January - December 1987
January - March 31, 1988

ANNUAL REPORT

Province of British Columbia
Ministry of Energy, Mines
and Petroleum Resources

BC

British Columbia Cataloguing in Publication Data

British Columbia. Ministry of Energy, Mines and Petroleum Resources.
Annual report. -- 1978-1986 ; 1987/88-

Continues: British Columbia. Ministry of Mines and Petroleum Resources. Annual report. ISSN 0365-9356
Continues in part: British Columbia. Ministry of Energy, Transport and Communications. Annual report. ISSN 0709-4477
Report year varies: 1978-1986, Dec. 31; 1987/88- , Mar. 31. Report for 1987/88 covers 15 month period Jan. 1, 1987 to Mar. 31, 1988.
Reports for 1980, 1981, and 1982 issued as 1 volume published in 1984.
ISSN 0228-0078 = Annual report - Ministry of Energy, Mines and Petroleum Resources

1. British Columbia. Ministry of Energy, Mines and Petroleum Resources - Periodicals. 2. Mines and mineral resources - British Columbia - Periodicals.

TN27.B7B76 354.71106823'8'05
Rev. Sept. 1989

To the Honourable JACK DAVIS
Minister of Energy, Mines and Petroleum Resources
Parliament Buildings
Victoria, British Columbia

Sir:

I have the honour to submit the Annual Report of the Ministry of Energy, Mines and Petroleum Resources for the time period of January 1, 1987 to March 31, 1988.

Yours truly,

D.H. Horswill
Deputy Minister

The Honourable David C. Lam
Lieutenant-Governor of British Columbia

May It Please Your Honour:

I respectfully submit the Annual Report of the Ministry of Energy, Mines and Petroleum Resources for the time period of January 1, 1987 to March 31, 1988.

Jack Davis
Minister

Ministry Overview

Time Coverage

This Annual Report covers the time period January 1, 1987 to March 31, 1988. It represents the transition of the Ministry's Annual Report from the earlier calendar year reporting period to a fiscal year reporting period. This change puts the report of the Ministry's activity, its annual budget, and its Business Plan on a common 12-month basis.

Subsequent Annual Reports will cover this 12-month period, while this transitional report covers a 15-month time span.

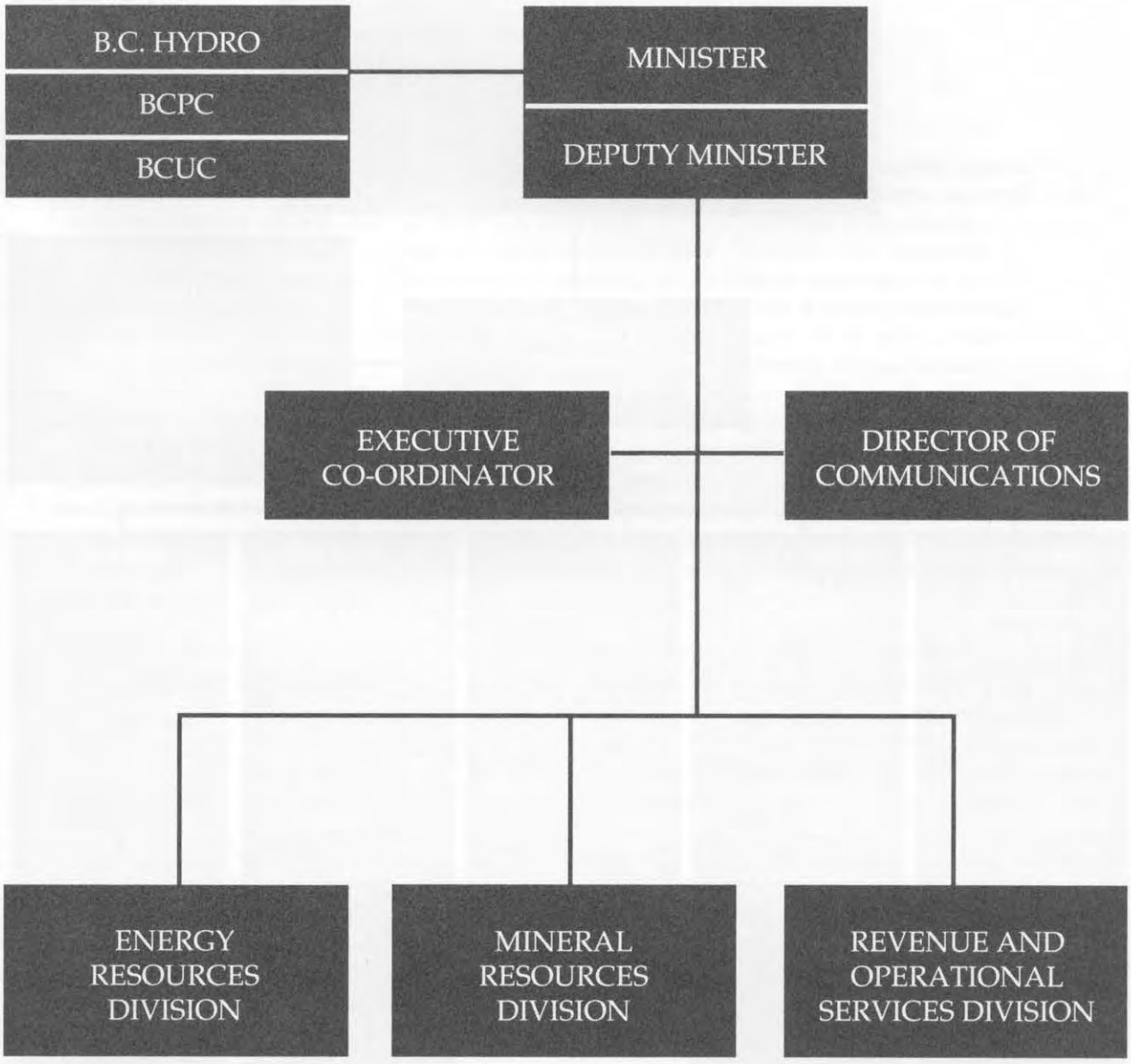
Ministry Reorganization

During the time period covered by this Report a number of significant organizational changes occurred. First, in November 1987, the former Petroleum Resources Division was amalgamated with the Energy Resources Division, thereby creating a single Ministry centre for policy, forecasting, and engineering in the energy sector.

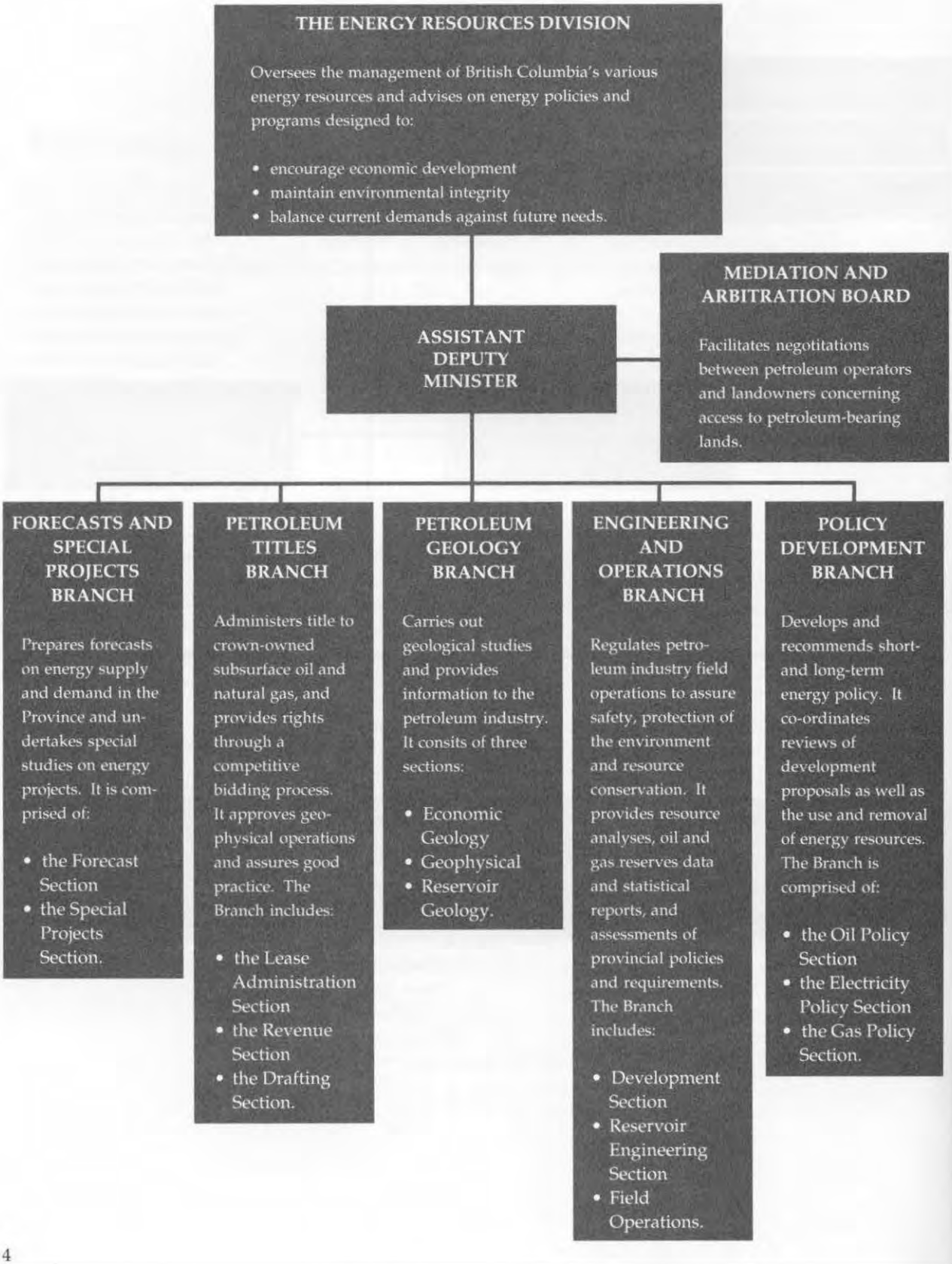
A further change in the Ministry's configuration occurred in December 1987 when the Government Personnel Services Division (GPSD) began operating within the Ministry. GPSD moved to the Ministry of Government Management Services in the summer of 1988 and is not reported in this document.

February, 1988 saw further reorganization within the Energy Resources Division. The project analysis branch was merged with policy analysis, while responsibility for the revenue function was likewise consolidated in the Energy Resources Division during the period of intensive work on rewriting the petroleum revenue data systems.

The organization chart on the following page reflects the Ministry's organization at March 31, 1988.


B.C. HYDRO
BCPC
BCUC
MINISTER
DEPUTY MINISTER
EXECUTIVE CO-ORDINATOR
DIRECTOR OF COMMUNICATIONS
ENERGY RESOURCES DIVISION
MINERAL RESOURCES DIVISION
REVENUE AND OPERATIONAL SERVICES DIVISION

Energy Resources Division



The Energy Sector in 1987

Energy policy branch initiatives in 1987 focused on deregulation of natural gas markets and prices. Following a five-month consultation process, a new market-based formula was developed which reserves 15 years of proven natural gas supplies for the Province's core market of residential, commercial and small industrial users. Large industrial gas consumers were given the responsibility of negotiating directly with producers for their own long-term sources.

Twenty-six short-term, interruptible Energy Removal Certificates (ERCs) were active in the reporting period, with 17 delivering a total of 21.2 petajoules (PJ) (546.5 10^6m^3) of natural gas to the United States for consumption mainly in the Pacific Northwest (Washington and Oregon). The remaining nine ERCs removed 4.6 PJ (117.6 10^6m^3) of natural gas from British Columbia for delivery to Canadian markets, mainly in Ontario. No firm short- or long-term ERCs were issued.

On the supply front, a natural gas royalty holiday for new gas wells was initiated for periods of 12 to 36 producing months, which, in combination with positive expectations about export markets, resulted in an upsurge of drilling in northeastern B.C.

A simplified natural gas royalty system was established to take effect June 1, 1988. Under the new system, a 15 per cent floor rate will be levied on non-associated gas selling up to $50 per 10^3m^3. For conservation gas, the floor rate will be eight per cent. As prices escalate above $50 per 10^3m^3, the royalty rate will also increase.

Following a call for proposals for a Vancouver Island gas pipeline in the fall of 1987, the Pacific Coast Energy Corporation (PCEC) proposal was selected over four others as the most cost-effective. PCEC's plan covered the largest market area for the lowest cost. It serves pulp mills and communities on Howe Sound, the Sechelt Peninsula and Powell River before crossing the Strait of Georgia at Comox to serve the Vancouver Island market from Campbell River south to Victoria. Port Alberni is included as well. PCEC was subsequently invited to make a formal application for a provincial Energy Project Certificate.

In the electricity sector, a new "interruptible" heating rate was established to help a wide range of customers reduce heating costs, particularly in areas where natural gas was not available, such as Vancouver Island and the Sunshine Coast. This program was subsequently expanded to allow homes and businesses with certain types of wood-fuelled heating systems to qualify for the discount rate.

The Industrial Electricity Rate Discount Act (1985) continued to assist regional economic diversity and provided the Province and B.C. Hydro with additional revenues by assisting large industrial consumers. Notable among those industrial consumers

Energy Resources Division

receiving assistance was Fibreco Pulp Inc. Fibreco plans a new pulp mill at Taylor, giving this region a significant economic boost.

An agreement between Alcan Aluminum and the provincial and federal governments cleared the way for Alcan to increase its power generating capacity at Kemano by about 520 megawatts. It was agreed that Alcan's water rights on the Nanika River will revert to the Province. This will result in increased protection of chinook and sockeye salmon stocks in the Nanika and Nechako rivers.

The Province approved an application by B.C. Hydro to include the energy capability of its Burrard thermal generating plant near Port Moody in its electrical system's exportable surplus. Small, private hydro-electric producers were encouraged to sell their surplus to West Kootenay Power and Light. These producers were given exemption from designation as public utilities under the Utilities Commission Act.

Several new power line projects came on-stream this year. A new power line linking Stewart to B.C. Hydro's province-wide power grid was approved. A138 kilovolt line north from Aiyansh was also approved. It is expected to be in service by the fall of 1989. This $19 million line will support the Province's regional development goals by providing a secure, economical power source for the region.

To prepare for the privatization of the Mainland Gas Division of B.C. Hydro, the Ministry introduced legislation to guarantee fair prices for lower mainland natural gas customers. A freeze on many of the utility's distribution charges was established to help guarantee stable prices for British Columbians during a three-year transition period.

In keeping with the provincial government's user-pay approach, the British Columbia Utilities Commission was directed to introduce a system of cost recovery to fund its annual budget starting with fiscal year April 1, 1988. The Commission will charge the utilities it regulates for the services it provides, rather than being funded by the provincial treasury.

The Ministry joined with the Ministry of Environment and Parks and the federal Ministries of Energy, Mines and Resources and Environment to release a joint government response to the West Coast Offshore Petroleum Exploration Environmental Panel Report. A commitment to negotiate a joint management agreement was made at the same time. Although considerable progress toward an agreement was made in 1987, an agreement was not concluded.

Forecasts and Special Projects Branch

In this reporting period, the Branch:

- produced the British Columbia Energy Supply and Requirements Forecast Update 1987-1992
- transferred its energy modelling system to new computer facilities
- restructured and re-estimated the provincial energy model
- co-ordinated a review of the Province's natural gas surplus determination procedures and release of the "Reasons for Decision" on new procedures
- performed the financial feasibility and cost-benefit analyses necessary to evaluate the proposed Vancouver Island gas pipeline project
- produced a study of market constraints and opportunities for British Columbia natural gas exports.

Petroleum Titles Branch

Oil and gas companies continued the trend begun in 1986 of consolidating their holdings by surrendering lands that they would be unable to explore in the foreseeable future. As a result, the overall number of tenures administered by the Branch declined. However, amounts collected by the Branch increased, due to an increase in revenue from the disposition of Crown Reserve petroleum and natural gas rights.

This increase was partly attributable to the increase in the number of dispositions from eight to 11 per year, to the resale of surrendered titles as well as to the greater availability of rights as a result of the stratigraphic reversion program which requires lessees to surrender unproven geological formations.

The Petroleum and Natural Gas Act was amended by the Petroleum and Natural Gas Amendment Act 1987. Modifications were made to the lease continuation provisions to enable a faster turnover of lease tenures. This was accomplished by limiting the lessee's ability to continue a lease by paying penalties. Changes were also made to the pooling provisions to enable the pooling of Crown and freehold petroleum and natural gas rights to satisfy production spacing requirements. New underground gas storage provisions were enacted to clarify ownership and the procedures for the development of storage reservoirs. The former Underground Storage Act was repealed.

Energy Resources Division

Petroleum Geology Branch

Significant oil discoveries were made in the Blueberry West, Brassey and Boundary Lake areas.

Renewed interest in Halfway formation oil and gas fields was generated by the use of seismic amplitude anomalies to define reservoir areas. Areas involved include Beatton River, Milligan, Weasel, Wildmint and Flatrock.

New gas wells in the Monias area required remapping of the Halfway formation. Three discrete intervals were recognized above a thicker lower unit. The topmost Halfway unit appears to be stratigraphically equivalent to the Artex formation of Brassey and Wilder areas.

Significant infill and stepout wells were drilled in the Stoddart West Belloy oil pools.

Multiple zone gas prospects in the Kiskatinaw and Taylor Flat formations occur in Alces, Boundary Lake, Parkland and Doe areas.

The Branch carried out reviews of 110 oil and gas pools, including the fields mentioned above, to evaluate possible changes due to new drilling.
The DEI Moyie d-8-C deep wildcat well was drilled and abandoned during the year. The well, located south of Cranbrook, was a 3,476 metre test of the Pre-Cambrian sediments.

Preparations for the drilling of a "special well" in the Sparwood area were started. They included discussions with officials and residents of the nearby area. An Emergency Response Plan was implemented and tested. The well was safely drilled and subsequently abandoned.

Studies of the hydrocarbon potential of the Georgia Basin and the Queen Charlotte Basin were initiated. This work was done by consultants to the Branch, who were assisted by Branch staff in obtaining data and preparing final reports.

Development of a Zone Designation System was started during the year to simplify the stratigraphic reversion process and to minimize potential litigation.

All petroleum and natural gas (P&NG) leases having expiry dates in the period were reviewed for stratigraphic reversion and continuation under the P&NG Act, Sections 74 and 80. The review also included preliminary evaluation of leases expiring in the next year. This was done to give lease holders who were expecting cancellation advance notice.

Staff were also involved with many queries from the general public concerning geologic and drilling information in Fort St. John and in geothermal areas.

Work commenced on the British Columbia oil and gas historical exhibit at the Royal British Columbia Museum entitled "Rocks, Rigs and Roughnecks" which will open in November 1988.

Engineering and Operations Branch

On June 1, 1987 a gas well drilling incentive program came into force in British Columbia. The aim of this program was to encourage exploration and follow-up appraisal drilling for new sources of natural gas, particularly in the relatively unexplored parts of the Province.

A royalty exemption of 12 producing months for development gas wells and ranging from 12 to 36 producing months for exploratory wildcat gas wells (depending on location and geological age of the producing zone) was granted to eligible wells spudded between June 1, 1987 and June 1, 1990 (a three-year window of opportunity). An exception is the Fort St. John area, (also designated as Royalty Area A) where a two-year window of opportunity was granted.

The intention of this incentive program was to encourage the introduction of new gas reserves to the market place. Accordingly, the program is being monitored closely for any indications that companies are using exempt gas as a way of not producing royalty paying gas. In such cases, the exempt status may be withdrawn from offending wells.

Production Vigilance Study

The purpose of this project was to develop and test a detailed inspection program that verified the accuracy of reported oil production and sales volumes used as the basis for calculating Crown royalty. The objectives were to:

- develop a detailed inspection program
- complete detailed inspections on a representative number of operating oilfield facilities
- prepare and complete a computerized analysis of reported production and related data
- establish a mechanism for recording and controlling incidents of crude oil theft.

The project was approved in early 1987 and work began in November, 1987.

Chevron Sparwood Well

The Chevron Shell Mansfield c-72-D/82-G-15 exploratory well was proposed to be drilled approximately four miles north of Sparwood. Chevron acquired the tenure (permit) and the right to drill the well in 1983, as a result of a successful competitive bid. They then conducted surface and seismic exploration activities culminating in an application in October, 1986 to drill the Mansfield c-72-D well.

In December, 1986 Chevron held an open house in Sparwood to inform the public of the upcoming activity. As a result of concerns expressed by community members, the Ministry conducted a survey of public attitudes in late December, 1986. This survey indicated that residents wanted more information about the well.

After the survey, Ministry staff visited and interviewed a cross-section of the community in February, 1987. A list of questions and answers was then developed. The results were published in April, 1987. On June 16 and 17, 1987, public meetings were held. The concerns of the citizens of Sparwood and the Elk Valley Health and Safety Protection Committee were presented at length. Three major issues dominated:

- criteria for alerting the community in the event of loss of well control
- testing of an Emergency Response Plan
- liaison between the community, the Ministry and Chevron.

These three significant issues were addressed in a series of meetings in September, 1987 with Mr. Vern Millard (past chairman of the Alberta Energy Resources Conservation Board), the Elk Valley Committee, the Ministry and Chevron. As a result, major changes were made to Chevron's Emergency Response Plan. In addition, the Ministry imposed specific drilling plan requirements under the November 30, 1987 approval of the well. By adding a number of conditions to ensure safe operations, a decision was made to proceed with the well.

Industry Database

During 1987, the historical well production database was brought back into operation. The new system utilized modern computer equipment, and was programmed with a more powerful database language. In addition, the pool reserves database (hydrocarbons) was converted and fully integrated with the historical production database. During the last half of the year, the Ministry commenced work on expanding the existing well production database to include other types of well data, much of which had previously been made available via the Schedule of Wells publication.

Petroleum Titles Activities, 1986 and 1987

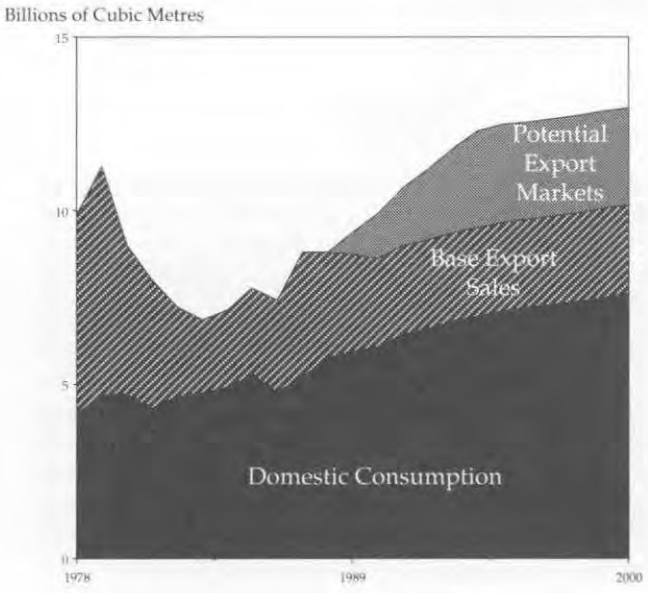
Activity	1986		1987	
Titles Administered	Number	Hectares	Number	Hectares
Permits	271	4.9 million	179	2.7 million
Leases	7,040	4.2 million	6,673	3.8 million
Drilling Licences	148	0.5 million	212	0.7 million
TOTALS	7,459	9.6 million	7,064	7.2 million
Comment:	Industry continued to consolidate their land holdings by surrendering land that they had no immediate plans to explore.			

Provincial Revenue from the Petroleum Industry ($ Millions)

	1983	1984	1985	1986	1987
Rentals and Fees	40	42	46	39	33
Crown Reserve Dispositions	26	62	88	29	44
Royalties (oil and products)	89	103	93	57	57
Natural Gas Royalties (or equivalent)	103	114	79	59	55
TOTALS	258	321	306	184	189

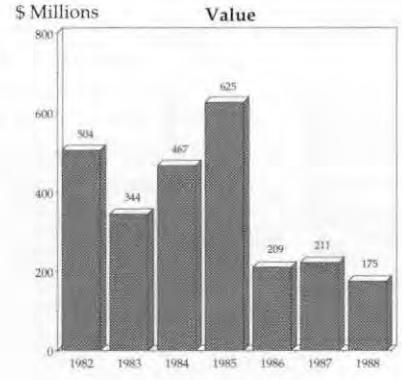
Energy Resources Division

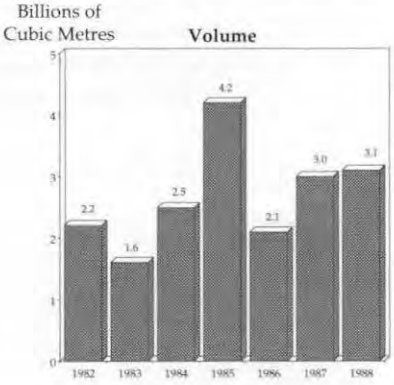
Natural Gas Production and Exports



- Natural gas production has recovered since 1983 but remains well below the peak reached in 1979.
- B.C.'s base export sales are all to the Pacific Northwest - our traditional market.
- Deregulation and declining productive capacity in the U.S. have opened new market opportunities for B.C. gas producers.
- Potential sales to California could boost production to 13 billion cubic metres in the mid-1990s.

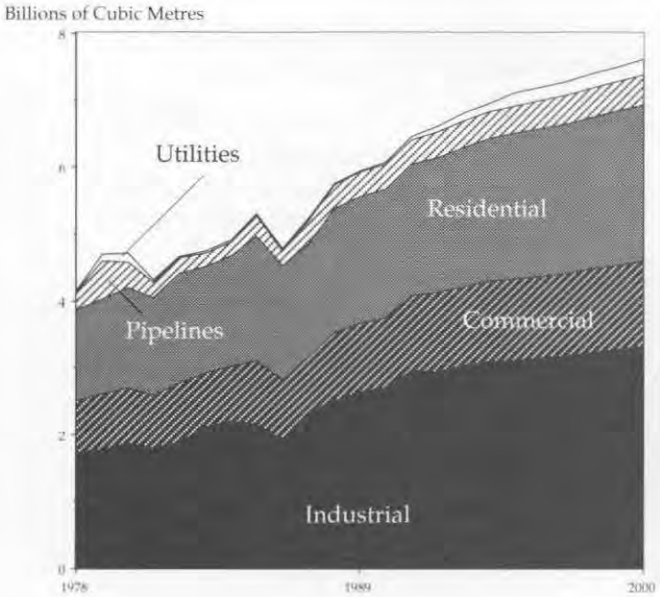
Natural Gas Exports





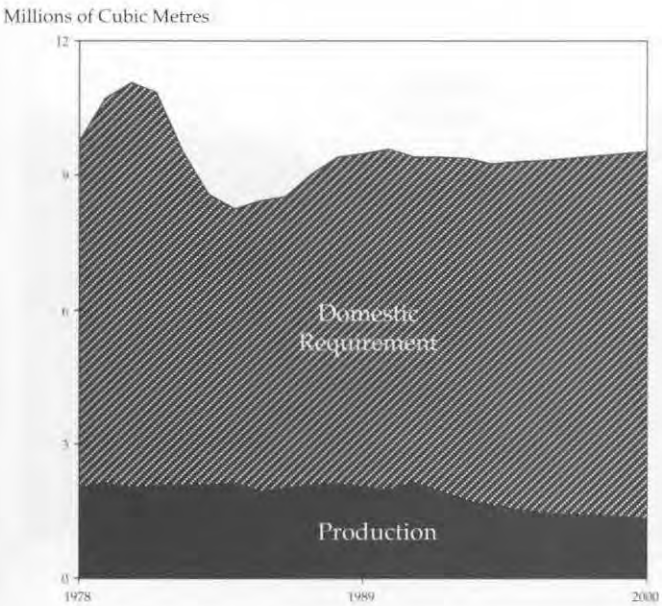
- 1985 was the peak year for both price and volume during the 1980s.
- Export prices and revenues have dropped by more than 50 per cent.
- 1988 was second highest export volume year, but lowest in revenues.
- Industry is optimistic both prices and volumes will improve in the 1990s.

Natural Gas Consumption Trends



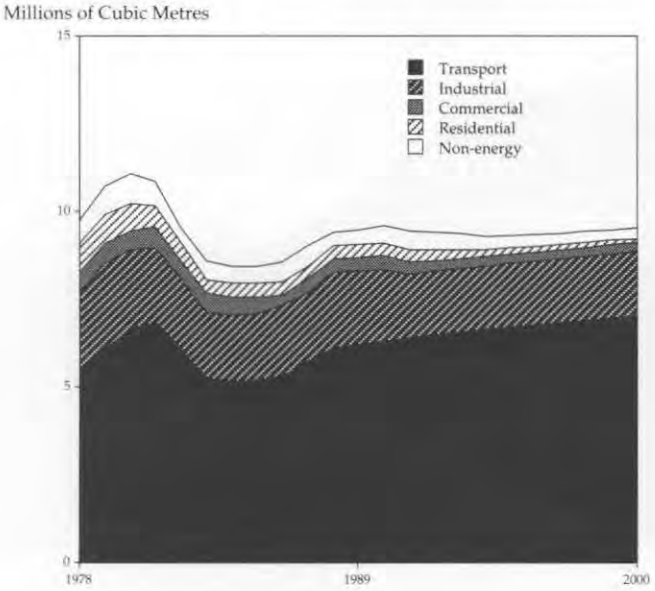
- Domestic natural gas consumption increased 3.3 per cent per year between 1978 and 1988.
- Demand is projected to increase by 2 - 2.5 per cent per year to the year 2000, including sales to the Vancouver Island natural gas pipeline.
- Total natural gas requirements include end-use consumption, pipeline fuel and gas burned in thermal plants to generate electricity.

Oil Supply and Demand



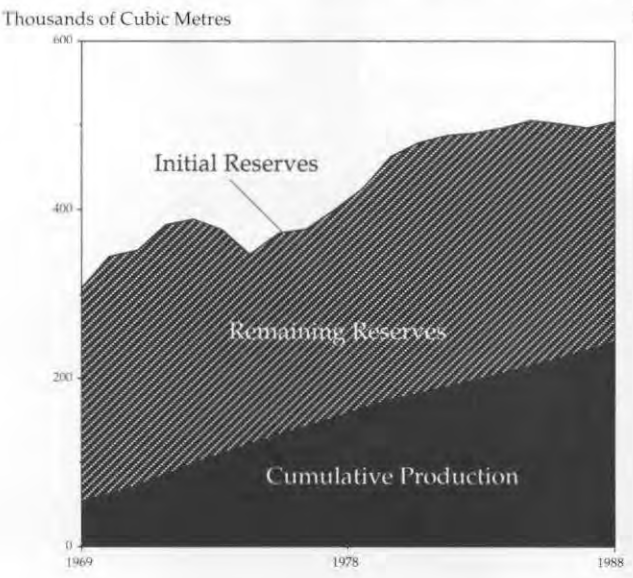
- Oil consumption peaked in 1980 at 11 million cubic metres, then declined in each of the next five years.
- Demand recovered significantly between 1985 and 1988 due to low oil prices and stronger economic growth.
- B.C. depends on Alberta for approximately 75 per cent of its oil supply.
- Production in B.C. is expected to decline gradually as reserves diminish.
- An oil discovery in 1988 at Brassey will help to maintain production.

Petroleum Product Consumption Trends

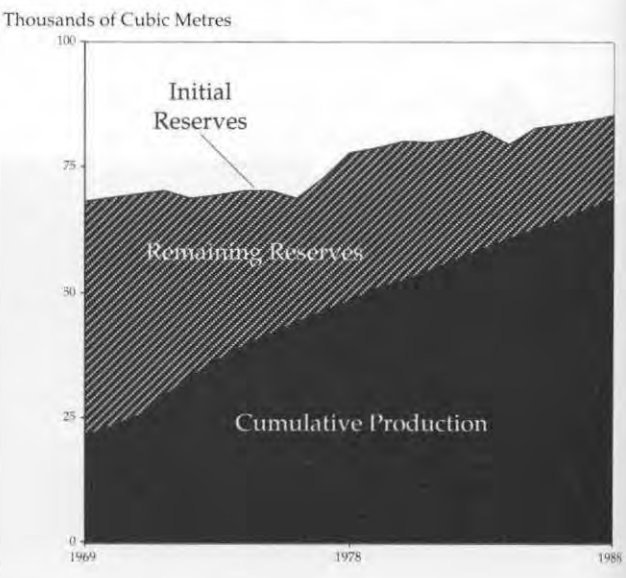


- Over 60 per cent of petroleum product demand in B.C. comes from the transport sector.
- While oil has largely been replaced in other uses by electricity and natural gas, there are few economical substitutes for gasoline.
- Transportation requirements are projected to increase by 1.2 per cent per year to the year 2000.
- The Vancouver Island pipeline will displace heavy fuel oil in seven pulp mills and light heating oil in the residential/commercial sector. A total of one-third to one-half million cubic metres will be displaced.
- Total petroleum product consumption is expected to remain stable.

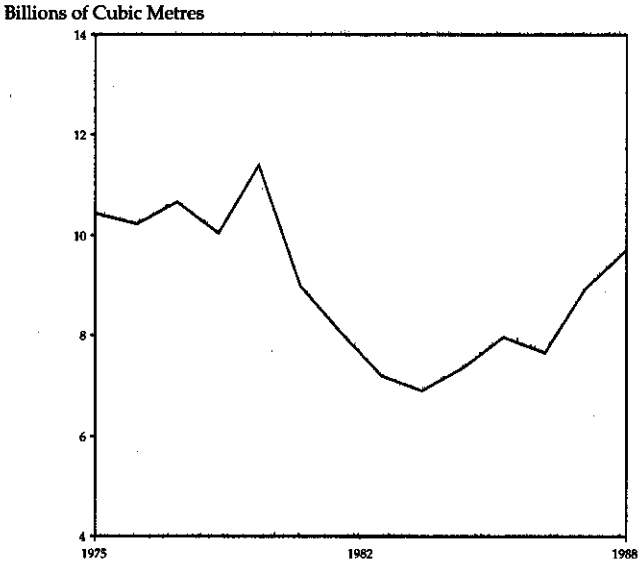
Growth in Raw Gas Reserves



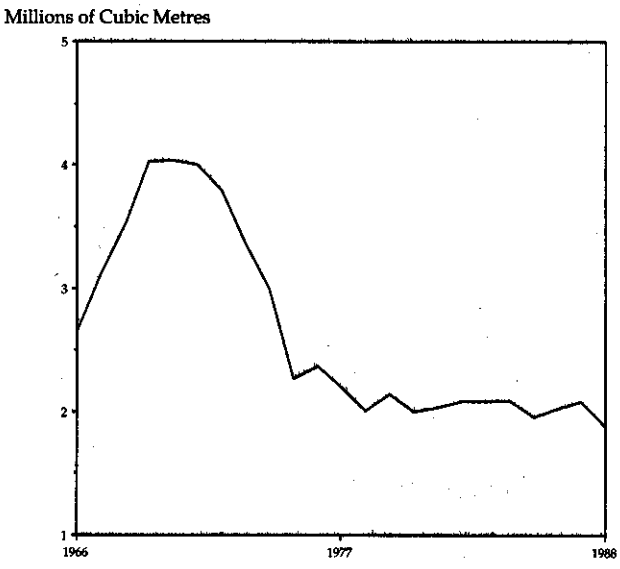
Growth In Oil Reserves



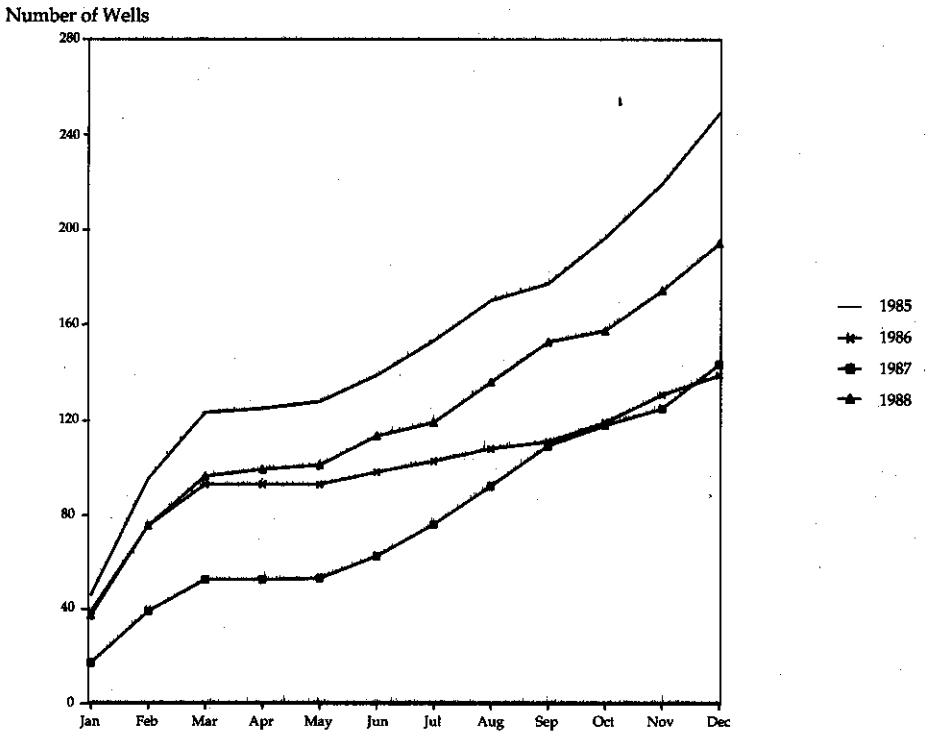
Marketable Gas Production



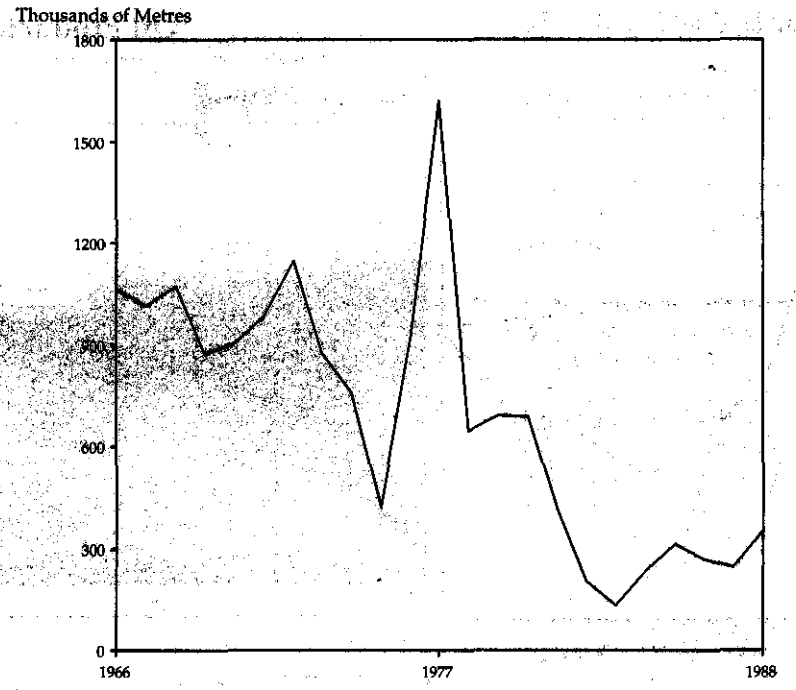
Oil Production



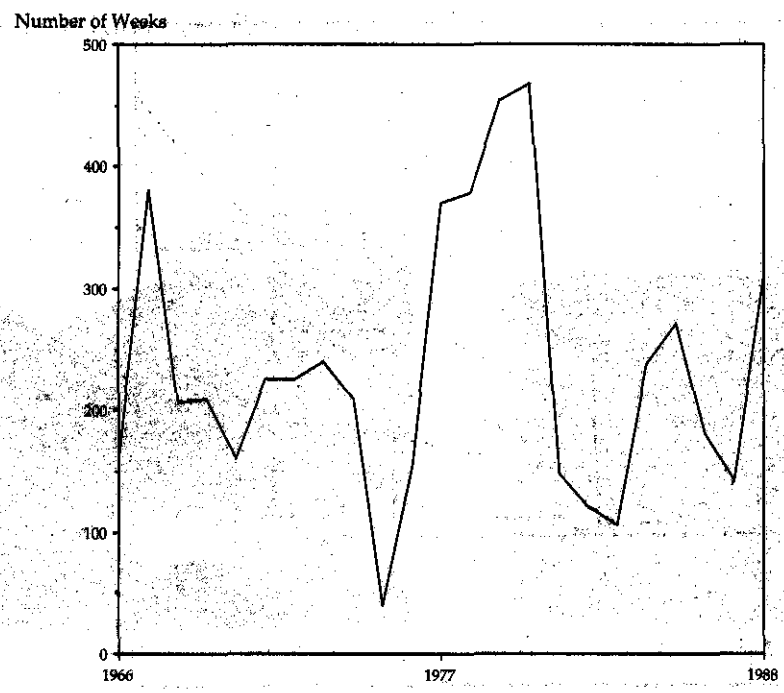
Number of Wells Spudded



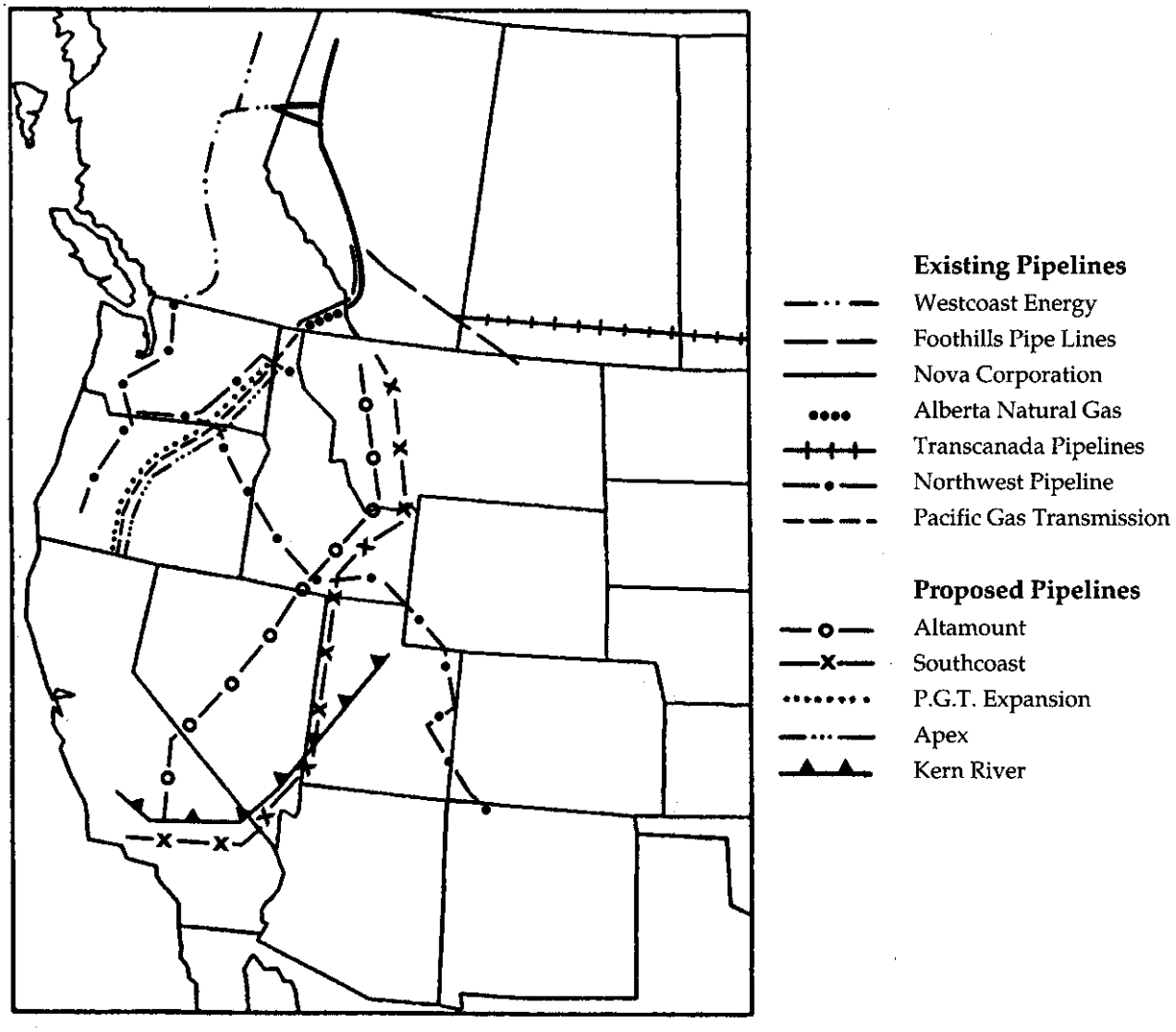
Metres Drilled



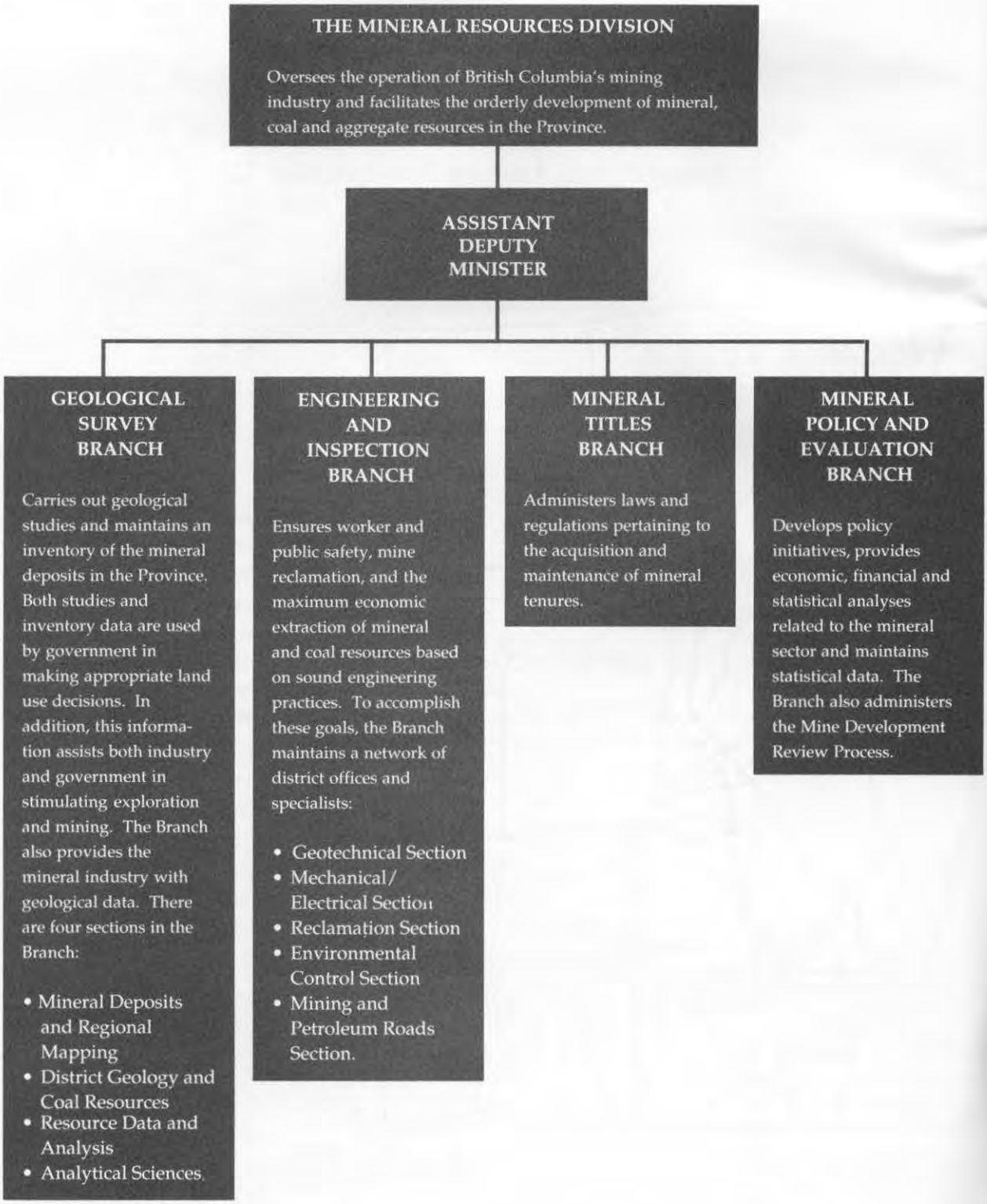
Geophysical Crew Weeks



Western North American Gas Pipelines



Mineral Resources Division



The Mining Industry in 1987

The performance of the world mineral industry improved considerably in 1987 as a result of higher metal prices. This was particularly true for precious metals and copper. Sustained growth in productivity, combined with increased sales volumes, allowed the British Columbia mining industry to generate positive earnings for the first time in six years.

The total value of minerals produced in British Columbia increased more than 13 per cent over 1986 to $2.8 billion. This increase was due almost entirely to the metals sector. The value of output in that sector increased almost 29 per cent over the $1.2 billion total recorded in 1986.

The coal industry regained some strength during 1987, mainly as a result of increased Japanese steel production. While British Columbia coal production increased in 1987, falling world coal prices caused revenues to decline. Southeast coal producers' contract prices, which are negotiated in U.S. dollars, improved somewhat in early 1988, but the appreciating Canadian dollar offset the gains.

Coal companies continued to seek new sales opportunities in both traditional and new markets. On Vancouver Island, the Quinsam mine produced limited volumes for the domestic industrial market. It also supplied test shipments to Japan. Westar Mining Ltd. expanded the Falcon Pit at the Greenhills mine, and Quintette Coal Ltd. opened the Shikano Pit in the northeast coal fields.

British Columbia's copper industry was bolstered by dramatic increases in copper prices towards the end of 1987, while the value of copper production rose almost 34 per cent to $842 million.

Copper mining operations in the Highland Valley were further rationalized when Teck's Highmont mine and mill were brought into the existing Cominco-Lornex partnership. Highmont assets will be linked with the existing operation by moving the Highmont mill 7.5 kilometres to the Lornex site. When it is completed, the project will raise the combined daily milling rate to 131,000 tonnes.

Gibraltar Mines' new heap leaching plant ran successfully throughout the winter. The plant uses a technology which is new to Canada, and its success in our colder climate makes the operation a model for other mines in the Province.

Westmin Resources began an expansion of its milling operations at Myra Falls on Vancouver Island from 3,000 to 4,000 tonnes per day.

Production of lead and zinc was lower than in 1986, primarily as a result of a 17-week strike at Cominco's smelter at Trail. This was offset by rising lead prices which contributed to an increase exceeding $10

million in the value of lead production.

Early in 1988, zinc prices also began to rise as the resurgent steel industry fuelled demand. After having completed a major zinc modernization program in 1986 at the Trail smelter, Cominco continued to improve its competitive position in 1987 by embarking on the first phase of a lead modernization project.

Cassiar Asbestos Corporation successfully penetrated new markets in 1987, increasing its production of asbestos fibre by almost 25 per cent. Asbestos prices also improved somewhat in 1987, following several years of decline.

Cassiar, assisted by a provincial government loan of $25 million, decided to proceed with the development of the McDame underground deposit. Production from the McDame deposit is scheduled to commence upon closure of the open pit mine in 1990.

Cassiar is also developing a wet milling method which extracts fibre from tailings by means of a gravity process. Construction of the milling facility was underway by the end of the year.

Gold continued to be the primary focus of exploration and development in the Province. Record mineral exploration expenditures of $190 million were registered in 1987: this strong pace continued into early 1988. The Nickel Plate mine near Hedley opened at the end of April. Construction also began on the Lawyers, Johnny Mountain, and Silbak Premier/Big Missouri mines. Several other precious metal projects are nearing production decisions.

Mineral Highlights

The $5 million Financial Assistance for Mineral Exploration (FAME) program of cash grants in support of private sector mineral exploration was continued in 1987. Grants were awarded to 156 prospectors, 84 exploration projects, and 20 mine exploration projects.

Government received the report of the Mineral Industry Task Force in February, 1987. It implemented one of the report's recommendations (in the March 1987 budget) by exempting drill bits, grinding media, explosives and related blasting supplies from the social services tax. These exemptions granted the mining industry an estimated $10 million in relief annually. Longer-term recommendations made in the Task Force report were under active consideration during 1987/88.

During the year, several projects moved closer to production decisions under the Mine Development Review Process, the Province's mechanism for the review and approval of sound, publicly acceptable mine developments. Six proposed coal and metal mine developments were approved in principle and were advanced to the process' Stage III (the licencing stage).

Prominent in the review process in 1987 were:

- the Falcon Pit at the Greenhills coal mine which was granted approval-in-principal in June
- the Johnny Mountain and Silbak Premier/Big Missouri gold/silver projects, approved by Cabinet in June and July respectively.

The review process handled a record workload in 1987, consisting primarily of precious metal projects. Over the year, almost 30 submissions were received by the review process.

Geological Survey Branch

The Geological Survey Branch carried out several new regional mapping and geochemistry programs in 1987. Results of the Regional Geochemical Survey will be released on computer "floppy" disks for use by the exploration community.

The accelerated level of geoscientific programs under the B.C./Canada Mineral Development Agreement (MDA) continued in 1987. New projects on platinum group elements, gold skarns, coal deposit modelling and a coal quality file were begun. Coal projects undertaken in 1987 continued to move away from regional to deposit-oriented studies as coal companies restricted exploration and focused instead on the feasibility of mining established reserves.

The redesign of the mineral inventory file, or MINFILE, was completed in 1987.

The data are being released in printed ("hard") copy, microfiche and "floppy" disk formats. A computer search system is provided free of charge to customers who purchase the data.

The Branch was also able to reinstate the B.C. Geoscience Research Grant Program. Twenty grants totalling $120,000 were awarded to researchers in eight Canadian universities.

Engineering and Inspection Branch

The Engineering and Inspection Branch inspected over 1,400 mineral and coal exploration sites, placer mines and sand and gravel operations during 1987. This was an increase of 20 per cent over 1986 inspections.

Significant progress was made on the review of the Mines Act and its Regulations. Representatives from industry, labour and the univerisities are participating in the review.

The B.C. Acid Mine Drainage Task Force, a joint initiative with industry and academia, was organized by the Branch. Its purpose is to foster and co-ordinate research in the prediction, prevention, treatment, control and monitoring of this environmental problem. Because of its efforts to date, British Columbia is recognized as a world leader in this field.

Engineers of the Branch continue to be recognized for developing high standards for mechanical and electrical safety, such as the braking standards for very large haulage trucks. The Branch organized several regional and provincial mine rescue competitions and co-sponsored symposia on reclamation.

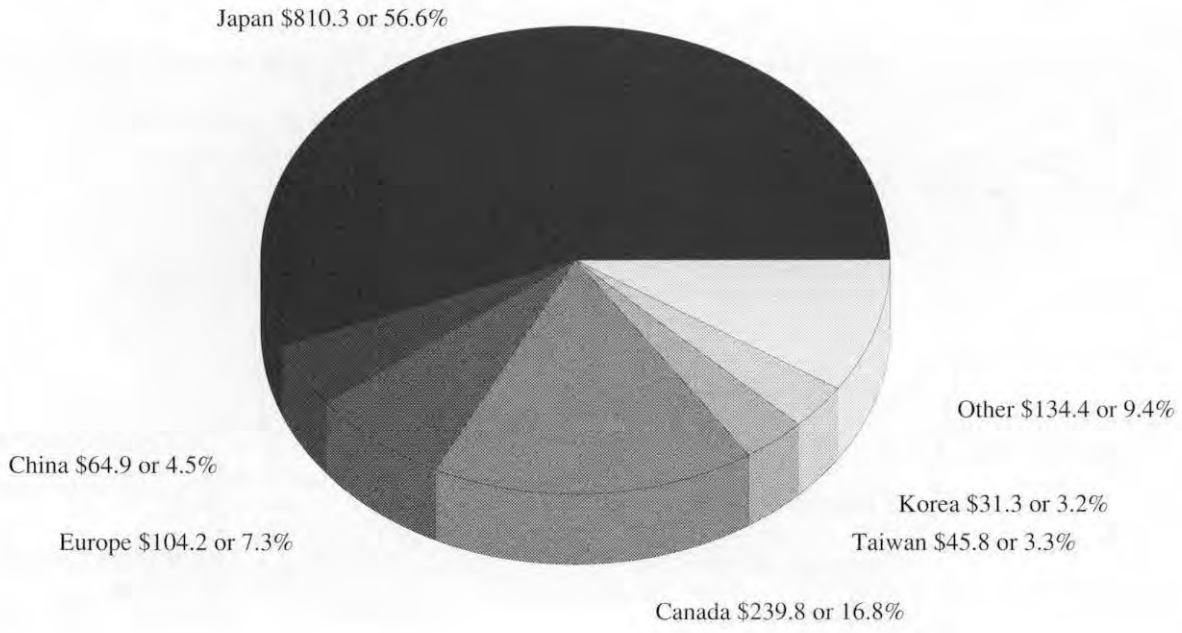
Mineral Titles Branch

The Mineral Titles Branch's efforts toward statute amendment resulted in the introduction of the Mineral Tenure Act in the Spring 1988 Session of the Legislature. This Act combines the provisions of the earlier Mineral Act and Mining (Placer) Act and introduces a number of important concepts which will assist development in the placer and industrial minerals sectors.

The Branch worked to improve the timely processing and provision of titles information for the mining sector. A major goal of minimizing errors in receiving, recording and mapping data was attained through the establishment of checking procedures at the mining division offices.

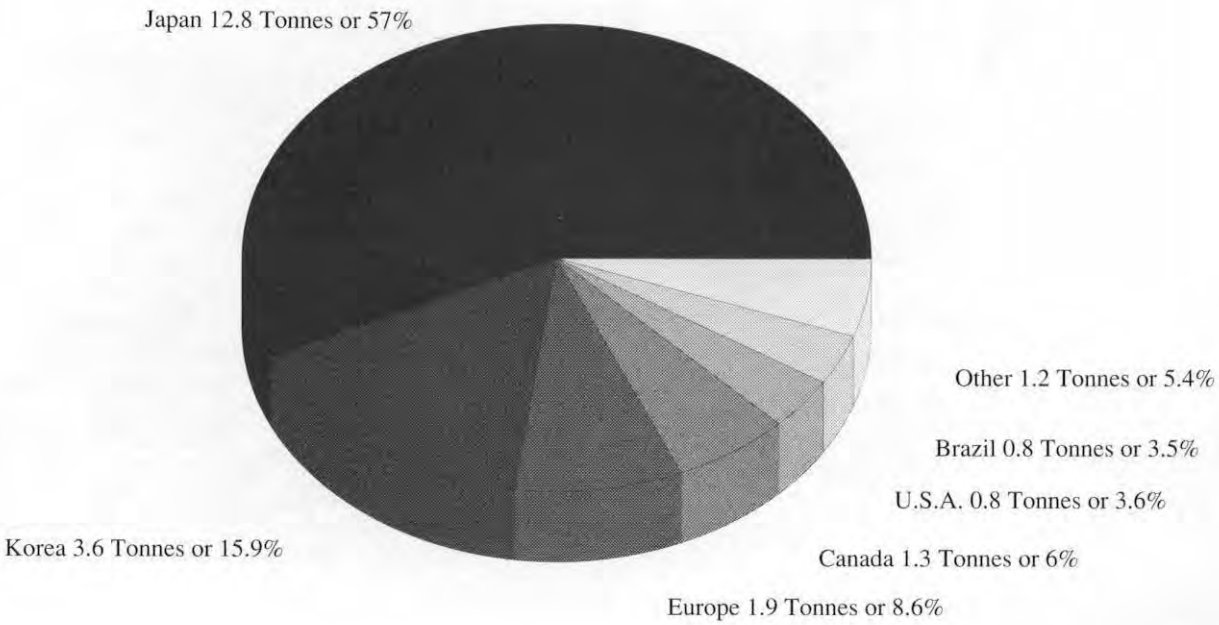
The Branch recorded 10,267 claims in 1987. This constituted a level of activity which was previously matched only in 1983. The spring and summer months continued the historical pattern of having the highest volumes of claim staking.

Destination of Metals Shipped from B.C. Mines in 1987 ($ Millions)

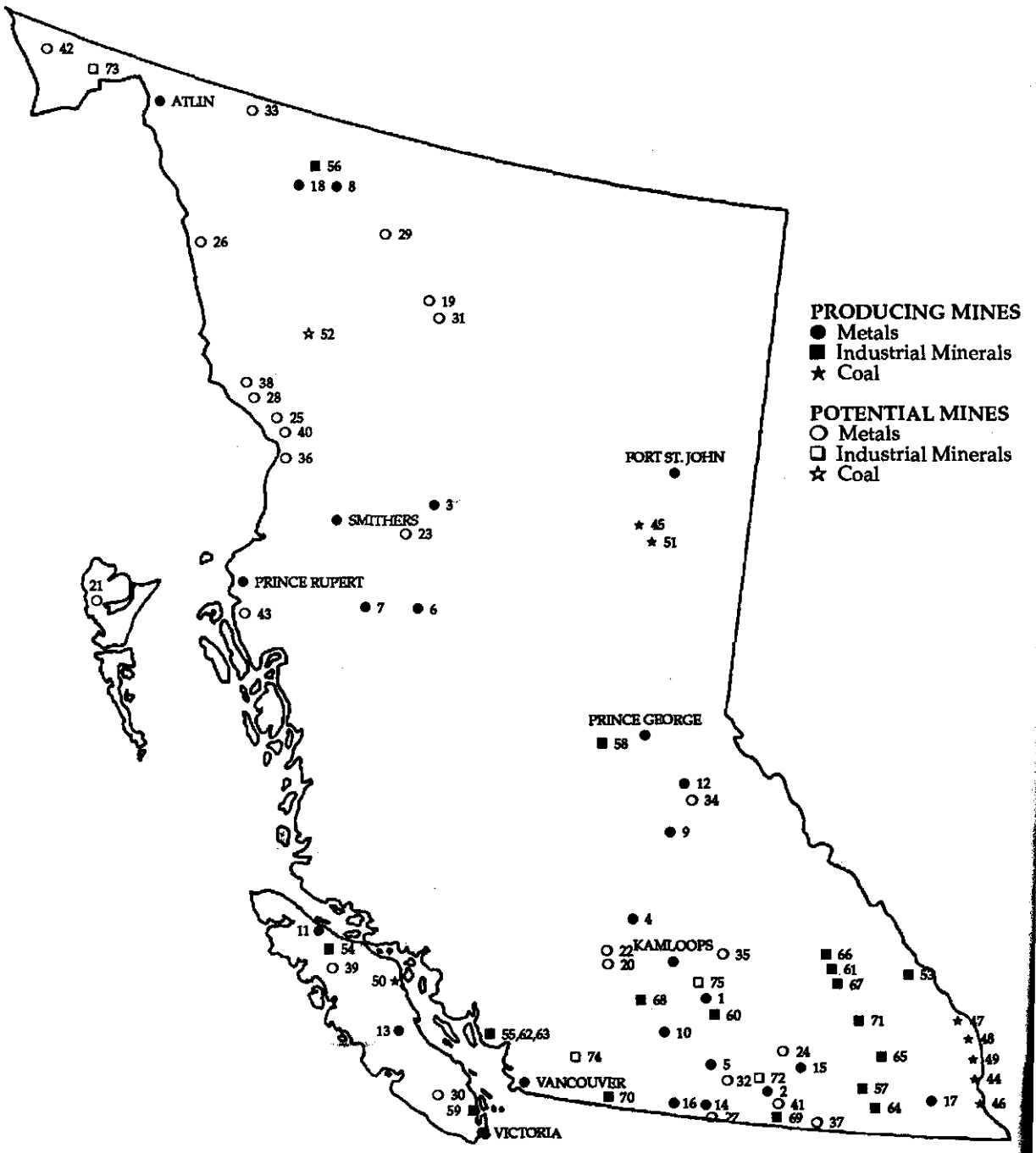


Note: Metals are shipped in ores/concentrates .

Destination of Coal Shipped from B.C. in 1987 (Million Tonnes)



Major Producing Mines and Selected Potential Mines in British Columbia, 1987



Producing Metal Mines

1. Afton (Cu, Au, Ag)
2. Beaverdell (Ag, Pb, Zn)
3. Bell (Cu, Au, Ag)
4. Blackdome (Au, Ag)
5. Brenda (Cu, Au, Ag, Mo)
6. Endako (Mo)
7. Equity (Ag, Au, Cu)
8. Erickson (Au, Ag)
9. Gibraltar (Cu, Au, Ag, Mo)
10. Highland Valley Copper (Cu, Au, Ag, Mo)
11. Island Copper (Cu, Au, Ag, Mo)
12. Mosquito Creek (Au)
13. Myra Falls (Cu, Zn, Au, Ag)
14. Nickel Plate (Au)
15. Silvana (Pb, Zn, Ag)
16. Similkameen (Cu, Au, Ag)
17. Sullivan (Pb, Zn, Ag)
18. Taurus (Au)

Potential Metal Mines

19. Al (Au)
20. Bralorne (Au)
21. Cinola (Au, Ag)
22. Congress (Au, Ag)
23. Dome Mountain (Au, Ag)
24. Esperanza (Au)
25. Gold Wedge (Au, Ag)
26. Golden Bear (Au, Ag)
27. Hedley Tailings (Au)
28. Johnny Mountain (Au, Ag)
29. Kutcho Creek (Cu, Zn, Ag)
30. Lara (Au, Zn, Cu)
31. Lawyers (Au Ag)
32. Lumby (Au, Ag)
33. Midway (Ag, Pb, Zn)
34. Quesnel River (Au)
35. Samatosum (Ag, Au)
36. Silbak Premier/Big Missouri (Au, Ag)
37. Skylark (Au)
38. Snip ((Au, Ag)
39. Spud (Au)
40. Sulphurets (Au, Ag)
41. Union (Au)
42. Windy Craggy (Cu, Co, Au, Ag, Zn)
43. Yellow Giant (Au, Ag)

Producing Coal Mines

44. Balmer
45. Bullmoose
46. Byron Creek
47. Fording
48. Greenhills
49. Line Creek
50. Quinsam
51. Quintette

Potential Coal Mines

52. Mount Klappan

Producing Industrial Mineral Mines

53. Baymag (Magnesite)
54. Benson Lake (Limestone)
55. Blubber Bay (Limestone)
56. Cassiar (Asbestos)
57. Crawford Bay (Dolomite)
58. Dahl Lake (Limestone)
59. Dunsmuir (Clay)
60. Harper Ranch (Limestone)
61. Hunt (Silica)
62. Ideal Cement (Limestone)
63. Imperial Limestone (Limestone)
64. Lost Creek (Limestone)
65. Lussier River (Gypsum)
66. Moberly (Silica)
67. Parson (Barite)
68. Pavilion Lake (Limestone)
69. Rock Creek (Dolomite)
70. Sumas Mountain (Clay)
71. Westroc (Gypsum)

Potential Industrial Mineral Mines

72. Bearcub (Feldspar, Quartz, Mica)
73. O'Connor River (Gypsum)
74. Pacific Talc (Talc)
75. Red Lake (Fuller's Earth)

Mineral Production of British Columbia, 1986 and 1987

	1986		1987	
	QUANTITY	$ VALUE	QUANTITY	$ VALUE
METALS				
Copper ..... kg	332,215,028	629,479,111	355,897,693	842,341,196
Gold ..... g	9,391,519	155,035,893	12,011,160	239,101,394
Iron Concentrates ..... t	50,546	2,217,168	58,070	2,220,950
Lead ..... kg	91,784,242	38,183,405	69,911,213	49,828,244
Molybdenum ..... kg	11,573,619	92,781,106	14,138,543	121,687,917
Silver ..... g	395,850,085	94,615,495	371,599,737	122,562,405
Zinc ..... kg	137,582,871	138,022,893	100,718,749	109,368,709
Others	-	6,331,620	-	3,274,214
Total Metals	-	1,56,666,691	-	1,490,385,029
INDUSTRIAL MINERALS				
Asbestos ..... t	78,348	39,662,680	97,848	46,938,025
Sulphur ..... t	501,459	82,613,624	505,831	64,885,085
Others	-	12,117,722	-	13,405,688
Total Industrial Minerals	-	134,394,026	-	125,228,798
STRUCTURAL MATERIALS				
Cement ..... t	1,077,218	75,584,058	1,312,074	88,181,547
Sand and Gravel ..... t	42,887,795	105,281,747	49,259,996	131,316,297
Others	-	33,797,881	-	39,048,533
Total Structural Materials	-	214,663,686	-	258,546,377
COAL ..... t	20,851,972	934,504,287	22,586,852	892,521,959
TOTALS	-	2,440,228,690	-	2,766,682,163

Provincial Revenue from the Mining Industry ($ Thousands)

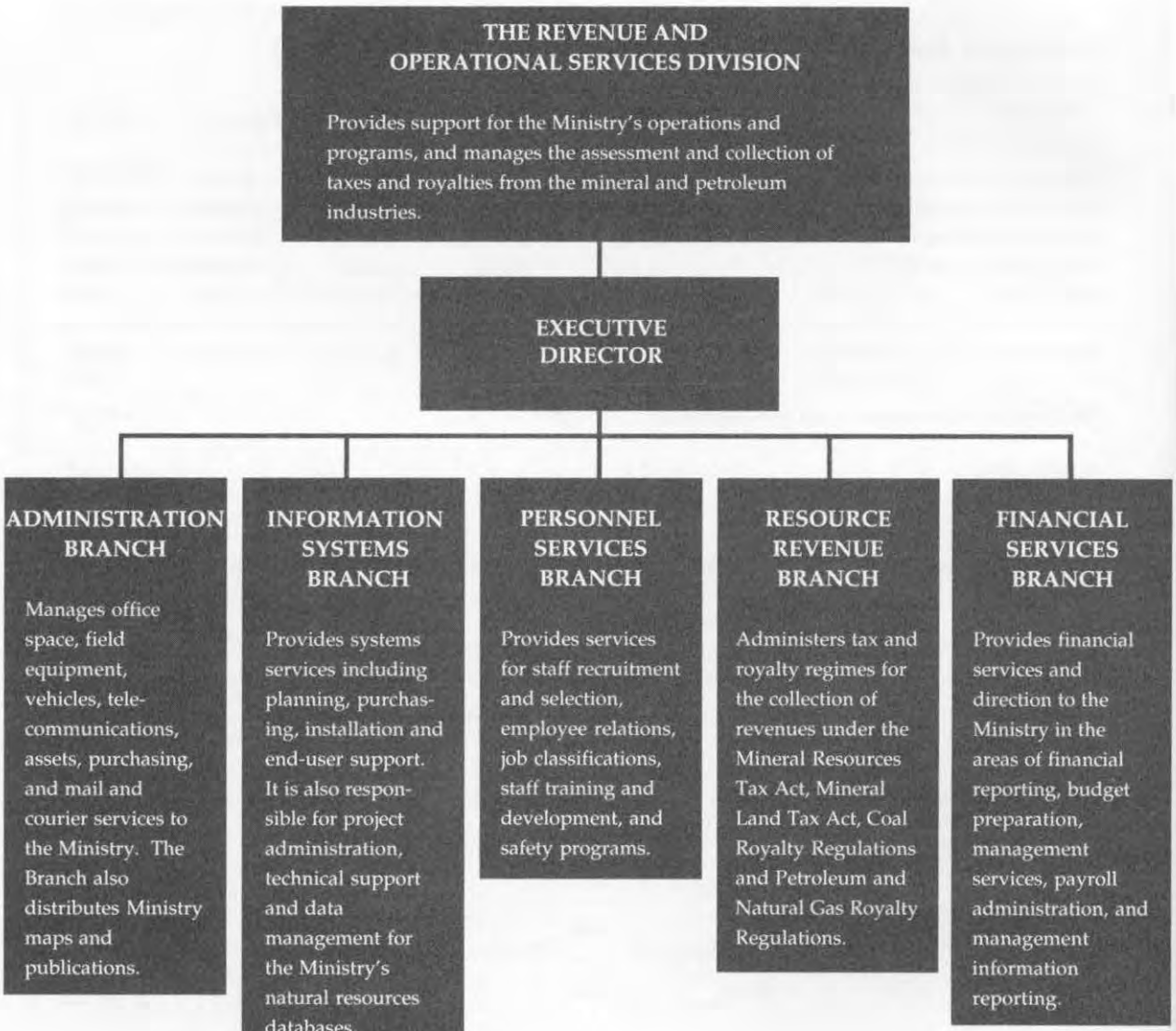
	1983/84	1984/85	1985/86	1986/87	1987/88
Claims, Coal Licences and Rentals	6,612	7,092	4,649	6,530	7,366
Coal, Minerals and Metals Royalties	8,945	23,203	23,821	24,087	22,795
Mineral Land Tax	15,940	17,409	18,622	16,507	12,215
Mineral Resource Tax	(1,537) *	5,850	4,968	8,016	10,418
Mining Tax	1,657	2,183	4,113	445	792
TOTALS	31,617	55,737	56,173	55,585	53,586

* Rebate for overpayment from previous year.

Employment in the Mineral Industry in British Columbia to 1987

	Metals	Coal	Structural Materials	Industrial Minerals	Exploration & Development	TOTALS
1983	10,416	4,249	511	554	3,720	19,450
1984	9,208	5,781	492	437	4,789	20,707
1985	8,102	5,821	907	410	4,262	19,502
1986	7,712	5,210	983	419	3,650	17,974
1987	8,380	5,144	1,069	411	6,320	21,324

Revenue and Operational Services Division



Highlights

The Administration Branch provides administrative suppport services to all Ministry staff including facility management, vehicle control, tele-communications, repro-graphics, purchasing, mail services, records, risk management, and asset control.

From January 1987 to March 1988, the Administration Branch initiated privatization of publications and map sales, decentralized the purchasing of attractive assets and consumable office supplies for the Ministry, and began development of a risk management manual. The Branch continued work on asset inventory control, completed conversion of all Ministry phones to Provnet, and carried out implementation of the Operational Records Classification and Administrative Records Classification file system.

A major staff relocation within Victoria was completed, based on the Ministry's organizational structure.

The Branch also initiated consolidation of its warehouse operations with the Purchasing Commission and Ministry of Environment, and finalized the Ministry policy on portal-to-portal use for the Ministry's vehicle fleet.

In 1988, the Information Systems Branch continued to consolidate the Ministry's major information systems on the B.C. Systems Corporation's shared VAX computer, and completed the Assessment Reports Index System and the Audiometric Records System for the Mineral Resources Division.

The Ministry installed over 100 computer workstations for professional and clerical staff, and began to extend electronic mail services to all areas of the Ministry.

The Personnel Services Branch provides services in all areas of human resources management within the Ministry including staffing programs, organizational analysis, classification analysis, employment policy, labour relations, training, development, and workplace health and safety.

The business goal of the Resource Revenue Branch is to ensure that the Crown receives its fair share of resource revenues.

The Branch has a mandate to:

- calculate, verify, collect and report the royalties and taxes from mining and petroleum industries
- ensure compliance with statutory intent in self-assessing revenue programs through an adequate audit process
- operate in the most efficient and cost-effective manner possible.

During this period, a reallocation of Ministry resources increased the Branch staff. Formation of a Petroleum Audit Section created one FTE and formation of a Validation Section created three FTEs.

The Ministry received Treasury Board approval to review the royalty and engineering production accounting systems with a goal of creating an integrated resource management system.

Key Activity Measures — Revenues

I. Value of Hydrocarbons Production ($ Millions) - value to the producers at the wellhead

	1987	January–March 1988	TOTAL
Crude Oil	$305	$ 57	$362
Field Condensate	3	1	4
Natural Gas	376	138	514
Gas Plant Liquids	21	6	27

II. Provincial Revenue from the Petroleum Industry ($ Millions)

		1987	January–March 1988	TOTAL
Royalties:	Oil & Products	$58	$13	$71
	Natural Gas	55	20	75

III. Mineral Land Tax - Actuals (Calendar Year)

1985	1986	1987	1988
$19,126,375	$17,273,741	$12,112,891	$12,536,385

IV. Mineral Resource Tax - Actuals (Calendar Year)

1985	1986	1987	1988
$1,357,896	$6,839,253	$10,449,275	$18,864,237

	Fiscal Year:	86/87	87/88
		$9,448,653	$9,596,344

V. Coal Royalties - Actuals (Calendar Year)

1985	1986	1987	1988
$23,856,425	$23,752,482	$21,907,348	$23,070,819

	Fiscal Year:	86/87	87/88
		$24,082,430	$23,010,890

Ministry Budget — Standard Expenditure Classification

	Fiscal Year 1986/87	Fiscal Year 1987/88
Salaries	11,639,739	12,179,761
Supplies and Services	9,067,091	10,922,817
Capital	1,976,315	1,382,018
Other Expenditure (Write Offs)	1,120	-
Grants (Includes Fort Nelson Revenue Sharing Agreement)	8,471,017	5,150,187
Recoveries (Mineral Development Agreement)	(1,022,210)	(1,052,141)
TOTALS	30,133,072	28,582,642

Details of Expenditures by Appropriations and Activities, and by Standard Expenditure Classification

Summary of Expenditures	Fiscal Year 1986/87	Fiscal Year 1987/88
Minister's Office	197,174	234,077
Resource Management Program (Net of Recoveries)		
Executive Management	858,319	1,008,492
Revenue and Operational Services Division	3,232,180	3,626,897
Energy Resources Division	5,024,867	1,924,622
Mineral Resources Division	10,030,391	11,574,914
Petroleum Resources Division	3,946,031	3,866,046
Fort Nelson Indian Band Revenue Sharing Agreement Statutory	451,947	397,234
Financial Administration Act Sec. 24 (c) - Interest on Revenue Refunds	415,757	30,139
Mines Act Sec. 15 (2) - Mine Improvement	9,142	3,451
Mineral Development Agreement (Net of Recoveries)	1,168,240	1,202,447
Mineral Exploration Incentives Program	4,799,024	4,714,323
TOTALS	30,133,072	28,582,642