralorne mine was reactivated during 1973 as part of a rehabilitation programme.

A Bertram-Nordberg, 250-horsepower, 60 by 72-inch, double-drum hoist at the Boss Mountain mine of Noranda Mines, Limited was put back into regular service d&g the year.

A Canadian Ingersoll Rand, 53 by 36-inch, single-drum, 100-horsepower hoist 'was pot back into service when the HB mine Of Cominco Ltd. was reopened early in 1973.

Mining operations at the Mount: Copeland mine of King Resources Company ceased during the year, resulting in the removal from service of a Vulcan Denver, 150-horsepower, 48-inch diameter, single-drum hoist.

Revisions made to. the Mines, ***Regulation Act*** and the Coal ***Mines Regulation Act,*** during 1973, require that the safety catches on every shaft conveyance used for the transport of persons be subjected to a "free-fall" test before being put into service. This test consists of a sudden release Of the shaft conveyance, carrying a load equal to the designed maximum man-load, in such a manner that the safety catches engage the shaft guides when the conveyance is descending at a speed equal to tbe maximum hoisting speed. These tests, which have been mandatory for many

years in other parts of Canada, are essential in order that the effectiveness of the safety catches under actual emergency conditions can be realistically predicted.

Another amendment *to* the *Mines Regulation Act* and the *Coal Mines R&a-&n Act* ensures that, *in* general, provisions of the Acts referring to. hoisting ropes also apply to tail or balance ropes. This clarification was necessary be&use the safe operation of a tail rope at a modern friction hoist installation is of equal importance to that of a hoisting rope. A failure, in service, of a tail rope could, for example, result in a serious shaft accident, either by altering the ratio of the rope tensions on the friction drive pulley and causing rope slip or by falling down the shaft and becoming entangled with other ropes or the conveyances.

During *1973, 54* breaking test reports were received for samples of rope tested to destruction in accordance with Rule 164 of the *Mines Regulation Act,* and 90 nondestructive test reports were also received during this same period. Sixty-one of these nondestructive tests were carried out by Wire Rope Industries of Canada, Limited, using a DC Defectograph, and 29 were carried out by Rotesco of Canada, Limited, using their AC Electromagnetic Rope Tester. As a result of the continued use of nondestructive rope testing, 33 separate four-month rope-life extensions were granted enabling hoisting ropes to remain in service beyond the normal two-year statutory limit.

Off-highway Trucks and Mobile Equipment

There were no major construction projects undertaken during 1973, and all changes in the size and number of trucks, shovels, and front-end loaders in use were the result of expansions Or reappraisals of existing facilities.

Of the total of 584 dump trucks in use, 196, or over 33 per cent, had box capacities in excess of 60 tons, and 179, or over 30 per cent, carried pay loads of over 80 *tons.*

The trend in the use of rubber-tired front-end loaders can be seen from a comparison between 1969 and 1973. In 1969, 197 front-end loaders were used of which 94, or: almost *48* per cent, had buckets with a capacity of 2 cubic yards or less and only six machines, or approximately 3 per cent, had a bucket capacity in excess of 6 cubic yards.

In 1973, 285 front-end loaders were used, of which 90, or over 31 per cent, had buckets of 2 cubic-yard capacity or less, and 29, or approximately 10 per cent, bad a bucket capacity in excess of 6 cubic yards.,

In the case of pit *shovels,* there were *77* in use *in 1969, of which.28,* or over *36* per cent, had a dipper capacity in excess of 4 cubic yards, whereas in 1973, out of 87 shovels in use, 55, or over 63 per cent, had a dipper capacity Of over 4 cubic yards.

A Wabco Haulpak 3200, 200-ton truck was put into service in the open pit of Lornex Mining Corporation Ltd. during the month of July. This vehicle, the second make of 200-ton truck to be used in British Columbia, has an empty weigbt of *348,500* pounds, and measures 50 feet 6 inches in over-all length, 22 feet 7 inches in over-all width, and 17 feet 5 inches in over-all height. When the box is fully raised for dumping, the over-all height is 44 feet. 6 inches.

At tbis Department's request, the manufacturer sent a team Of test engineers to the mine to prove the adequacy of the service braking system. A portable scale was set up and the truck weighed, both empty and goaded. A full series of dynamic brake tests were carried out, initially on a level roadway and finally on an 8-per-cent downgrade. Over-all stopping' distances were measured from initial speeds of between 5 and 22 miles per hour, using only the service brakes.

The vehicle speed was measured with a recording oscillograph and a speed-sensing panel. The brake application time was also recorded on the oscillograph by using the voltage from the brake "stop" light as an indicator. This same voltage signal was also used to fire a brake reaction detonator mounted at the rear of the truck and which ejected a dye marker Onto the road surface at the moment of brake pedal actuation. The maximum temperature attained by the brake drum after each test was also recorded. The oscillograph records show an approximate 0.75-second delay from the initial movement of the brake pedal to the first observable deceleration of the vehicle. The distance travelled during this system delay time, which would be about 22 feet from an initial speed of 20 miles per hour, is included in the measured stopping distance.

The following is a summary Of the results obtained from these tests:

Gross Vehicle Weight (Lb.)	Approximate Initial Speed (M.p.h.)	Stopping Distance (Ft.)	Maximum Temperature of Brake Drum (°F)
348,500	7	17	98
	12	34	103
	17	60	115
	22	91	130
720,000	6	25	210
	11	56	215
	16	135	180
	22	195	195

All the above tests were conducted on a downgrade, dry, compact, gravel roadway with a slope of 8 per cent. The service brakes alone were used to stop the vehicle (no retarder used).

These results were most satisfactory for tbis class of vehicle and prove that the service brakes can safely stop a fully loaded truck under all normal operating conditions. It should be noted, however, that if a graph is constructed showing the variation of stopping distance with initial speed, then the predicted stopping distances from initial speeds in excess of 25 miles per hour increase alarmingly. For example, a stopping distance of around 400 feet may be required from 30 miles per hour, and a distance of over 700 feet from 40 miles per hour. These figures show clearly the need for prompt action by a driver in the event of a failure in the dynamic braking system when travelling downgrade with a fall load.

Several amendments to the *Mines Regulation Act* and the Coal *Mines Regulation Act,* affecting the design and use of motor-vehicles in mines, were enacted during 1973, and some of these are. as follows: All trucks with dump boxes are now required to have a permanently attached support, capable of securing and locking the box in its raised position; every truck or loader with a manufacturer's gross vehicle weight rating of over ~100,000 pounds shall, when newly put into service, have a manufacturer's nameplate fixed in the cab showing the vehicle Serial number, the maximum rated load capacity, and the maximum grade on which the vehicle may safely operate; any modifications made to a truck or loader, affecting the steering or braking system or designed to increase weight-carrying capacity, have to be approved by the manufacturer, and accepted by the Chief Inspector of Mines. The manager of every mine has to submit an over-all traffic control scheme for his operation, and this has to be accepted by the Inspector of Mines.

Every vehicle fitted with hydraulically actuated service brakes shall, when newly put into use, have the hydraulic system split into two or more separate and independently operated circuits, each of which is capable of safely stopping and holding the vehicle under any operating condition of load, grade, and speed.

Emergency run-off lanes or impact barriers are required on all roadways used for the transport of persons, or for haulage purposes, where the grade exceeds 5 per cent. No vehicle, other than a vehicle used directly for production, shall be allowed into any operating open pit unless it is carrying adequate means of indicating its presence to the operators of vehicles having restricted vision.

Every loader, grader, scraper, tractor, and bulldozer shall, when newly put into service, be equipped with a roll-over protective structure meeting the requirements of an appropriate Recommended Practice of the Society of Automotive Engineers or such other requirements as may be acceptable to the Chief Inspector of Mines.

The following is a summary of the heavy open-pit and quarry equipment in use during 1973:

Dump Trucks (Off-highway)

Capacity of Vehicle (Tons)	Number in Use
0–20	198
21–40	140
41–60	50
61–80	17
81–100	90
120	67
150	1
200	21
Total	584

Pit Shovels

Size of Shovel Bucket (Cu. Yds.)	Number in Use
0–2	16
2¼–4	16
4¼–6	15
6¼–8	6
9–11	7
13–14	5
15–16	16
25	4
54–64 (draglines)	2
Total	87

Front-end Loaders

Size of Bucket (Cu. Yds.)	Number in Use
0–2	90
2¼–4	109
4¼–6	57
8¼–10	14
10¼–12	5
15	5
20–25	5
Total	285

General

In January 1973 a meeting of representatives from the Department of Mines and Petroleum Resources; the Department of Commercial Transport; the Department of Lands, Forests, and Water Resources; the British Columbia Hydro and Power Authority; and the Workmen's Compensation Board was arranged under the chairmanship of F. MacLean, Deputy Minister of Commercial Transport, in order to discuss common problems involving the design, use; and regulation of mobile equipment in British Columbia. As a result of this meeting, an inter-Departmental Joint Standing Committee on Mobile Equipment was formed, comprising two members of the Workmen's Compensation Board, a member of the Department of Commercial Transport, a member of the Department of Mines and Petroleum Resources, and a, member of the Motor-vehicle Branch. This group met on 14 occasions during the year and considered over 250 separate requests from manufacturers and distributors for joint acceptance of their equipment for use in British Columbia. The work of this committee has been extremely useful in correlating the standards adopted by different Government agencies in British Columbia, and also by a pooling of ideas and experiences of the many inspectors employed by the different authorities. In general, manufacturers and users have welcomed the format&Of this committee and have benefited from its efforts to establish a more uniform policy ln British Columbia.

As a result of a resolution agreed to by the Canadian Provincial and Territorial Chief Inspectors of Mines at their annual meeting, a set of guidelines. for the design, construction, and testing of mobile and other mining equipment was compiled and presented to manufacturers and distributors at the first Canadian Mining and Aggregate Equipment Exhibition held in Toronto on November 20, 21, and 22, 1973. The Chief Inspectors had found that many manufacturers were reluctant to meet individual Provincial safety standards because of the relatively small market involved and they believed that a concerted 'approach by all inspection authorities would carry more weight. With considerable help from other Provincial mine inspectors, the proposed guidelines, as finally presented, covered many aspects of motor-vehicles, personnel carriers, mobile cranes, raise climbers, and personnel hoists, pit shovels and drills, monorail transporters, conveyers, and shop cranes.

It was explained to the manufacturers and distributors that the proposed guidelines were not intended as proposed rules or regulations but were simply ideas for further discussion by all interested parties. It is hoped that sufficient comments and criticism wlll be received from manufacturers and others, to enable a revised set of guidelines to be presented to the Chief Inspectors of Mines at their next annual meeting, and that this presentation can be used as a basis for future legislation.

ENVIRONMENTAL CONTROL

The following is the summary of the environmental control report submitted by S. Elias, Senior Inspector, Environmental Control.

Sixty-three surveys of dust and ventilation conditions were made at 58 operations during 1973. The surveys were made. at lode mines, both underground and open pit, rock quarries, gravel-crushing plants, and at open-pit and underground coal-mining operations. Measurements of the ventilation and observations of the condition Of exhaust systems and other 'measures relative to the' prevention, suppression, and elimination of dust and health hazards were made. Recommendations and advice were given for improvements which it was considered would help to lower the health hazard in. general.

Three different instruments are use&for sampling the various types of dust. The Konimeter is used to sample rock dust at the Underground and open-pit mines and- plants, at the rock and limestone quarries, and at crushing operations,: The midget impinger and gravimetric sampler are used to sample asbestos dust and fibre in the asbestos industry, and the gravimetric sampler is used to assess the health hazard in the coal mines.

Fifty per cent of the surveys at drilling operations at underground mining operations gave averages of less than 300 particles per cubic centimetre of air. Drilling in development raises is the most. hazardous due to higher than average dust concentrations.

Niiety per cent of the surveys at the "all others underground" category gave averages below the 300 particles per cubic centimetre of air standard. Industry must be aware that the cost of additive contamination of mine air by mechanization with diesel-powered equipment must be considered when planning mining methods to ensure that tbe distribution of adequate ventilation receives the priority necessary' to avoid adverse health hazards.

In tbe crushing plants at underground mines category, 69 per cent of the surveys gave averages that Were less than 300 particles per cubic centimetres of air. Careful maintenance of the dust-control systems and good housekeeping is required to maintain dust concentrations within the desired standard.

There are still dust-control systems in the assay grinding-rooms that will not maintain satisfactory conditions. The hazard is well defined and the control measures are available; these must be utilized in the future.' Sixty-three per cent of the surveys gave averages that were below 300 particles per cubic centimetre of air.

Methods to control dust at open-pit drilling operations are installed at all drills; the effectiveness of control is directly proportional to the workman's attitude toward dust control-instruction may be the answer: Fifty-six per cent of the surveys gave concentrations that are within the 300 particles per cubic centimetre of air standard.

At "all other operations" in open-pit mining the caterpillar operator is receiving the highest dust concentration. This is due to reversing the engine cooling fan so that the heat from the engine is utilized to keep tbe operator warm during the winter months. The installation of cabs with heaters is overcoming this adverse condition. Ninety-one per cent of the surveys gave averages that were less than 300 particles per cubic centimetre of air.

Crushing plants at open pits are still experiencing problems with dust control due to a number of factors, e.g., large tonnages, improper maintenance of dust-control equipment, lack of workmen for housekeeping; etc. Forty-one per cent of the surveys were under the 300 particles per cubic centimetre of air.

At rock and limestone quarries the results of the dust surveys showed the following: At drilling operations 83 per cent of the surveys were less than 300 particles per cubic centimetre of air, at "all others" operations 100 per cent were within the standard; at crushing o&rations 47 per cent were below the 300 particles per cubic centimetre of air; at bagging operations one survey was taken that was above the allowable standard: An intensified programme is under way to ensure better dust control is practised 'at crushing operations of the structural-materials and industrial-minerals operations..

In the coal mines 63 per cent of' the gravimetric samples were below the 3.0 milligrams per cubic metre standard, and 75 per cent of the Konimeter surveys were below the 300 particles per cubic centimetre of air. A change in the method of auxiliary ventilation is necessary to reduce the dust hazard at continuous miners.

Forty-three noise surveys were made at various mining operations. Eighty-three per cent of all workmen in the mining industry that are exposed to excessive noise levels were wearing ear protection. Ninety-five per cent of the drills used underground were equipped with acceptable muffling devices. Audiometric testing for hearing acuity is receiving excellent attention from the mining industry.

Certificates of fitness were checked at the mining operations with the following results:

Lode mining—98 per cent had the required certificates of fitness.

Coal mining—96 per cent had the required certificates of fitness.

The following graphs show the median of all averages in the various operations in the lode mines obtained each year since 1937.

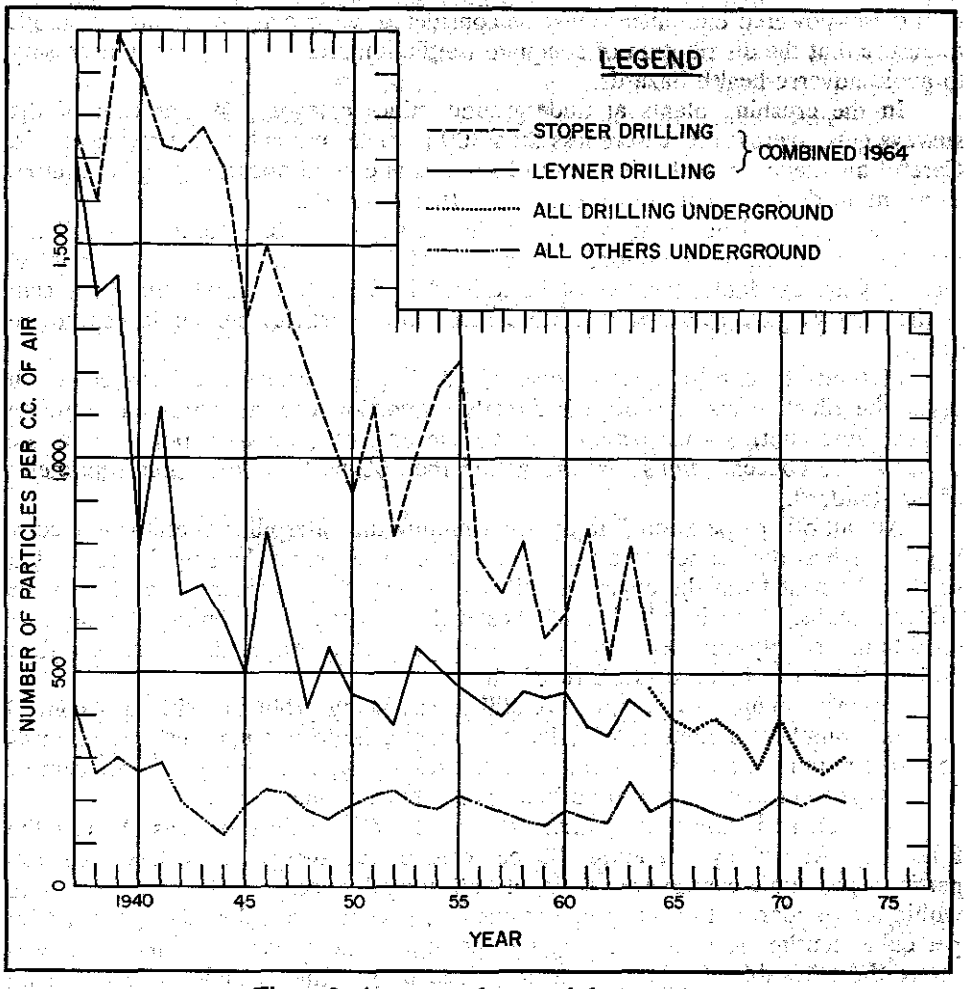


Figure 8. Average underground dust counts.

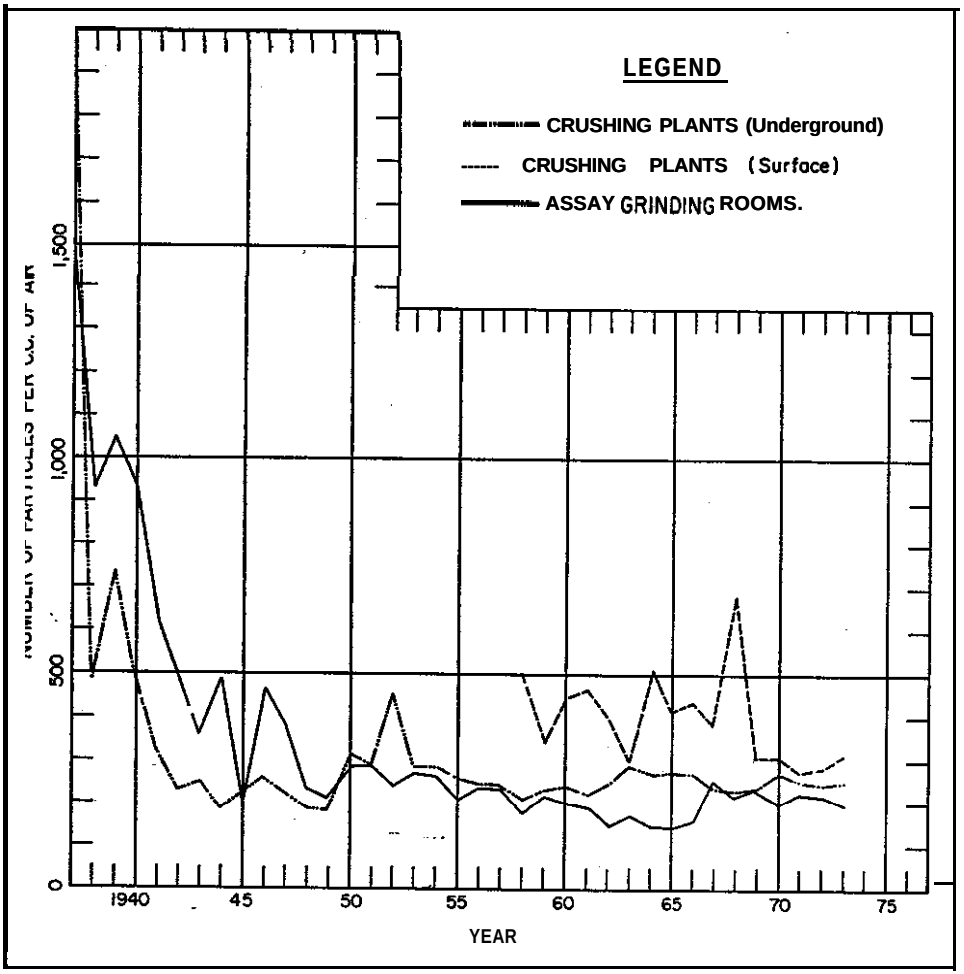


Figure 9. Average crushing and grinding dust counts.

SHIFTBOSS CERTIFICATES

Section 21 of the *Mines* Regulation *Act* requires that every person employed underground or in open-pit working must be under the daily supervision of an official who is tbe holder of a shiftboss certificate issued under the Act. In addition, section 23 of the Coal *Mines* Regulation *Act* requires that every person employed in open-pit workings at a coal mine shall be under the daily supervision of a shiftboss or other official who is the holder of an open-pit shiftboss certificate issued under the Act.

An applicant for a shiftboss certificate must hold a mine-rescue certificate (surface or underground as requisite), a currently valid first aid certificate, and is required to pass an examination on the regulations and rules as contained in the respective Acts. Three different certificates are issued—one for underground metal-mining operations; one that is valid in both coal- and metal-mining open-pit operations; and a third for sand-, gravel-, and clay-removal operations. A fee of $5 is charged for the examination. There were 165 applications for examinations filed during 1973.

The Board of Examiners may grant provisional certificates under such conditions as it considers advisable. During 1973, 110 provisional certificates were issued.

Examinations were held at various places throughout the Province, and, of the 117 examinations written, 94 candidates passed. There were 107 shiftboss certificates issued, 33 to underground shiftbosses, 68 to those employed in open-pit mining, and six to those employed in gravel pits. The recipients are listed in the accompanying tables.

Underground Shiftboss Certificates, 1973

Cert. No.	Name	Date	Cert. No.	Name	Date
715	James E. A. Lovestrom	3/1/73	732	William J. Hope	26/4/73
716	Jack M. Lambert	8/1/73	733	Peter I. Morrison	2/5/73
717	Archie C. Anstey	9/1/73	734	James A. McCormack	2/5/73
718	William J. Zenuik	9/1/73	735	John B. Hancock	2/5/73
719	Bertram Johns	5/2/73	736	Kenneth Adams	3/5/73
720	Thomas G. C. Richards	16/2/73	737	Andrew J. Pothier	23/5/73
721	Albert J. Gartner	21/2/73	738	Josef Hoffman	23/5/73
722	Kent E. Card	22/2/73	739	Donald F. Stanley	23/5/73
723	Lyle R. Flint	22/2/73	740	Michael A. Lalonde	25/5/73
724	Donald K. McBain	19/3/73	741	Ronald F. Brow	8/6/73
725	Daniel A. Danielson	20/3/73	742	Gerald T. Bullock	19/7/73
726	Kenneth L. Saje	28/3/73	743	Kenneth E. Farran	19/7/73
727	William G. Clarke	2/4/73	744	George B. Nickerson	19/7/73
728	A. Daniel Tidsbury	4/4/73	745	Robert E. Kirschman	13/8/73
729	William H. LaCroix	6/4/73	746	Robert J. Dowdall	13/8/73
730	Spencer G. Turley	25/4/73	747	George Braun	25/9/73
731	James D. Pringle	26/4/73			

Gravel-pit Shiftboss Certificates, 1973

Cert. No.	Name	Date	Cert. No.	Name	Date
GP-32	Peter J. Mitchell	5/1/73	GP-35	John Sarnowski	27/2/73
GP-33	John P. Carlson	27/2/73	GP-36	Richard G. Ball	9/5/73
GP-34	Peter Nassichuk	27/2/73	GP-37	Brian H. Butler	4/9/73

Open-pit Shiftboss Certificates, 1973

Cert. No.	Name	Date	Cert. No.	Name	Date
OP-186	Douglas W. Flynn	5/1/73	OP-220	Clarence E. Bouthillier	26/3/73
OP-187	Norman H. Merke	5/1/73	OP-221	L. Gordon Clarke	27/3/73
OP-188	Frank M. Paparich	5/1/73	OP-222	William G. Clarke	2/4/73
OP-189	Thomas E. Daley	8/1/73	OP-223	Bernard F. Hartinger	3/4/73
OP-190	Stanley G. Hill	8/1/73	OP-224	A. Daniel Tidsbury	4/4/73
OP-191	Joseph M. Pasich	8/1/73	OP-225	Barry H. Sherman	8/5/73
OP-192	C. W. Robert Slater	8/1/73	OP-226	Ernest S. Hogg	8/5/73
OP-193	Marc Lemieux	12/1/73	OP-227	Vernon W. Shuttleworth	9/5/73
OP-194	Eric R. Ernst	24/1/73	OP-228	Peter L. Ogryzlo	9/5/73
OP-195	Juhan J. Kalmet	1/2/73	OP-229	Gerald H. Grosky	9/5/73
OP-196	Frank B. Firomski	1/2/73	OP-230	Frank Kovacs	13/6/73
OP-197	Kurt Rosger	1/2/73	OP-231	Horst Schoenhoff	15/6/73
OP-198	William A. Lyons	1/2/73	OP-232	Leonard F. Vaness	26/6/73
OP-199	Milton J. Prokopetz	1/2/73	OP-233	James W. Allin	28/6/73
OP-200	Brian Whitehead	1/2/73	OP-234	Dino A. Basso	28/6/73
OP-201	George E. Hatch	5/2/73	OP-235	Thomas E. Milner	28/6/73
OP-202	William D. Diment	5/2/73	OP-236	R. Norman Myhre	28/6/73
OP-203	Keith P. Koppert	5/2/73	OP-237	Lyle E. Paulhus	17/7/73
OP-204	Agnar Hamarsnes	12/2/73	OP-238	Andy H. Johnson	18/7/73
OP-205	Donald A. Greenwood	12/2/73	OP-239	William H. Myckatyn	27/8/73
OP-206	Thomas G. C. Richards	16/2/73	OP-240	Julian R. J. Gagnon	1/10/73
OP-207	Richard A. McKay	27/2/73	OP-241	Meno Bianchini	11/10/73
OP-208	Thomas W. James	7/3/73	OP-242	Thomas C. Geske	11/10/73
OP-209	George MacQueen	15/3/73	OP-243	Orval C. Walmsley	11/10/73
OP-210	Edward P. Bodnar	19/3/73	OP-244	Edward A. Tibble	11/10/73
OP-211	David Humes	19/3/73	OP-245	Donald J. Barker	17/10/73
OP-212	Russel E. Larson	19/3/73	OP-246	Jay K. Taylor	24/10/73
OP-213	Charles O. Eddy	19/3/73	OP-247	Ken W. Pickering	14/11/73
OP-214	George L. McNaughton	23/3/73	OP-248	Jack H. Tyrrell	14/11/73
OP-215	Warren H. Draper	23/3/73	OP-249	Richard E. Rodger	19/11/73
OP-216	Richard M. Young	23/3/73	OP-250	Gene G. Lant	4/12/73
OP-217	William G. Kinzel	23/3/73	OP-251	Bradley G. Thiele	17/12/73
OP-218	Wallace R. Kerr	23/3/73	OP-252	Ronald Stard	17/12/73
OP-219	Donald E. Auger	26/3/73	OP-253	John D. M. Byer	21/12/73

CERTIFICATE3 OF COMPETENCY

Sections 23 and *24* of the *Coal Mines Regulation Act require* that managers and certain other supervisory officials of underground coal mines shall be the holders of certificates of competency issued under this Act. A Board of Examiners is responsible for setting examinations from time to time for these certificates, for considering applications for interchange certificates, and for advising the Miter in accordance with section 26 (3) of the Act. In 1973 only one candidate presented himself for examination (for a second-class certificate), but was unsuccessful. Six candidates applied for interchange certificates, all of whom were granted certificates by the Minister on the Board's recommendation. These included two applicants for first-class certificates, one for a second-class certificate, one for a third-class certificate, and two for mine surveyor's certificates. One of the applicants for a tint-class certificate was required by the Board to sit for a written examination on the *Coal Mines Regulation Act,* which he passed successfully. Three of the applicants for interchange certificates held equivalent qualifications from the United Kingdom, one from the State. of Western Australia, and two from the Province of Alberta. All candidates were interviewed by members of the Board.

The following certificates were issued in 1973:

First-class Certificates of Competency

Certificate No.	Name	Date
A237	P. J. Appleby	February 19.
A238	J. W. Cowan	April 10.

Second-class Certificate of Competency

B 3 3 9 ..... M. Bianchini..... - July *30.*

Third-claw Certificate of Competency

C1057 .....R. Brewer..- . ..... June 14.

Surveyor's Certificates

114..... R. J. Postlethwaite..... May 31.
115 .....P. J. Shedden..... August 9.

MINE RESCUE, SAFETY, AND FIRST AID

Five folly equipped mine-rescue stations are maintained throughout the Province. These are at Fernie, Kamloops, Nanaimo, Nelson, and Prince George, and, with the exception of Femie, each station is established as a mobile unit to transport equipment anywhere in that area to be available for either rescue or training purposes. The mine-rescue co-ordinator at each station is fully qualified to instruct in first aid and mine-rescue training.

Each station is equipped with sufficient self-contained oxygen-supplying apparatus to maintain two mine-rescue teams of six men each should any emergency arise in the nearby ties. In addition, varying amounts of similar equipment are maintained at the different mines throughout the Province. This equipment is either wholly owned by the mine or is on loan from the Department. In 1973 the mine-rescue equipment owned by this Department totalled 57 Aerorlox two-hour liquid-oxygen breathing-machines, 9 Dräeger BG-174 and 44 McCaa two-hour high-pressure gaseous-oxygen breathing-machines, and 51 Chemox one-hour chemical oxygen-producing machines. The equipment owned by industry totalled 30 Aerorlox, 24 BG-174, 50 McCaa, and 67 Chemox machines. Each station, as well as most mines, have additional auxiliary equipment such as Type N gas masks, self-rescuers, gas detectors, oxygen therapy units, and first aid equipment.

The district co-ordinators of rescue training make periodic visits to the mines to give rescue training to open-pit and underground employees and to check the rescue equipment to insure it is being maintained satisfactorily.

Courses in both underground and surface mine-rescue training as well as first aid are presented by the district co-ordiiators and are detailed herewith.

In the Fernie district, underground mine-rescue training was given to 56 men employed by Kaiser Resources Ltd. at Michel and surface mine-rescue training was given to a total of 154 persons working in various open-pit and miscellaneous other operations in the East Kootenay area. Assistance was also given in the examination of 95 St. John Ambulance first aid candidates and to 31 Industrial first aid candidates.

The Kamloops mobile unit provided mine-rescue training at Bethlehem, Brenda, Craigmont, Gibraltar, and Ingerbelle (Similkameen) mines, and at Mica Creek Dam with 50 men obtaining surface mine-rescue certificates, and 27 men obtaining the underground mine-rescue certificates. Assistance in training and examinations were given to 150 candidates for their St. John Ambulance first aid certification.

In October two instructors' training classes were given at Kamloops at which all co-ordinators assisted 22 candidates for survival rescue instructors' certificates, and 25 candidates for surface mine-rescue instructors' certificates. The survival rescue training is an innovation in our rescue-training programme and is designed for all men working underground to become acquainted with the basic rudiments of self-protection and preservation should they be exposed to any tie hazard underground.

The Nanaimo mobile unit provided underground mine-rescue training for a total of 51 persons at the mines at Britannia and Tasu, for the Diamond Drilling Association in Vancouver, and the British Columbia Institute of Technology in Bumaby. In addition, 48 persons were given surface mine-rescue training at the Tasu and Island Copper mines and Pitt River quarry. Nineteen persons in the Nanaimo and Powell River areas were given the rescue training course provided for individuals endeavouring to qualify for the shiftboss certificates required to be held by gravel pit supervisors. This unit also provided first aid training for 13 persons qualifying for their first aid certificates.

The Nelson mobile unit provided surface mine-rescue training to a total of 48 persons at the Rossland Mig School, in Salmo, and in Nelson. In addition, 147 persons were trained for and received their first aid certificates. Assistance in examining was also given to 12 mine-rescue candidates and 34 first aid certificate candidates in Kiiberley.

The Prince George mobile unit provided surface mine-rescue training for a total of 73 persons employed at Bell (Newman), Cassiar, Endako, Gibraltar, and Granisle open-pit mines. Underground mine-rescue training was provided for 31 persons employed at Coalition Coal, Granduc, Pinchi Lake, and the Silver Queen (Nadina) mines. Additionally, nine men were provided gravel-pit-rescue training at Kitimat, and four were trained for their St. John Ambulance First Aid Certificate in Prince George.

In summary, Department Rescue Co-ordinators conducted rescue-training classes for the certification of 128 men in underground mine rescue, 240 men in surface mine rescue, and 29 men in gravel-pit rescue. In addition, training was given either fully or in part to 365 individuals who qualified for either the St. John Ambulance or Industrial first aid certification. The names of the persons completing the rescue courses and awarded. Department certificates are contained in the following lists:

Underground Mine-rescue Certificates, 1973

Cert. No.	Name	Where Trained	Cert. No.	Name	Where Trained
5161	Gerald F. Allain	Britannia Beach.	5176	John Alexander McIntosh	Tasu.
5162	Roger Boucher[1]	Britannia Beach.	5177	Charles L. Stafford	Tasu.
5163	Jose Gomez Diaz	Britannia Beach.	5178	Steven A. Wulf	Tasu.
5164	Jules U. Pellerin	Britannia Beach.	5179	David Ian Ross Henderson	Vancouver.
5165	Spencer J. Turley	Britannia Beach.	5180	Roger Barry Elliott	Vancouver.
5166	William Joseph Hope	Britannia Beach.	5181	Brian Prochnicki	Vancouver.
5167	Bertram Johns	Britannia Beach.	5182	N. Douglas Birkenhead	Vancouver.
5168	Kenneth A. MacKenzie	Britannia Beach.	5183	Kenneth Walter Lukawesky	Vancouver.
5169	Helmut Koch	Britannia Beach.	5184	Richard George Turner	Vancouver.
5170	Clark A. Fortin	Britannia Beach.	5185	Rick I. Conte	Vancouver.
5171	Jack Palfy	Chetwynd.	5186	J. Scott Murray	Vancouver.
5172	Norman H. Bennett	Tasu.	5187	Douglas A. Wright	Vancouver.
5173	Larry Campanas	Tasu.	5188	Edward Leonard Hardy	Vancouver.
5174	Gerald Henry Heigh	Tasu.	5189	David Stanley Beal	Vancouver.
5175	Frank Kovacs	Tasu.	5190	David Vincent Cummings	Vancouver.

[1] Supervision only.

Underground Mine-rescue Certificates, 1973—Continued

Cert. No.	Name	Where Trained
5191	Paul Guiguet	Vancouver.
5192	Ernest Leo Eagles	Vancouver.
5193	Elmer E. Hoeppner	Vancouver.
5194	R. Paul Middleton	Vancouver.
5195	Arthur William Grimley	Fernie.
5196	Barry Lee Buchan	Merritt.
5197	Rodney L. Draper	Merritt.
5198	Gerald W. Miller	Merritt.
5199	Frederick H. Blair	Merritt.
5200	Alex Monroe Stocks	Merritt.
5201	Charles J. Petit	Merritt.
5202	Leonard K. Post	Merritt.
5203	Searle R. Malanych	Merritt.
5204	Paul R. Clairmont	Merritt.
5205	Evert John Houtstra	Merritt.
5206	Frank Foederer	Chetwynd.
5207	Roger E. Shields	Chetwynd.
5208	Brian Dingreville	Chetwynd.
5209	Frank Salt	Chetwynd.
5210	Archie Emblau	Chetwynd.
5211	Raymond William Watt	Chetwynd.
5212	Roman William Balko	Stewart.
5213	John B. Hancock	Stewart.
5214	James A. McCormack	Stewart.
5215	Kenneth Adams	Vancouver.
5216	Emile Kuzyk	Vancouver.
5217	Andrew John Pothier	Vancouver.
5218	Kenneth E. Erdman	Vancouver.
5219	John W. Cowan	Fernie.
5220	Louis Veress	Houston.
5221	George R. Buys	Houston.
5222	Walter Yasinowski	Houston.
5223	George Barton	Houston.
5224	Walter F. Judge	Stewart.
5225	Michael Anthony Lalonde	Stewart.
5226	James W. MacKenzie	Stewart.
5227	Vladimir Chramosta	Fernie.
5228	Ernie A. Klassen	Fernie.
5229	Henry John David Toews	Fernie.
5230	Wayne H. Tessman	Fernie.
5231	Elio E. Feragotti	Fernie.
5232	Kenneth S. Petras	Fernie.
5233	Gerald Tinley Bullock	Kimberley.
5234	James Allen Dales	Kimberley.
5235	Maxwell Earl Donaldson	Kimberley.
5236	Bruce Norman Dudley	Kimberley.
5237	Douglas John Fraser	Kimberley.
5238	Robert Archibald Horie	Kimberley.
5239	Robert James Johnston	Kimberley.
5240	Clarance Kenneth Martin	Kimberley.
5241	William Wallace McNiel	Kimberley.
5242	William Robert Roberts	Kimberley.
5243	James M. Thorrougood	Kimberley.
5244	Kenneth Edwin Farran	Kimberley.
5245	Theodore H. P. Roseman	Kimberley.
5246	Daniel Irwin Joseph Baker	Kimberley.
5247	Kenneth Wayne Porter	Kimberley.
5248	Richard Stewart Worden	Britannia Beach.
5249	Reginald M. Nordman	Britannia Beach.
5250	Bogdan (Bob) Tutush	Britannia Beach.
5251	Harold Joseph Rannells	Britannia Beach.
5252	Alan Graham Boon	Britannia Beach.
5253	Neil A. Pacey	Britannia Beach.
5254	Frederic Neil Ramseier	Britannia Beach.
5255	Barton George Stone	Britannia Beach.
5256	Lester R. Erickson	Mica Creek.
5257	Leonard D. Kochylema	Mica Creek.
5258	Jim W. Seminoff	Mica Creek.
5259	Lionel G. Heuscher	Mica Creek.
5260	Kryl E. Faulk	Mica Creek.
5261	William M. Taylor	Mica Creek.
5262	John D. Willett[1]	Mica Creek.
5263	James D. McDonald	Mica Creek.
5264	Robert C. Vaughan	Mica Creek.
5265	Thomas J. Dodge	Mica Creek.
5266	Daniel Golnich	Mica Creek.
5267	James E. Chambers	Mica Creek.
5268	Ronald J. Witham	Mica Creek.
5269	Sebastian M. Schmidt	Mica Creek.
5270	J. Douglas McIntosh	Mica Creek.
5271	Daniel Grady	Mica Creek.
5272	Henry Warner	Mica Creek.
5273	Nelson E. Allan	Stewart.
5274	Alex G. Boyle	Stewart.
5275	Michael W. Delich	Stewart.
5276	Ronald Gerald Devin	Stewart.
5277	William Alan Glover	Stewart.
5278	Charles Donald Marshall	Stewart.
5279	Pentti A. Pajala	Stewart.
5280	Richard Scott Parker	Stewart.
5281	Pierre Rancourt	Stewart.
5282	Edward Franklin Skoda	Stewart.
5283	Joseph John Shlemkevich	Stewart.
5284	Douglas Anthony Booth	Tasu.
5285	William N. Fegan	Tasu.
5286	Milan Kohout	Tasu.
5287	Wayne David Rains	Tasu.
5288	Leo Vienneau	Tasu.

Surface Mine-rescue Certificates, 1973

O-649	Rodney Keith Audia	Rossland.
O-650	Devinder Singh Aulakh	Rossland.
O-651	Alfred James Bergkvist	Rossland.
O-652	Walter Grassie Colk	Rossland.
O-653	Martin Richard Edgington	Rossland.
O-654	Major Singh Gill	Rossland.
O-655	Richard Hobman	Rossland.
O-656	Jerry Hunter	Rossland.
O-657	Leonard Thomas Joslin	Rossland.
O-658	Alistair Weber Metcalf	Rossland.
O-659	Donald Moroz	Rossland.
O-660	Adrian Carder Parkinson	Rossland.
O-661	Patrick Owen Rozek	Rossland.
O-662	Tom Simm	Rossland.
O-663	Leonard Francis Vaness	Rossland.
O-664	Gary Victor Weippert	Rossland.
O-665	Guy Oliver Winstanley	Rossland.
O-666	Richard Nelles Young	Rossland.
O-667	Eric R. Ernst	Kamloops.
O-668	Thomas M. Waterland	Kamloops.
O-669	Gordon Ross Pritchard	Fernie.
O-670	Roderick Douglas Nelson	Fernie.
O-671	Herbert S. Forsyth	Fernie.
O-672	Andrew Denton Prendergast	Fernie.
O-673	Jack Beard	Fernie.
O-674	William F. Hurst	Fernie.
O-675	Gilbert Grocutt	Fernie.
O-676	Anthony W. Freeman	Fernie.
O-677	Wallace R. Kerr	Fernie.
O-678	Donald Auger	Fernie.
O-679	Gerrit W. Van Andel	Fernie.
O-680	John Lyotier	Granisle.

[1] Supervision only.

Surface Mine-rescue Certificate, 1973—Continued

Cert. No.	Name	Where Trained
O-681	Frank Bernard Firomski	Granisle.
O-682	Doug W. Mearns	Granisle.
O-683	Gerald H. Grosky	Granisle.
O-684	Kurt Rosger	Granisle.
O-685	William Allen Lyons	Granisle.
O-686	Milton John Prokopetz	Granisle.
O-687	Keith Kasper	Granisle.
O-688	Peter L. Ogryzlo	Granisle.
O-689	Lyle Morin	Granisle.
O-690	V. W. (Bill) Shuttleworth	Granisle.
O-691	Thomas Gordon C. Richards	Granisle.
O-692	Brian Whitehead	Granisle.
O-693	Cyril Squires	Granisle.
O-694	Juhan John Kalmet	Granisle.
O-695	Murray Bruce Wilson	Cassiar.
O-696	Wayne Woodrow Anderson	Cassiar.
O-697	Paul Anders	Cassiar.
O-698	Donald Campbell	Cassiar.
O-699	Joginder Singh Thandi	Cassiar.
O-700	Edward A. Tibble	Elkford.
O-701	Thomas Carl Geske	Elkford.
O-702	Lloyd Frank Antypowich	Elkford.
O-703	Norman R. Axtell	Elkford.
O-704	Ronald James Mason	Elkford.
O-705	Lyle E. Paulhus	Elkford.
O-706	James D. Wrigley	Elkford.
O-707	Douglas F. Wolfe	Elkford.
O-708	Robert Keith Williams	Elkford.
O-709	John C. Crombie	Elkford.
O-710	John R. Miller	Elkford.
O-711	Allan B. Clarke	Elkford.
O-712	Philip L. Robinson	Logan Lake.
O-713	Richard E. Eckery	Logan Lake.
O-714	John Horvath	Logan Lake.
O-715	Albert B. Ryde	Logan Lake.
O-716	Jacob Bratiuk	Logan Lake.
O-717	Ivan Collins	Logan Lake.
O-718	Graham J. Smith	Logan Lake.
O-719	Henry Soviskov	Logan Lake.
O-720	Marcel P. Levesque	Logan Lake.
O-721	Alan M. Rigden	Logan Lake.
O-722	Salvador B. Brouwer	Tasu.
O-723	George Farsang	Tasu.
O-724	William N. Fegan	Tasu.
O-725	David Eric Haigh	Tasu.
O-726	Milan Kohout	Tasu.
O-727	Kauko O. Laspa	Tasu.
O-728	Arnold Glen Martinson	Tasu.
O-729	S. Wayne Moseanko	Tasu.
O-730	Terry A. Sampson	Tasu.
O-731	Horst G. Schoenhoff	Tasu.
O-732	Alvin George Amundson	Fernie.
O-733	Fred Robert Betker	Fernie.
O-734	Richard Abraham Blankman	Fernie.
O-735	Derek Ian Crawford	Fernie.
O-736	David Michael DeLuca	Fernie.
O-737	Nicholas Bernard George	Fernie.
O-738	Trevor John Gill	Fernie.
O-739	Wayne Frederick Osborne	Fernie.
O-740	Orval Claude Walmsley	Fernie.
O-741	Andrew Louis Zuffa	Fernie.
O-742	Archie Lesiuk	Port Hardy.
O-743	Harry B. Gould	Port Hardy.
O-744	Ronald J. Hillis	Port Hardy.
O-745	Ken A. Sandberg	Port Hardy.
O-746	Gregory Kenneth Thompson	Port Hardy.
O-747	Donald N. Ihlen	Port Hardy.
O-748	John S. Pressdee	Port Hardy.
O-749	Marvin S. Orosz	Port Hardy.
O-750	Abel James Hindle	Port Hardy.
O-751	Martin Philip Blackmore	Port Hardy.
O-752	William C. Zepik	Port Hardy.
O-753	Richard E. Rodger	Port Hardy.
O-754	Allan Morrison	Burns Lake.
O-755	Robert Charles Coupal	Port Hardy.
O-756	David E. Hoefling	Port Hardy.
O-757	Glen D. Marshall	Port Hardy.
O-758	Frank Bates	Fernie.
O-759	Gary Borgen	Fernie.
O-760	Raymond D. Cameron	Fernie.
O-761	Vince Colucci	Fernie.
O-762	Ray Corcoran	Fernie.
O-763	Wytze Kingma	Fernie.
O-764	Yves Laborderie	Fernie.
O-765	Auguste P. Mercereau	Fernie.
O-766	Ole Robert Rothel	Fernie.
O-767	Terrence Rowlinson	Fernie.
O-768	Keith Watson	Fernie.
O-769	Redvers M. Krause	Princeton.
O-770	A. Wayne Morrison	Princeton.
O-771	R. Bruce Giggey	Princeton.
O-772	Alan K. Van Dusen	Princeton.
O-773	John Leiding	Princeton.
O-774	Angus J. McInnis	Princeton.
O-775	Neil A. Murdoch	Princeton.
O-776	James G. Fiske	Princeton.
O-777	Donald J. Barker	Princeton.
O-778	Gerd Antpoehler	Princeton.
O-779	James W. Allin	Princeton.
O-780	Ernest S. Hogg	Princeton.
O-781	Roderick K. Folick	Princeton.
O-782	Delmar D. Dyck	Princeton.
O-783	John D. Martens	Princeton.
O-784	Leno Carlo Benetton	Elkford.
O-785	Barry Sherman	Elkford.
O-786	Richard P. Grieve	Elkford.
O-787	George Edward Jackson	Elkford.
O-788	Benjamin Cyril Ramage	Elkford.
O-789	Daniel R. Wilson	Elkford.
O-790	Walter James Broadfoot	Athalmer.
O-791	John R. Hemmelgarn	Athalmer.
O-792	Harold James Harreson	Athalmer.
O-793	Robert F. Kimm	Athalmer.
O-794	Allen McElderry	Athalmer.
O-795	Nolan Rad	Athalmer.
O-796	David Alexander Taylor	Endako.
O-797	Brian L. McHugh	Endako.
O-798	Thomas E. Bloomquist	Endako.
O-799	Jay Kent Taylor	Endako.
O-800	Garry Alan Bugg	Endako.
O-801	Kenneth L. Meger	Endako.
O-802	Mark Alfred Lacerte	Endako.
O-803	Allen J. Hachey	Endako.
O-804	Kenneth George Harvey	Endako.
O-805	William C. Pratt	Granisle.
O-806	David W. Campbell	Granisle.
O-807	Gary L. Bye	Granisle.
O-808	William Francis Barry Tripp	Granisle.
O-809	Stephen Cadman Simcox	Granisle.
O-810	Bunnie Merrill Godin	Granisle.
O-811	Thomas Patrick Miller	Granisle.
O-812	Michael Caruk[1]	McLeese Lake.
O-813	William Drake	McLeese Lake.
O-814	David Roughley	McLeese Lake.
O-815	Gunter Mierse	McLeese Lake.
O-816	Wesley Harrie	McLeese Lake.
O-817	Donald Charles Finter	McLeese Lake.
O-818	Earnest R. Adams	McLeese Lake.
O-819	William Nelson	McLeese Lake.
O-820	David Adrian Oliver	McLeese Lake.
O-821	Taeke Vanderkup	McLeese Lake.
O-822	Robert John Young	McLeese Lake.

[1] Supervision only.

Surface Mine-rescue Certificates, 1973—Continued

Cert. No.	Name	Where Trained	Cert. No.	Name	Where Trained
O-823	Gerry Charette	McLeese Lake.	O-856	Keith MacKenzie	Fernie.
O-824	Harlan Dennis Wheaton	McLeese Lake.	O-857	Frank W. Poch	Fernie.
O-825	John Nelis	McLeese Lake.	O-858	Larry John Torok	Fernie.
O-826	Harvey Stanley Rielly	McLeese Lake.	O-859	Ian L. Dufour	Fernie.
O-827	Peter D. Paterson	Port Hardy.	O-860	Allen L. Bucht	Fernie.
O-828	Larry R. Foreman	Port Hardy.	O-861	Krishnamurthy Pendala	Tasu.
O-829	Ronald R. Callihoo	Port Hardy.	O-862	Mary Catharine Bennett	Tasu.
O-830	Richard Leo Starr	Port Hardy.	O-863	Kenneth M. Dickinson	Tasu.
O-831	Varge W. Murray	Port Hardy.	O-864	Philip Donald Graham	Tasu.
O-832	Jack H. Tyrrell	Port Hardy.	O-865	Gordon A. Heide	Tasu.
O-833	Peter R. Dussome	Port Hardy.	O-866	Gerald H. Heigh	Tasu.
O-834	Jack E. Kraehling	Port Hardy.	O-867	Douglas W. Scheving	Tasu.
O-835	Richard Allen Love	Port Hardy.	O-868	Donald George Irwin[1]	Granisle.
O-836	Hayward M. MacDonald	Port Hardy.	O-869	Eric Dennis Sells	Endako.
O-837	Adelard J. Denis	Port Hardy.	O-870	Ron Stard	Endako.
O-838	Ken William Pickering	Port Hardy.	O-871	William M. Takashita	Endako.
O-839	Gerald Jones	Ashcroft.	O-872	Bruce J. MacNeill	Endako.
O-840	Ronald P. Bohn	Ashcroft.	O-873	Hans Geertsema	Endako.
O-841	Rodney R. Cragg	Ashcroft.	O-874	Lawrence A. Cadden	Endako.
O-842	Robert H. Rodford	Ashcroft.	O-875	Reay Garayt	Endako.
O-843	Gordon G. Black	Ashcroft.	O-876	Ronald David Newton	Endako.
O-844	Robert Vye	Ashcroft.	O-877	Allan Wallace Service	Endako.
O-845	John D. Beyer	Ashcroft.	O-878	Bradley Glenn Thiele	Endako.
O-846	Hitoshi Negoro	Ashcroft.	O-879	William Evelyn Phillipps	Granisle.
O-847	Morley R. Zant	Ashcroft.	O-880	Peter John Appleby	Granisle.
O-848	Malcolm R. Brown	Ashcroft.	O-881	Otto Dale Stanvick	Granisle.
O-849	Roderick G. Lowe	Ashcroft.	O-882	Robert Alexander McClure	Granisle.
O-850	Malcolm Laycock	Fernie.	O-883	Daniel Oscar Thompson	Granisle.
O-851	Gordon Tanner	Fernie.	O-884	Risto R. Rasku	Granisle.
O-852	Gene Lant	Fernie.	O-885	Ernest Rene Bond	Granisle.
O-853	Kenneth E. Durant	Fernie.	O-886	Gary D. Webster	Granisle.
O-854	Thomas H. Travis	Fernie.	O-887	Alan E. Lloyd	Granisle.
O-855	Norman M. Hanson	Fernie.	O-888	William Bertram Rutherford	Granisle.

Gravel Pit Mine-rescue Certificates, 1973

G-84	Brian Reid Merrick	Powell River.	G-99	Dennis Dribnenki	Kitimat.
G-85	Franciscus Spreeuw	Powell River.	G-100	Clarence Denton	Kitimat.
G-86	Hank Vander Mast	Nanaimo.	G-101	Victor H. Pealo	Kitimat.
G-87	Alan E. Beckerley	Victoria.	G-102	Les Weibe	Kitimat.
G-88	Mela Singh Sangha	Victoria.	G-103	Richard M. Bates	Terrace.
G-89	Gary Louis Scott	Nanaimo.	G-104	Daniel G. Bristow	Nanaimo.
G-90	Charles William Boyles	Cobble Hill.	G-105	Merlyn L. Clark	Nanaimo.
G-91	Kenneth John Laity	Lantzville.	G-106	Gordon Sinclair Murcheson	Nanaimo.
G-92	Brian Harold Butler	Sooke.	G-107	Abraham Leroy Richardson	Nanaimo.
G-93	Jack Milner	Nanaimo.	G-108	Kenneth S. Robinson	Nanaimo.
G-94	Walter James Broadfoot	Invermere.	G-109	Gerald A. Shires	Nanaimo.
G-95	Joseph Banyay	Kitimat.	G-110	Borge G. Soros	Nanaimo.
G-96	Merdo N. Bosiak	Kitimat.	G-111	Frederic McRae Willing	Nanaimo.
G-97	Lorne J. Darby	Kitimat.	G-112	Gary W. Woods	Nanaimo.
G-98	Jerry Chayba	Kitimat.			

[1] Supervision only.

Four mine-safety associations operate in different areas of the Province. They are sponsored by the Department of Mines and Petroleum Resources and the Workmen's Compensation Board and are aided by mining company officials, safety supervisors, Inspectors of Mines, mine-rescue co-ordinators, and, in some areas, local industry. These organizations promote mix-rescue and first aid training as well as safety education in their various districts.

The Vancouver Island Mine Safety Association held its 59th annual competition in Nanaimo on May 26. The four teams competing for the mine-rescue trophy were from Britannia, Sunro, Texada, and Lynx mines. The winning team was that of Texada Mines Ltd., and was captained by Harold Diggin.

The West Kootenay Mine Safety Association held a surface mine-rescue competition on May 26 at the Phoenix mine of The Granby Mining Company Limited. The six teams that participated were from the Kaiser Resources Ltd.'s open pit on Harmer Ridge, Fording Coal mine, Brenda mine, Phoenix mine, Western Gypsum mine, and Ingerbelle mine at Similkameen Miming Company Limited. The Fording Coal mine team of Cominco Ltd., captained by Ben Ramage, won the trophy.

The West Kootenay Mine Safety Association held its 27th annual competition in Nelson on June 2. The three teams that competed in the mine-rescue event came from the Reeves MacDonald, Highland Bell, and Silmonac (Kam Kotia-Burkam Joint Venture) mines. The Reeves MacDonald Mines Limited's team, captained by George Fecyk, won the district trophy.

The Central British Columbia Mine Safety Association held its 25th annual competition in Kamloops on June 2. Six teams entered the competition and represented the Silver Queen (Nadiia) mine of Bradina Joint Venture, Craigmont Mines Limited, Giant Mascot Mines Liiited, Granduc Operating Company, and the Pinchi Lake mine of Cominco Ltd. The winning team was from the Pinchi Lake mine of Cominco Ltd., and was captained by Peter Jones.

The Central British Columbia Mine Safety Association held its second north section surface mine-rescue competition at Prince George on June 9. The seven teams that competed were from the Bethlehem, Island Copper, Bell (Newman), Granisle, Endako, Tasu, and Cassiar asbestos mines. The winning team, captained by Lawrence Stout, was from the Highland Valley operation of Bethlehem Copper corporation Ltd.

The East Kootenay Mine Safety Association held its 52nd annual competition on June 9 at Fernie with four teams competing in the mine-rescue event. Two teams were from the Sullivan mine of Cominco Ltd., and two from the Michel underground operations of Kaiser Resources Ltd. The Kaiser team, captained by Peter Zeitb, won the East Kootenay trophy.

The winners of the district underground mine-rescue competitions competed in Kamloops on June 16 for the Provincial trophy which was won by the Kaiser Resources Ltd. team, captained by Peter Zeitb. This team represented British Columbia at Glace Bay on June 23 when the 7th Canadian Mine-rescue Championships were held. Competing teams were from Alberta, British Columbia, Nova Scotia, and the Northwest and Yukon Territories. The winning team was from Nova Scotia.

BRAVERY AWARDS

There were two instances recorded where individuals performed notable acts of bravery in 1973 in British Columbia. These are herewith recorded:

On May 25, 1973, Jim Mellon, a miner employed by Kam Kotia-Burkam Joint Venture at the Silmonac mine near Sandon, arrived at a working place where he knew another miner intended to blast several holes. As he neared the scene a shot detonated, and although he knew more shots were to go he quickly ran to the miner, whom he found suffering from the effects of the blast (later determined as a broken leg and arm, a damaged knee, and several cuts). Mr. Mellon took the injured man across his shoulders and retreated to a safe area before the next shot went off.

Mr. Mellon was awarded the Medal for Bravery of the Canadian Institute of Mining and Metallurgy at the Annual Meeting of the Institute in Montreal in April 1974. He also received a bravery cash award of $1,000 from the Workmen's Compensation Board in Nelson in March 1974.

On September 28, 1973, a miner fell approximately 136 feet down a 52-degree raise at the Pride of Emory mine of Giant Mascot Mines Limited. Mark Cawston, foreman, and Harry Skoglund, superintendent, were soon on the scene, and while they knew there was hung-up ore above which could come down on them, Mr. Cawston and then Mr. Skoglund lowered themselves on ropes and recovered the miner, who unfortunately was dead.

At the end of the year the *commission* of the Workmen's Compensation Board were investigating the incident to determine if awards should be granted.

JOHN T. RYAN TROPHIES

The John T. Ryan safety trophies were established in 1941 by the Mine Safety Appliances Company of Canada Limited to promote safety in coal and metal mines in Canada. Three Canadian and six regional trophies were established and their administration was given to the Canadian Institute of Miig and Metallurgy.

British Columbia metal mines compete for the British Columbia and Yukon Regional District award as well as for the national metal-mines trophy. The trophies are awarded to the metal-mining company or companies having the least number of compensable accidents per million man-hours of employment recorded. If the million hours cannot be achieved in one year, they may be accumulated over a longer continuous time interval; however, no portion of that period may be used in another application for the same award but can be utilized in application for a higher award. In 1973 the British Columbia and Yukon Regional District award for metal mines was won by the Myra mine of Western Mines Limited, with an accident frequency of 32.3.

Special mention should be made of the continuing excellent low accident frequency at Texada Mines Ltd., which was 5.4 in 1972, and 1.6 in 1973: This mine won the regional award in 1969, and the Canadian award in 1971. Having won these two awards, this mine's accident statistical period did not recommence until January 1, i972, and although these low frequencies have been obtained, there is still an insufficient total number of hours worked to requalify for competition.

The Britannia mine of Anaconda Britannia Mines Division of Anaconda Canada Limited, which won the British Columbia and Yukon Regional District award for metal mines in 1973 with an accident frequency of 15.3 per million man-hours, reduced this frequency to 12.7 in 1973, but was unable to qualify for entry similar to Texada Mines Ltd.

The coal-mine award is presented to the coal-mining company having worked a minimum of 120,000 man-hours with the least number of compensable accidents. The coal mines of British Columbia are grouped with those of Alberta to form a Western Region. In 1973 the Western Regional Award trophy was woo by Kaiser Resources Ltd. with an accident frequency of 79.71 per million man-hours.

WEST KOOTENAY MINE SAFETY ASSOCIATION TROPHY

In 1951 the West Kootenay Mine Safety Association donated a safety trophy for annual competition in order to encourage and promote safety in small mines. Entrants were originally restricted to the West Kootenay area, but in 1956 this restriction was removed and entries are accepted from any qualifying mine in the Province.

The award is made to the metal mine having the lowest accident rate and having worked a total of from 2,500 to 30,000 shifts per year, at least one-third of which having been worked underground.

In 1973 the award was won by the Highland-Bell mine of Teck Corporation Ltd. with an accident frequency of 0.103 per thousand man-shii.

SAFETY COMPETITION, OPEN-PIT MINES AND QUARRIES

In 1961 the Department of Mimes and Petroleum Resources organized a safety competition for the open-pit and quarry industry and instituted awards and donated a trophy for annual competition for operations having the least number of compensable accidents during the year. In 1965, in order to provide a more equitable competition basis, it was decided to donate a second trophy and to divide the entrants having a large number of man-hours into two groups—the A group, for those operations having from 35,000 to 200,000 man-hours per year; and the B group, for those having in excess of 200,000 man-hours per year. A certificate of achievement is awarded to operations amassing 15,000 man-hours without accidents over any continuous time interval.

In 1973 the A trophy was won jointly by two operations each having no compensable or lost-time accidents. The number. of accident-free man-hours is indicated in parentheses after the names of the following list of companies winning tbis award: The Cobble Hill quarry of British Columbia Cement Company Ltd. (61,203), and the Texada Island quarry of Canada Cement Lafarge Ltd. (47,500).

The Phoenix Copper Division of The Granby Mining Company Liited won the B trophy with an accident frequency of 9.06 per million man-hours.

In addition to the foregoing operations, certificates of achievement were won by the following and their number of accident-free man-hours listed: Canadian Refractories Division, Dresser Industries Canada, Ltd. (22,809), the Coquitlam Gravel pit of Lafarge Concrete Ltd. (19,682), the Kitimat Division of Ocean Construction Supplies Northern Liited (17,961), L.H. & K. pit of L. G. Scott Construction, Kitimat (24,161), the Langley pit of Construction Aggregates Ltd. (21,275), and the Kamloops Lafarge quarry operations of Plateau Construction Ltd. (15,102).

RECLAMATION

Under the authority of subsection (*18)* of section 11 of ***the Mines Regulation Act,*** Order in Council 1532 was approved on May 7, 1973, making mineral exploration, where there is significant disturbance of land by mechanical means, subject to section 11 of the Mines ***Regulation Act.***

During the calendar year 1973, 34 reclamation permits were issued and 38 reclamation permits were approved for renewal by the Minister of Mines and Petroleum Resources under authority of section 8 of the Coal Mines ***Regulation Act or section*** 11 of ***the Mines Regulation Act.***

Summary of ***Reclamation Permits Issued to December 31.1973***

Type of Mine	Number of Permits	Disturbed Land	Bonding
		Acres	$
Metal mines	46	18,366	2,581,500
Quarries and gravel	18	811	69,800
Coal mines	3	3,175	500,000
Coal exploration	20	2,857	258,500
Mineral exploration	25	500	61,700
Totals	112	25,709	3,471,500

AID TO THE SECURITIES COMMISSION

A. R. C. James, Senior Inspector of Mines, continued to act as mining engineer adviser to the British Colombia securities Commission. Hi duties are mainly to advise the Commission in regard to engineering reports submitted in support of prospectuses by mining companies as required by Regulation 17 under the Securities Act. Engineering advice is also required from time to time by the Commission on certain other matters, such as in connection with programmes financed by rights offerings to shareholders, on the assessment of reports of work done on mining properties, on changes in programmes or property holdings after a prospectus has been issued, on prices paid for mining properties, conditions of option agreements and in the approval of company press releases.

In 1973 a total of 159 engineering reports was examined and the Commission advised on their contents. The reports were submitted by 121 companies, mainly in support of prospectuses. One or two days a week, depending on the amount of work on hand are normally spent at the Commission offices. Valued assistance to the Commission in the evaluation of reports on petroleum and natural gas properties was given by W. M. Young, senior geologist with the Petroleum and Natural Gas Division.

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