Ministry of Energy, Mines and Petroleum Resources
Honourable Jack Davis, Minister

ANNUAL REPORT

ENGINEERING & INSPECTION BRANCH

1989

MINING IN BRITISH COLUMBIA

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FOREWORD

History of Reporting

Reporting on the activities of the Engineering and Inspection Branch has been through several different channels since the inception of the Branch in 1877.

A century later, in the mid-1970s, the volume of information in the Ministry/Department of Mines' Annual Reports had grown so tremendously that it had become unmanageable in one volume. Rather than reduce the level of reporting, however, the Ministry chose to introduce several smaller publications describing its various activities.

Between 1975 and 1988, the Engineering and Inspection Branch essentially reported in the publication entitled Mining in British Columbia. This year, 1989, sees a re-arrangement of the material previously contained in Mining in British Columbia, and a change in publication title to the Annual Report of the Engineering Inspection Branch, to more clearly reflect both the Branch's activities and the content of the material.

Since 1981, the report of the Engineering and Inspection Branch has been produced by Yorkshire Resources, a Victoria-based company, from data prepared by Branch staff, as well as private industry sources.

Other Helpful Publications

The Ministry of Energy, Mines and Petroleum Resources issues an annual report which contains a synopsis of those sector activities which fall under its mandate, e.g., mineral, petroleum, and energy resources.

Those interested in the mineral sector may also wish to subscribe to the Mineral Market Update, produced quarterly, which provides information on mineral markets, mining operations, exploration activities and projects in the Mine Development Review Process, as well as maps showing the location of major operating mines and exploration/development projects in the province. The Ministry also produces British Columbia Mineral Statistics, annual summary tables giving historical mineral production to the present.

A catalogue of the Ministry's other publications and help in ordering are available through the various outlets of Crown Publications.

Further information on the activities of the various mining companies can be obtained from the Mining Association of British Columbia, the Coal Association of Canada and various commercial publications.

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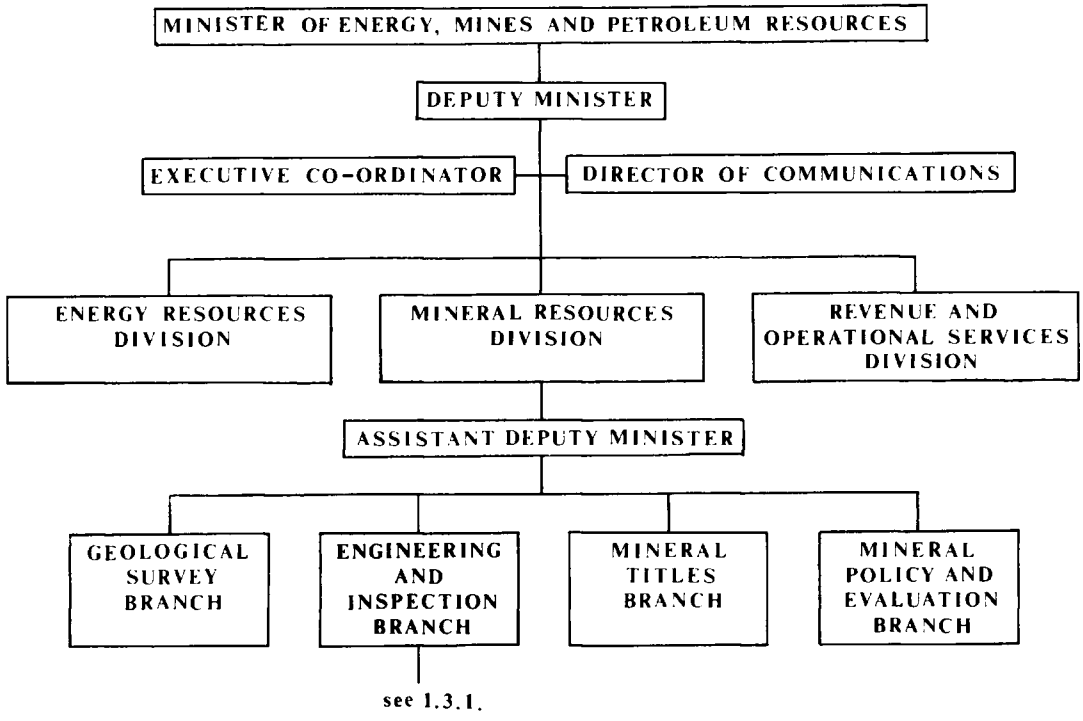


1.1.2. Branch Mandate

The activities of the Engineering and Inspection Branch aim to fulfill three major areas defined in the Branch mandate:

1. To ensure worker health and safety, public safety, and suitable reclamation and protection of the land and watercourses affected by mining and exploration work.

2. To monitor mining activity to ensure optimum resource extraction.

3. To facilitate and expedite sound, publicly acceptable mining ventures by sponsoring a comprehensive, credible and widely understood project review and approval process.

1.1.3. Branch Functions

Key functions of the Engineering and Inspection Branch in carrying out its mandate are:

1. administering the Mine Development Review Process (M.D.R.P.)
2. issuing mining and exploration approvals and reclamation permits
3. conducting mine inspections and monitoring mining activity
4. collecting data and maintaining records.

The Branch also participates in various special projects to further research and increase knowledge in all aspects of its mandate.

The responsibilities of the Branch have increased in recent years due to the addition of the Mine Development Review Process in 1988. Furthermore, permitting procedures have become more complex to keep pace with new environmental and land use issues, and new technologies continue to change mining activity.

1.1.4. Branch Address

The Branch mailing addresses and telephone numbers in Victoria and Vancouver are given below. (For the addresses and telephone numbers of Regional Offices see Section 4.)

Victoria: 105-525 Superior Street, Victoria, B.C., V8V 1X4.
Tel: (604) 387-3781 Fax: (604) 387-5985

Vancouver: 150-800 Hornby Street, Vancouver, B.C., V6Z 2C5.
Tel: (604) 660-9363. Fax: (604) 660-2653

1.2. LEGISLATION

1.2.1. Mandatory Legislation

The Engineering and Inspection Branch derives its mandate from the Mines Act, Mines Regulation, Coal Mines Regulation, Uranium/Thorium Exploration Regulation and, in regard to the Mine Development Review Process, the working policy of the Environment and Land Use Committee of Cabinet (E.L.U.C.).

1.2.2. Changes to Legislation

In July, 1989, a new Mines Act, Bill 56 (1989) received third reading in the House. This Act provides for the replacement of the Mines Regulation and the Coal Mines Regulation by a Health, Safety and Reclamation Code.

The Code will be divided into eleven parts:

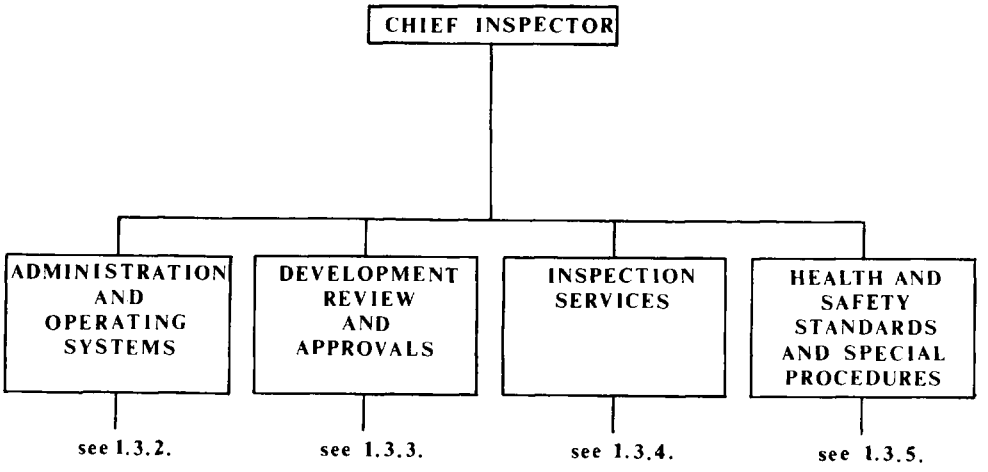
1. General Rules
2. Industrial Hygiene
3. Emergency Procedures
4. Buildings, Machinery and Equipment
5. Electrical Power Systems
6. Mine Design and Procedures
7. Hoists and Shafts
8. Explosives
9. Dams and Waste Emplacements
10. Reclamation and Abandonment
11. Exploration.

The staff of the Engineering and Inspection Branch has been actively involved in drawing up the Code. A Steering Committee, comprising representatives from labour, industry and government, and chaired by the Chief Inspector, will produce the final draft to be distributed to all concerned parties.

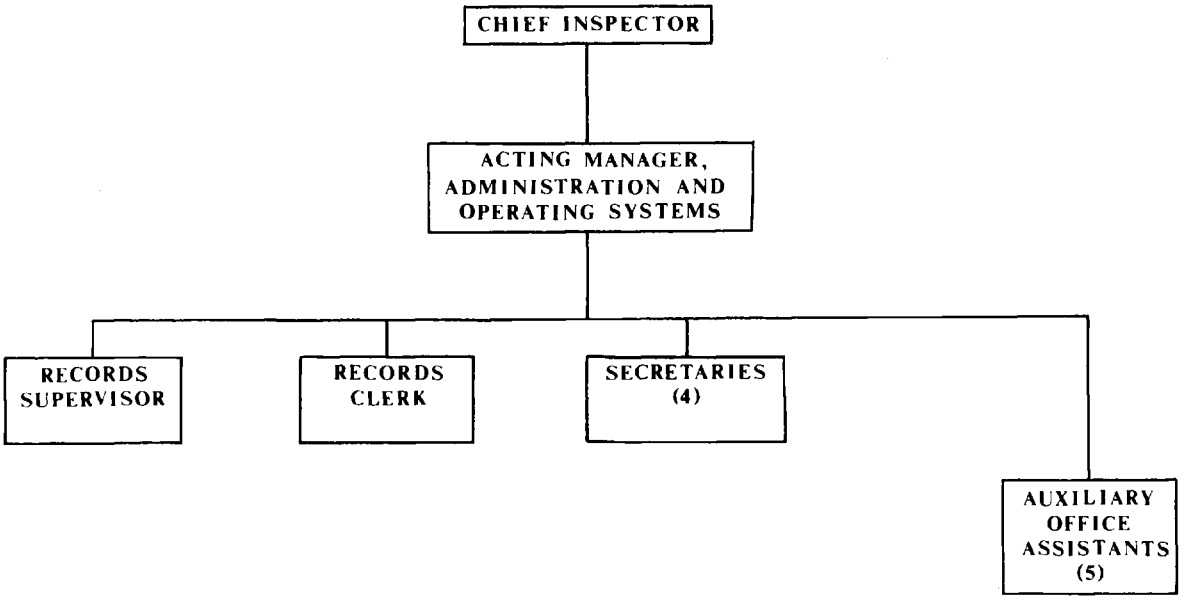
The Steering Committee will hold meetings, hear presentations and receive comments from interested persons or groups before finalizing the Code. It is anticipated that this work will be completed in time to allow proclamation of the Act and Code in early 1990. The Steering Committee will then review and revise the Code annually to ensure it remains abreast of new technology and mining practices.

1.3. BRANCH STRUCTURE

1.3.1. Overview of Branch Structure

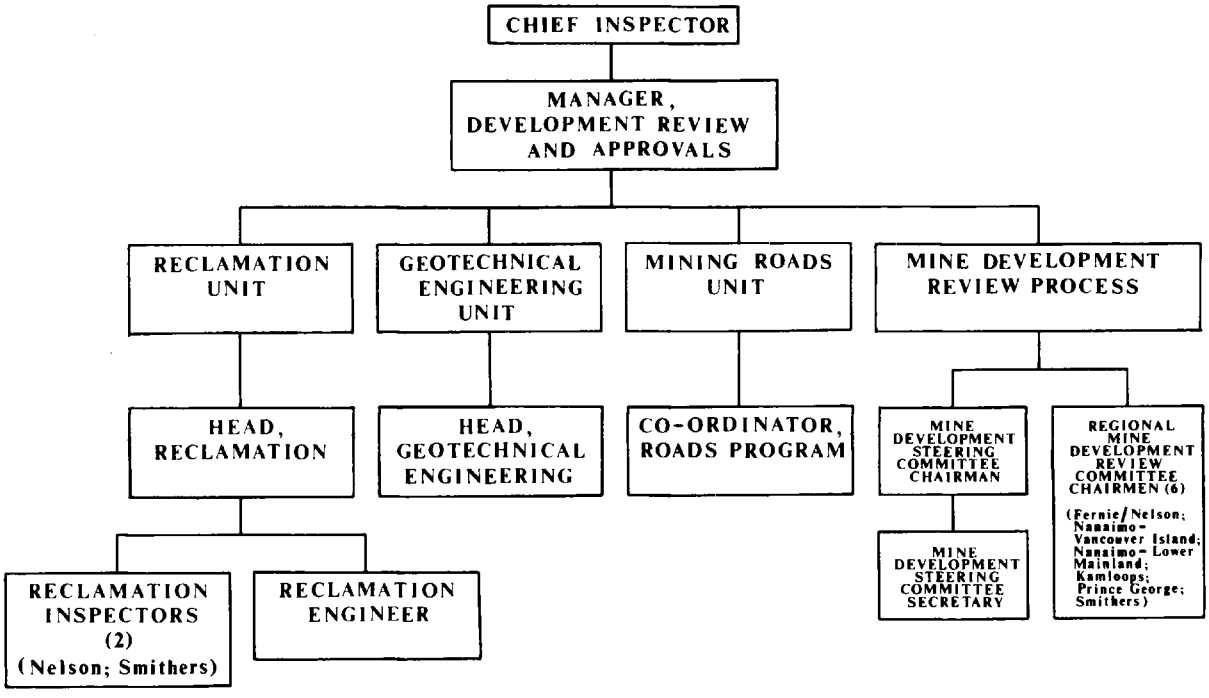


1.3.2. Administration and Operating Systems



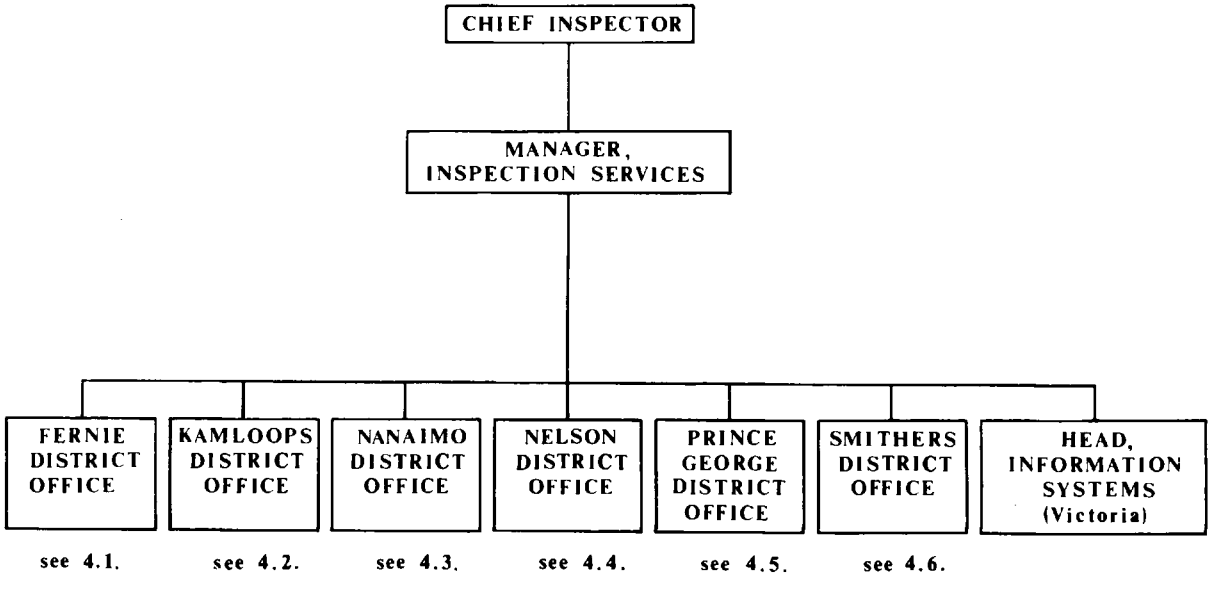
All positions based in Victoria.

1.3.3. Development Review and Approvals

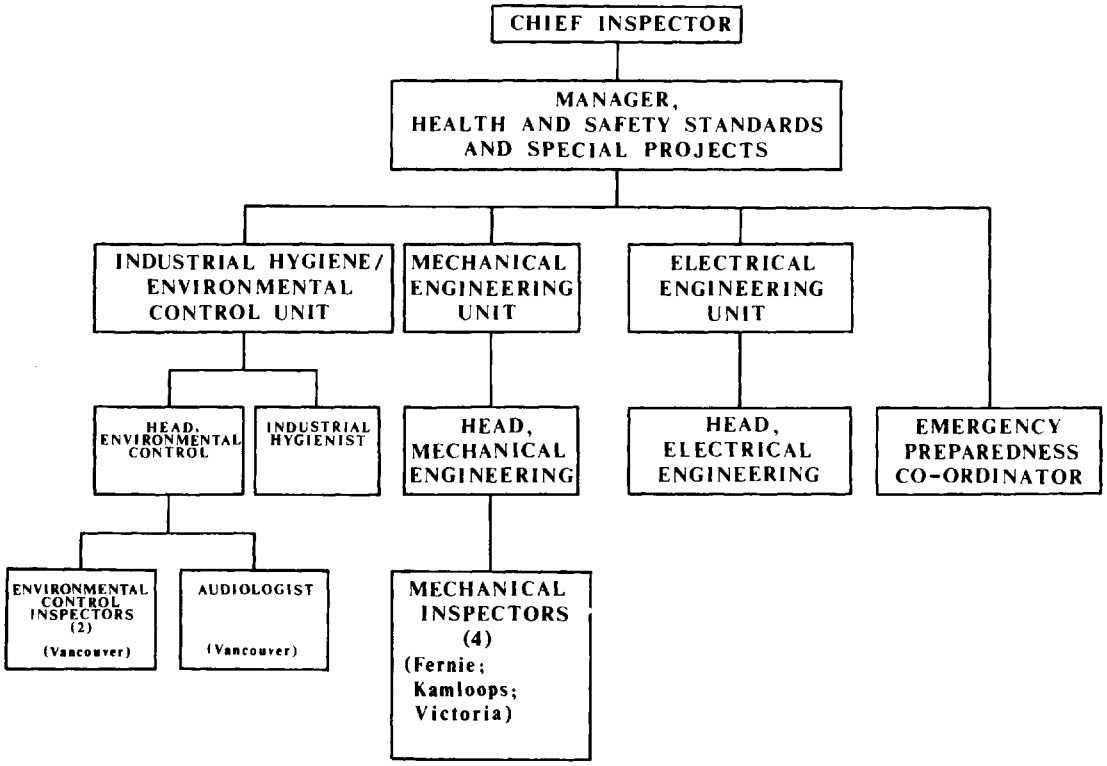


Positions based in Victoria except as indicated in brackets ( ).

1.3.4. Inspection Services



1.3.5. Health and Safety Standards Special Projects



Positions based in Victoria except as indicated in brackets ( ).

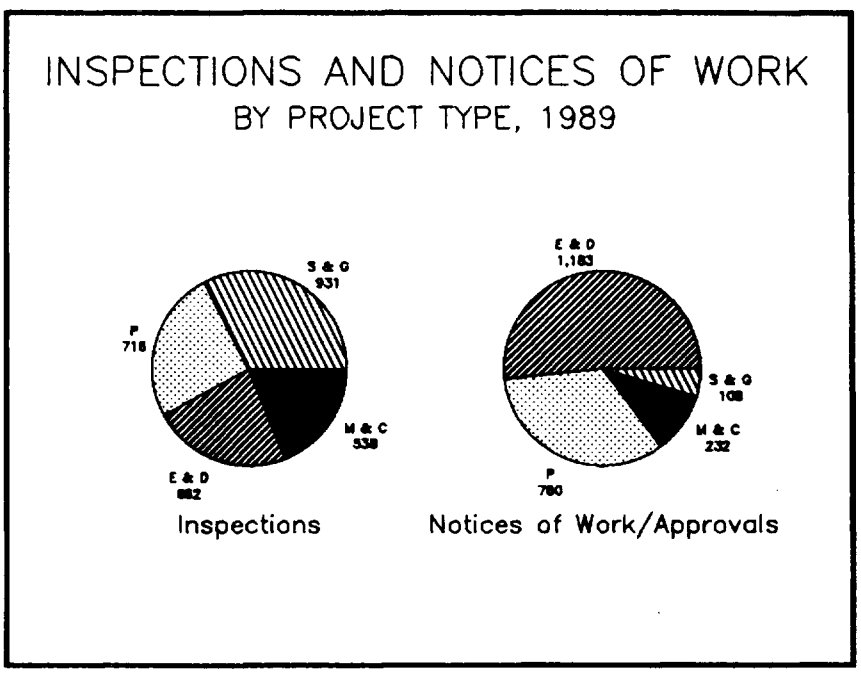
1.4. 1989 OVERVIEW STATISTICS

1.4.1. Mine Inspection

Type of Operation	No. of Inspections	% of total
Operating metal & coal mines (M&C)	536	18.9
Sand, gravel & quarries (S&G)	931	32.7
Placer mines (P)	716	25.1
Exploration/development (E&D)	662	23.3
Total	2847	100.0

1.4.2. Mine Permitting

Type of Operation	Notices of Work/ Approvals of Mining Projects	% of total
Operating metal & coal mines (M&C)	232	10.2
Sand, gravel & quarries (S&G)	108	4.7
Placer mines (P)	760	33.3
Exploration/development (E&D)	1183	51.8
Total	2283	100.0



1.4.3. Mine Development Review Process

Stage of M.D.R.P.	No. of Submissions Filed
Prospectus	20
Stage I	8
Stage II	6
Total	34

PART 2: ADMINISTRATION AND OPERATING SYSTEMS

The Branch administrative mandate is to ensure that the personnel and financial resources of the Branch are managed for maximum efficiency and effectiveness.

2.1. BRANCH STAFFING LEVELS

The following table shows the staffing levels of the Engineering and Inspection Branch from 1980-1989. The numbers show full-time employees only and do not include auxiliary personnel. The staffing level in 1989 was 58, a reduction of 25% from the 1980 level.

Branch Staffing Level, 1980-1989

Year	No. of full-time employees
1980	77
1981	77
1982	66
1983	66
1984	61
1985	61
1986	60
1987	61
1988	52
1989	58

2.2. BRANCH PERSONNEL

In 1989, the Chief Inspector of Mines and Director of the Branch was Mr. R.W. McGinn.

Branch personnel by office and position are listed below. Auxiliary positions are indicated by the abbreviation (aux).

Victoria:

Chief Inspector of Mines/Director	R.W. McGinn
Acting Manager, Administration and Operating Systems	L. Rennie
Manager, Development Review and Approvals	R.L. Crook
Manager, Inspection Services	R.A. Fyles
Manager, Health and Safety Standards and Special Projects	T. Vaughan-Thomas
Head, Environmental Control Engineering	D.J. Murray
Head, Geotechnical Engineering	R.T. Martin
Head, Information Systems	B. McLaughlin
Head, Mechanical Engineering	T.G. Carter
Head, Reclamation	J.C. Errington
Co-ordinator, Roads Program	J.E. Brenner
Inspector of Mines/Emergency Preparedness Co-ordinator	R. Brow
Head, Electrical Engineering	R.F. King
Inspector of Mines - Reclamation	D.M. Galbraith
Mine Development Steering Committee Chairman (acting)	N. Ringstad

Mine Development Steering Committee Technical Assistant (aux)	A. Currie
Records Supervisor	E. Seronik
Records Clerk	N. Morgan
Secretary	V. Archer
Secretary	S. Ferguson
Secretary	B. Hill
Secretary	C. Howell
Office Assistant	J. Jensen
Office Assistant (aux)	L. Ostle
Office Assistant (aux)	M. Massicotte
Office Assistant (aux)	G. Tucker
Office Assistant (aux)	M. Wiegler
Office Assistant/Receptionist (aux)	K. Sawrie
Clerk 3 (aux)	L. Swanton

Vancouver:

Inspector of Mines - Environmental Control	R. Kumar
Inspector of Mines - Environmental Control	A. Parker
Inspector of Mines - Environmental Control/ Audiologist	V. Pyplacz

Fernie:

District Inspector and Resident Engineer/ Office Administrator	R. Booth
District Inspector and Resident Engineer	A. Whale
Inspector of Mines/Rescue Co-ordinator	P.J. Switzer
Inspector of Mines - Mechanical	G.A. MacDonald
Inspector of Mines (aux)	D. Roach
Secretary	L. McIntyre
Office Assistant (aux)	L. Northey

Kamloops:

District Inspector and Resident Engineer/ Office Administrator	F.J.T. Hancock
District Inspector and Resident Engineer	E. Sadar
Inspector of Mines - Mechanical	R. Heistad
Inspector of Mines	J.E. Beswick
Inspector of Mines	H.P. Seguin
Secretary	L. MacCulloch
Office Assistant	J. Worsfold
Office Assistant (aux)	L. Wilms

Nanaimo:

District Inspector and Resident Engineer/ Office Administrator	R. Bone
Inspector of Mines	J.C. Alvarez
Inspector of Mines	H.A. Armour
Inspector of Mines	E. Beresford
Secretary	G. Peachey
Office Assistant (aux)	K. McKay
Office Assistant (aux)	L. Quinn

Nelson:

District Inspector of Mines/ Office Administrator	M.A. Mellor
Inspector of Mines - Reclamation	A.L. O'Bryan
Secretary	D. Bilinski
Secretary (aux)	S. Beatty
Office Assistant (aux)	D. Zukowski

Prince George

District Inspector and Resident Engineer/ Office Administrator	R.W. Lewis
District Inspector and Resident Engineer	D. Turner
District Inspector of Mines	J.J. Sutherland
Inspector of Mines	D. Miller
Secretary	T. Burroughs
Office Assistant	N. Wood

Smithers:

District Inspector and Resident Engineer/ Office Administrator	D.W. Flynn
District Inspector and Resident Engineer	B. Good
Inspector of Mines	D. Porteous
Inspector of Mines - Reclamation	E.J. Hall
Secretary	E. Konschuh
Office Assistant	S. Ciampichini
Office Assistant	J. Harris
Office assistant (aux)	G. Baker

2.3. STAFF CHANGES

The following staff changes occurred during 1989:

January:

- Katherine McKay joined the Branch in the Nanaimo office.
- Laurel Wilms assisted in the Kamloops Office during a vacation period until March 30.

March:

- Carol Howell was appointed to regular status.
- Linda Swanton commenced auxiliary employment but resigned in April to take another job.
- Janet Harris resigned from the Smithers office to take up a new career.
- David Miller commenced employment in the Prince George office.

April:

- Janet Jensen accepted a promotion in another Ministry.
- Kathie Sawrie and Gillian Tucker joined the Victoria office.

May:

- Valerie Archer joined the Victoria office as an auxiliary employee and successfully competed for the regular position in December.
- Dennis Roach joined the Fernie office, but was laid off in November due to budget restrictions.

June:

- Dave Turner resigned from the Prince George office but rejoined in November.

July:

- Ron Brow transferred from Nanaimo to Victoria and was appointed Emergency Preparedness Co-ordinator.
- Marjorie Massicotte commenced employment in Victoria, but resigned at year-end to return to school.
- Debbie Bilinski resigned from the Nelson office to accept a promotion in another Ministry.
- Sheri Beatty joined the Nelson office.

August:

- Ray Crook was confirmed as Manager, Development Review and Approvals.
- Maria Wiegler joined the Victoria office.
- Lise Quinn joined the Nanaimo office but was laid off in December due to budget restrictions.

September:

- Lynn Ostle joined the staff in Victoria.
- Donna Zukowski joined the Nelson office staff but was laid off in December due to budget restrictions.
- Joe (H.P.) Seguin joined the Kamloops office.

October:

- Dick Lewis of the Prince George office passed away suddenly. He had served the Branch in two periods, from 1968 to 1976 and from 1980 until his death, having worked for a major coal company in the intervening period.

November:

- Belinda McLaughlin commenced employment as Head, Information Systems.
- Gloria Baker joined the Smithers office.

December:

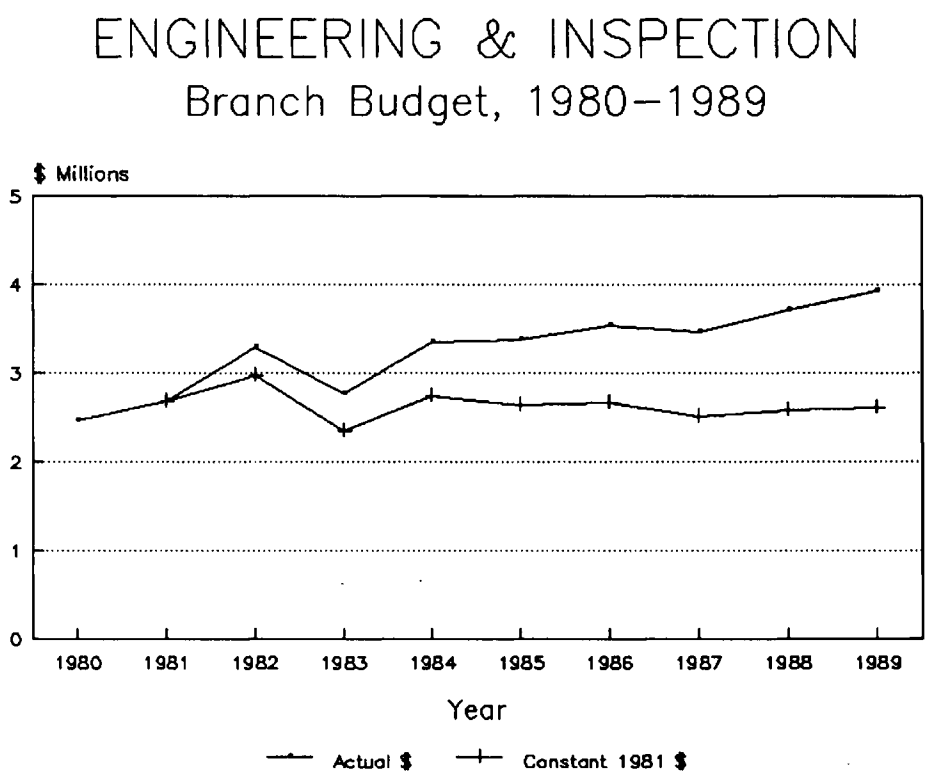
- Ernie Seronik was appointed to regular status.

2.4. BRANCH BUDGET

The Branch budget for 1980-1989 is shown below in actual dollars and constant 1981 dollars.

Branch Budget, 1980-1989

Year	Branch Budget (millions $)	
	Actual $	Constant 1981 $
1980	2.46	-
1981	2.68	-
1982	3.29	2.97
1983	2.76	2.35
1984	3.35	2.74
1985	3.38	2.64
1986	3.53	2.67
1987	3.46	2.50
1988	3.71	2.58
1989	3.93	2.60



PART 3: DEVELOPMENT REVIEW AND APPROVALS

3.1. RECLAMATION

Role and Responsibilities
Since 1969, mining companies have been required by law to reclaim all lands disturbed by mining in British Columbia. Reclamation Permits must be applied for and held by all mining companies. Security deposits are required for all Reclamation Permits to ensure that reclamation programs are adequately completed.

The duties of the Reclamation Section include:

a. the review and issue of mine reclamation permits;
b. the inspection of reclamation at mines;
c. the administration of reclamation security deposits on behalf of the provincial government; and
d. participation in selected committees and activities to enhance mine reclamation in the province, including spearheading the organization of the Annual Mine Reclamation Symposium.

Structure and Organization
This Section is comprised of the Section Head and the Reclamation Engineer who are based in Victoria, and two Reclamation Inspectors, one based in Nelson and one in Smithers.

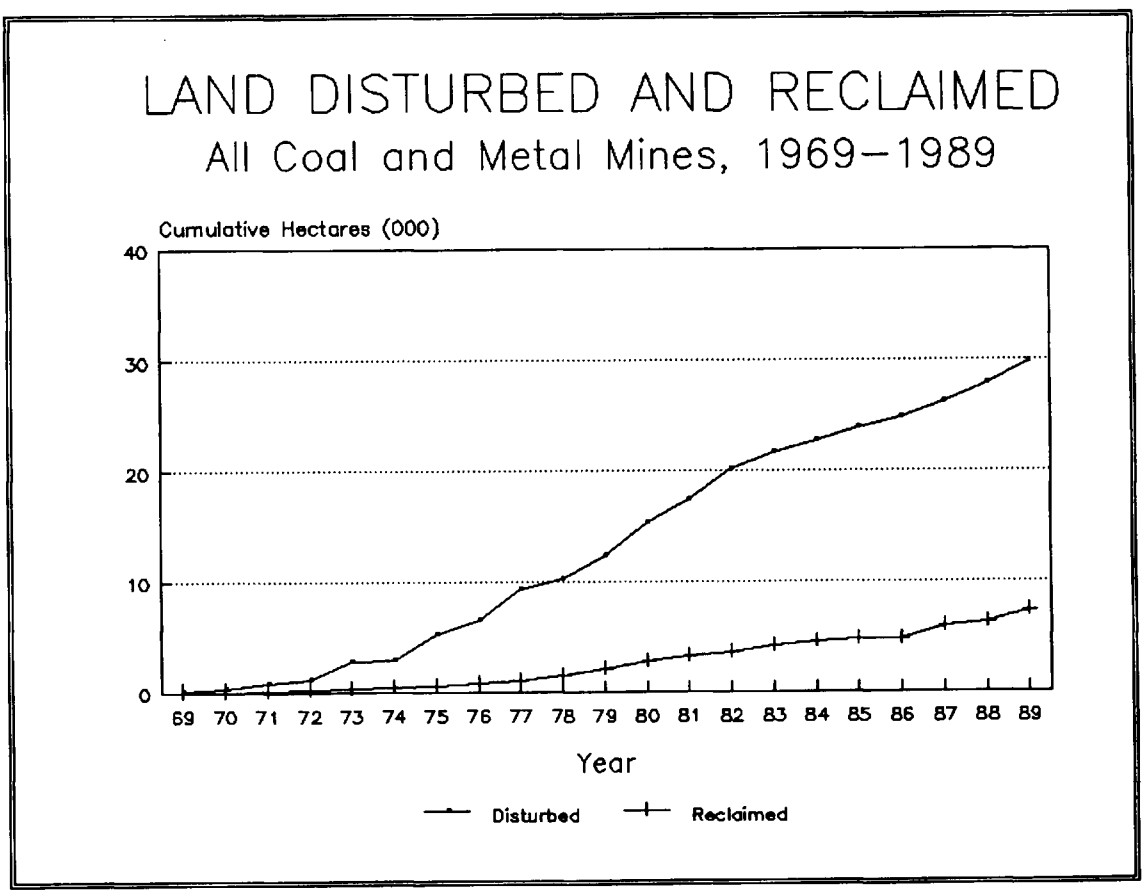
The Section works in close cooperation with members of industry and universities through the Technical and Research Committee on Reclamation. This committee has been active in supporting and fostering reclamation research and information exchange to ensure that technological advances in reclamation are disseminated rapidly throughout the mining industry.

Summary of Activities
Since the late 1960s, the composition of the mining industry in B.C. has changed from being almost exclusively underground operations, to mainly large-scale open pits. The coal and copper sectors have expanded greatly, and recently gold mining has again become important.

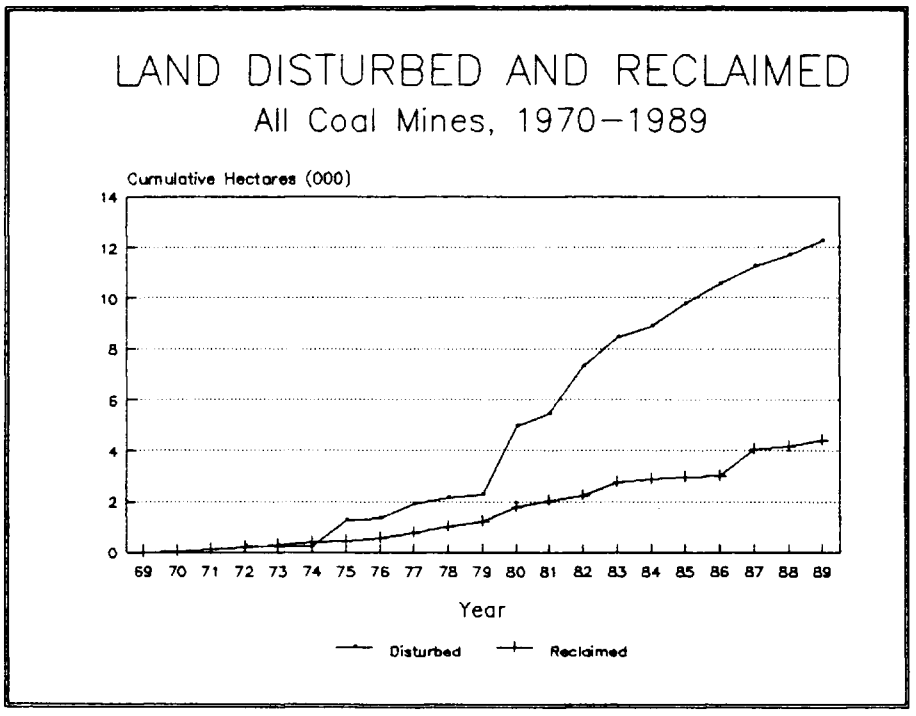
The mining industry now utilizes a much greater land base. Major coal and metal mines, which occupied less than 1,000 hectares in the late 1960s, now cover 29,779 hectares. A total of 7,332 hectares (25%) has been reclaimed by revegetation activities.

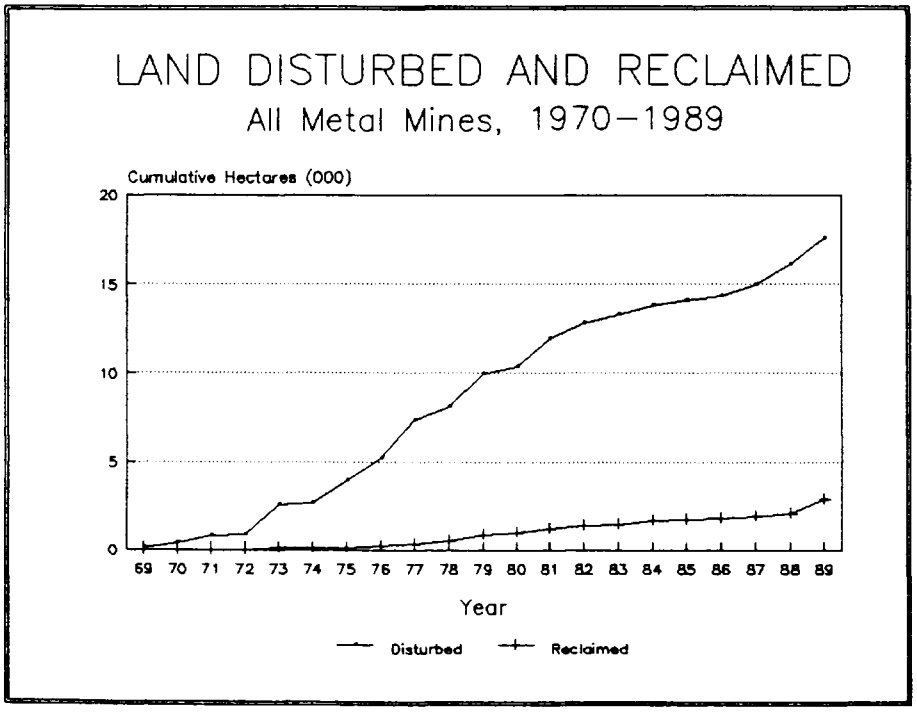
Mining Land Disturbance and Reclamation as of 1989
(Cumulative Hectares)

Type of Mine	Area Disturbed	Area Reclaimed
Coal mine	12 230	4 434
Metal mine	17 549	2 898
Total	29 779	7 332

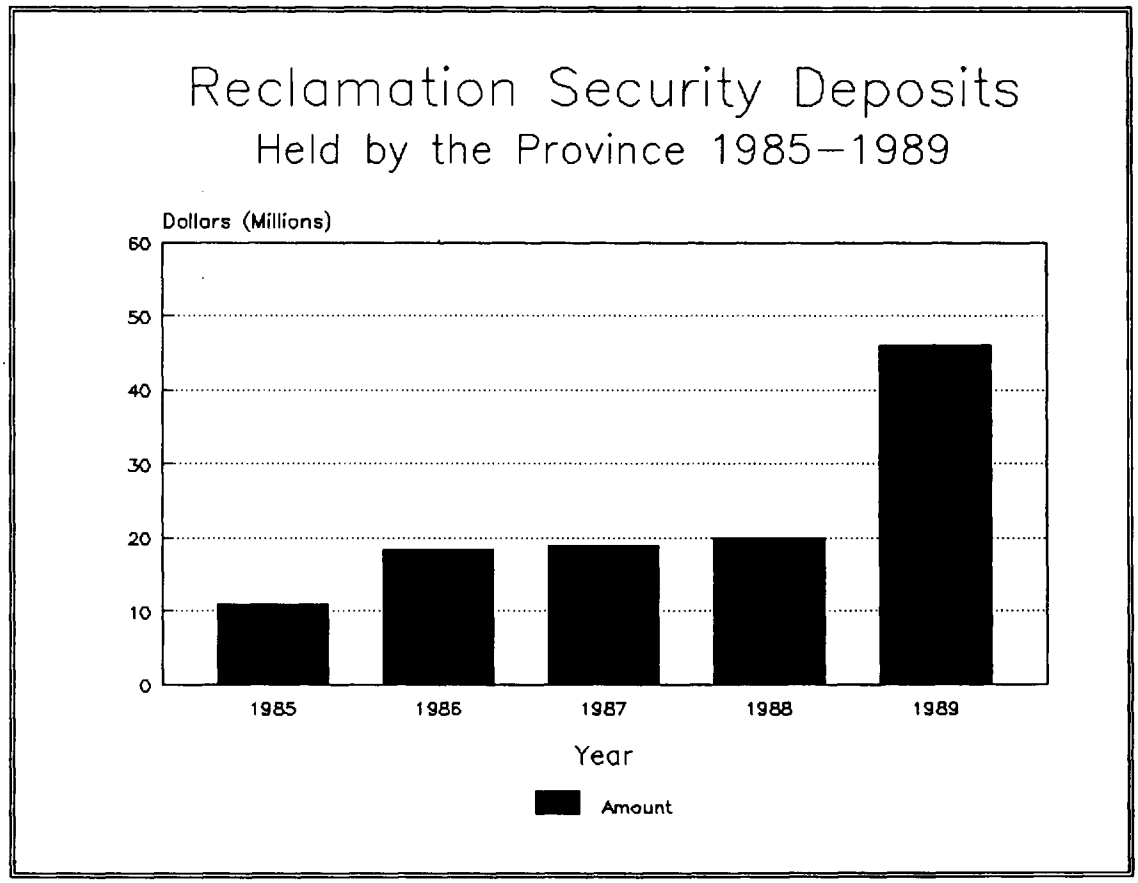


The graphs below show the separate breakdown of disturbed and reclaimed land at all metal mines and all coal mines. Coal mines have disturbed 12,230 hectares, of which 4,434 hectares (36%) have been reclaimed. Metal mines have disturbed 17,549 hectares, of which 2,898 hectares (17%) have been reclaimed.





By the end of the 1989 fiscal year, total reclamation security held by the province was $45,423,451. Total security held has increased significantly since 1985, and has more than doubled in the last year to reflect government policy that security should more closely match the actual costs of reclamation.



Acid Mine Drainage (AMD)

As well as the increasing land base occupied by mines, the potential for acid mine drainage (AMD) has strongly influenced mine reclamation guidelines and legislation. The environmental and social consequences of uncontrolled acid effluent could have a major impact on water quality far frem the mine site. Of the 16 metal mines currently operating in British Columbia, six are producing acid mine drainage and several more have the potential to produce acid mine drainage but are not yet doing so. Of the eight operating coal mines, none is presently generating acid mine drainage although one has the potential to do so.

The widespread concern over acid mine drainage led, in 1988, to the formation of the B.C. Acid Mine Drainage Task Force. The Task Force combines the talents of industry, academia, and the Provincial and Federal governments, and has the objective of developing cost effective solutions to acid mine drainage. A Steering Committee, chaired by the Chief Inspector, coordinates activity in association with three technical sub-committees: Prediction and Prevention; Treatment and Control; and Monitoring. These technical committees are responsible for developing and implementing solutions to the problem of acid mine drainage.

During 1989, the following studies were coordinated by the Task Force.

1. **Prediction Open Pits Project:** Acid Drainage from Mine Walls: the Main Zone Pit at Equity Silver Mines.

2. **Underwater Disposal of Waste Rock and Tailings Project:** Preliminary Assessments of Subaqueous Tailings Disposal in Benson, Mandy, and Anderson Lakes; and a Geochemical Assessment of Subaqueous Tailings Disposal in Buttle Lake.

3. **Diagenesis of Aquatic Tailings Project:** Geochemical Behavior of a Buried Marine Mine Tailings Deposit, Howe Sound.

4. **Westmin Resources Subaerial Tailings Disposal Project:** Evaluation of Subaerial Tailings Disposal Systems for Prevention of AMD at Myra Creek.

5. **Kutcho Creek Blending and Segregation Project:** Acid Generation Test Work, Phase II.

6. **BHP-Utah Waste Dump Hydrogeochemistry Project.**

7. **Gibraltar Acid Mine Drainage Model:** Phase I, Review and Assessment.

8. **Westmin Resources Waste Rock Treatment Project:** Hydrogeological Assessment and Development of AMD Control Technology for Myra Falls Waste Rock.

9. **Bell Mine Constructed Wetland Project.**

10. **Optimum Sampling Frequency Project.**

11. **Biological Monitoring of Acid Mine Drainage Project:** Literature Review for Biological Monitoring of Heavy Metals in Aquatic Environments.

12. **Aquatic Invertebrates Monitoring Project:** The Effect of Additions of Treated Acid Mine Drainage on the Abundance and Composition of Stream Macroinvertebrates and Periphytic Algae: An In Situ Mesocosm Experiment.

13. **Acid Mine Drainage Sediment Monitoring Project:** Review of Sediment Monitoring Techniques.

Funding for these studies was provided, in part, by the Mineral Development Agreement, a joint Federal/Provincial program.

Mount Washington Project

The Provincial Government continued the program to abate acid mine drainage on the Mount Washington mine near Courtenay on Vancouver Island. The Mount Washington copper mine closed in 1967 before any reclamation requirements were in place. Drainage from the pit and waste rock dumps is contaminated with enough copper to eliminate the fishery in the Tsolum River. During 1989, the glacial till blanket construction phase was completed, along with the construction of a 310 metre diversion ditch and the installation of fourteen piezometers. In mid-September the seeding and fertilizing of the waste dump was completed, and in October a program was set up to monitor the physical and chemical hydrogeology of the mine site and waste dump, and to evaluate the effectiveness of the reclamation activities already undertaken.

Mine Reclamation Symposium

The Technical and Research Committee organized the Thirteenth Annual Mine Reclamation Symposium held on June 8, 1989 in Vernon, British Columbia. One hundred and sixty delegates attended the symposium which had the theme "Water Management at Mine Sites".

Some British Columbia mining companies voluntarily exceed the requirements of their reclamation permits. During the symposium, awards and citations were presented honouring outstanding achievements in mine reclamation. The Annual B.C. Mine Reclamation Award was presented to Boss Mountain Mine. Citations were presented to Equity Silver Mines Ltd. for Metal Mining Reclamation; to Quinsam Coal Ltd. for Coal Mining Reclamation; to Columbia Ready-Mix for Sand and Gravel Pit Reclamation; and to Gulf Canada Resources Ltd. for Exploration Reclamation at the Mount Klappan Coal Project.

3.2. GEOTECHNICAL

Role and Responsibilities

The duties of the Geotechnical Section include:

a. the inspection of major geotechnical works at mines;
b. the assessment of engineering designs; and
c. the regulation of operational projects in the geotechnical field.

The structures being monitored include tailings impoundments, waste-rock dumps, spoil piles or stockpiles, and pitwalls. Other projects of occasional concern are water-retaining works and treatment ponds containing hazardous wastes.

Structure and Organization

The Section is administered by the Manager, Development Review and Approvals, and is staffed by one senior engineer with no technical assistants.

Summary of Activities

Nineteen eighty nine was an eventful year for this Section, with a significant increase in the number of active operations with major geotechnical structures. Twenty-six operations had major tailings impoundments, and 21 operations had major dumps or piles; a total of 31 sites were operating one of more of these major structures.

Most of the Section's work comprised investigations into incidents of failure at geotechnical structures; routine inspections; visits to mine sites for meetings or other reasons; and reviews of applications for mining plans. In addition, the Section was involved in the staging of a geotechnical workshop for Inspectors in March, 1989.

Incidents of failure in major geotechnical structures that were of concern to the Section included the following:

1. Instabilities were reported in pitwalls at Island Copper mine.

2. Spills from dams were recorded as unusual occurrences at both Highland Valley Copper mine and Bell Copper mine.

3. A leakage of tailings through the dam at the Premier Gold Project was discovered and investigated.

4. The dam at Blackdome Gold mine experienced appreciable distress which was investigated.

5. Although no failure occurred, the condition of the tailings impoundment at the Johnny Mountain gold project was a concern.

6. Failures of waste-rock dumps developed at Fording Coal mine and at the Greenhills operation of Westar Coal.

Visits were made to several mine sites apart from those mentioned above. Routine inspections were made at twelve sites of a total of 17 geotechnical works. Eight other visits were made for the purpose of meetings, reconnaissance, examination of conditions, and interest in both old and new developments.

Requests for approvals of mining plans containing geotechnical aspects did not absorb considerable time in 1989, most of that effort being spent on a small number of prominent projects. Three projects of note were: the Lornex tailings impoundment expansion at Highland Valley Copper; the mine plan for the Silbak Premier open pit gold mine; and the extension of the South Spoil waste-rock dump into Kilmarnock valley at Fording Coal Mine.

The registration of major tailings impoundments in the province, initiated in 1987, was terminated even though it was incomplete in some districts. The results were submitted to the world register for inclusion in its forthcoming revision.

3.3. MINING ROADS

Role and Responsibilities
Under the authority of the Ministry of Energy, Mines and Petroleum Resources Act, this Section operates the Mining and Petroleum Road Program to encourage and assist in the development of mineral resources in the province.

Structure and Organization
Administration of this Section is the responsibility of the Manager, Development Review and Approvals. The Road Program is staffed by one Certified Engineering Technician (Civil).

Summary of Activities
In 1989, the Ministry of Energy, Mines and Petroleum Resources, Engineering and Inspection Branch continued to provide technical and shared-cost assistance for road access studies for potential new mining sites.

This Section participated in providing review comments, technical advice, terms of reference and field inspections of completed mine access roads. Assistance was provided to Headquarters and Regional staff regarding the contracting of road access studies, and standards for haul roads on mine properties. In addition, the Section was occupied with the status of old mining roads by: answering queries on old mining road right-of-ways; supplying information to other ministries and the general public; and researching the liability aspect of old mining roads.

Specific activities during the year included the following:

1. Requests were received from Regional Offices to review consultants' haul road designs and comment on road grades, runoff lanes and road stability for the **Golden Bear** and the **Silbak-Premier Projects**.

2. The **Omineca Mine Road Extension**, from Moose Valley to the Lawyers property (104 kilometres), was inspected to determine the degree of success achieved in the road right-of-way reclamation. Some locations appeared satisfactory, while others had no vegetation. A landslide north of the Sturdee Airstrip was investigated. Recommendations were made to Cheni Gold Mines Ltd. on corrective measures.

3. The **Golden Bear Operating Company Mine Road Access** from kilometre 115 to kilometre 155, which had been constructed in 1988, had to be completely re-done. This was due to having attempted construction during the winter when snow and freezing conditions were encountered. Final construction was completed in the summer of 1989.

4. The **Mount Klappan Road Access** was further reviewed and a written report was submitted.

5. Several meetings were attended to discuss the **Windy Craggy Road Access Project**. Road access standards and the conditions under which line cutting could be carried out were major topics. Proposals from the mining company for this phase of the project were received. These were reviewed and comments submitted to the Mine Development Review Committee. Some field survey work was agreed to; however, no work in the Tatshinshinie Valley was approved.

6. In January 1989, the proposal call and the "Terms of Reference" for the **Iskut Road Access Study** were reviewed. Following the review, a Tender call was issued for a preliminary study of route options and estimated road construction costs for mining road access into Eskay and Branson Creeks (72 kilometres from Bob Quinn Lake to Bronson Creek and 20 kilometres from Volcano Creek to the Eskay Creek property).

   Proposals to do the required work were received on January 20, 1989, and work on the project commenced in February. A draft report was submitted in April and distributed to other government agencies for review. Review of the draft was completed, and by August 30 the final report had been presented.

   The Alaskan Government had prepared a cost-benefit study which was also reviewed and commented on. Access to the mine properties from Alaska was considered to be excessive for these smaller projects.

   By year end, "Terms of Reference" were being prepared in draft form for the survey and design of this proposed mine access road.

3.4. MINE DEVELOPMENT REVIEW PROCESS

Role and Responsibilities

The Mine Development Review Process (M.D.R.P.) is a non-legislative review procedure for new mining ventures, sponsored and administered by the province of British Columbia and driven by the working policy of the Environment and Land Use Committee of Cabinet (E.L.U.C). It is applied to coal and hardrock mineral mines and includes new mines, major expansions, and some larger pilot projects. It does not apply to smaller bulk sampling, placer, and sand and gravel operations.

The M.D.R.P. is designed to provide a comprehensive, credible and widely understood procedure for project review and approval in order to facilitate and expedite publicly acceptable mining ventures in the province.

Structure and Organization

The M.D.R.P. is administered by the Mine Development Steering Committee, chaired by the Ministry of Energy, Mines and Petroleum Resources and comprising senior staff from the Ministries of Environment, Municipal Affairs, Recreation and Culture, Transportation and Highways, Regional and Economic Development, and Native Affairs. Participants in the M.D.R.P. also include other provincial agencies, federal agencies, local governments, native groups and members of the public. A Branch staff member also acts as Secretary to the Steering Committee.

Summary of Activities

During 1989, several projects moved closer to production decisions under the M.D.R.P. Nine mine projects received approval-in-principle and advanced to Stage III, the licensing stage.

Prominent in the review process in 1989 were:

1. the Afton (Ajax Pit) Extension, which was granted approval-in-principle in February, 1989;

2. the Crows Nest Resources Ltd. Line Creek Rock Drain, which was granted approval-in-principle in March, 1989 making it the first major valley fill in the Province to be approved;

3. the Fording Coal Ltd. South Spoil Pile, which was granted approval-in-principle in August, 1989; and

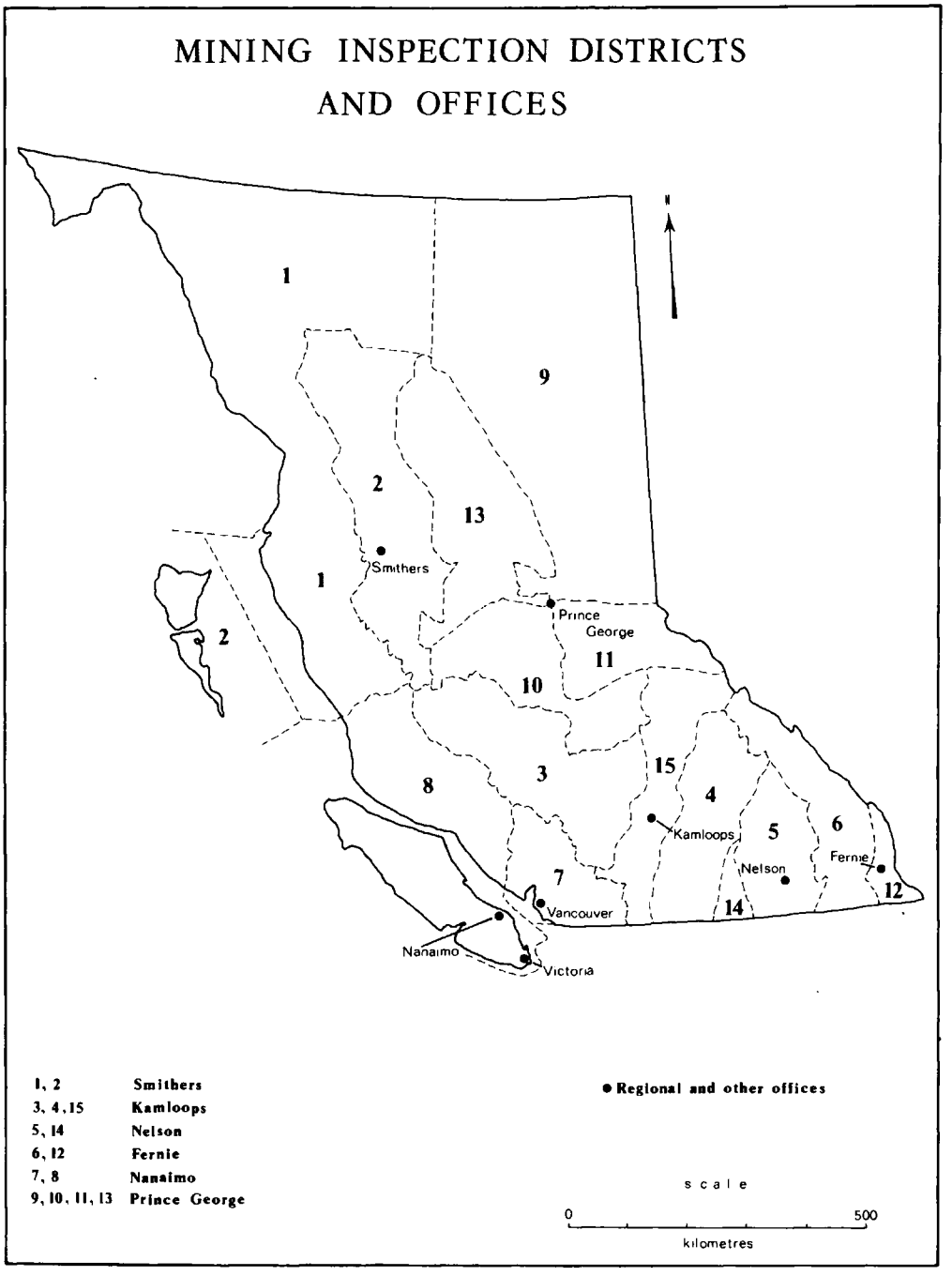
4. the Sulphurets Gold-Silver Project, which was granted approval-in-principle in September, 1989.

The review process handled 34 project submissions (see 1.4.3.) consisting of a variety of precious and base metal mines, plus some coal and industrial minerals projects. In 1989, the review process was partially regionalized to expedite the review and approval of small, relatively non-controversial mine projects. To facilitate this, a system of six Regional Mine Development Review Committees was established across the Province based in the major mine inspection centres. A comprehensive evaluation of the review process was initiated during the year which will continue into 1990.

The M.D.R.P. has been recognized by the World Commission on the Environment as making a significant contribution to sound decision-making on sustainable development.

PART 4: INSPECTION SERVICES

Inspectors of Mines, and for very small, low-impact projects, Contract Inspectors, stationed in Regional Offices, monitor mining activity for adherence to mining legislation and operating permits. The Regions are further subdivided into Inspection Districts. Mines are inspected and monitored during all phases of activity from exploration through development, construction, operation, closure and abandonment. Map 1 shows the Inspection Districts and the location of Regional Offices.



MAP 1

4.1. FERNIE REGIONAL OFFICE

4.1.1. Office Address

Bag 1000, Fernie, B.C., V0B 1M0.
Tel: (604) 423-6884 Fax: (604) 423-3194

4.1.2. Office Personnel

During the year, office personnel included:

R. Booth	District Inspector and Resident Engineer/Office Administrator
A. Whale	District Inspector and Resident Engineer
P.J. Switzer	Inspector of Mines
G. MacDonald	Inspector of Mines - Mechanical
D. Roach	Inspector of Mines (seasonal, part-time)
L. McIntyre	Secretary
L. Northey	Office Assistant

4.1.3. Area of Responsibility

The Kootenay Region is currently administered by two separate offices, one in Fernie and one in Nelson. The Fernie Regional Office is responsible for Inspection Districts #6 and #12 (see Map 1) in the southeast corner of the province. A. Whale is responsible for District #6 and R. Booth is responsible for District #12.

4.1.4. Inspection District #6

OPERATING MINES:

NAME:	Domtar Lussier River Mine
TYPE:	open pit industrial mineral
PRODUCT(S):	gypsum
LOCATION:	50°02'N 115°31'W
OWNER(S):	Domtar Gypsum Inc.

NAME:	Horse Creek Silica Mine
TYPE:	open pit industrial mineral
PRODUCT(S):	silica
LOCATION:	51°11'N 116°52'W
OWNER(S):	SMC Silicon Metaltech Corp.

NAME:	Moberley Silica Operations
TYPE:	open pit industrial mineral
PRODUCT(S):	glass sand
LOCATION:	51°22'N 116°58'W
OWNER(S):	Mountain Minerals Co. Ltd.

NAME: Mt. Brussilof Mine
TYPE: open pit industrial mineral
PRODUCT(S): high quality magnesite ore
LOCATION: 50°47'N 115°41'W
OWNER(S): Baymag Mines Co. Ltd.

NAME: Parson Barite Mine
TYPE: underground industrial mineral
PRODUCT(S): barite
LOCATION: 50°01'N 116°39'W
OWNER(S): Mountain Minerals Co. Ltd.

NAME: Queenstake Moyie River Mine
TYPE: large placer mine
PRODUCT(S): placer gold
LOCATION: 49°25'N 115°57'W
OWNER(S): Queenstake Resources Ltd.

NAME: Sullivan Mine
TYPE: underground metal
PRODUCT(S): zinc, lead, silver
LOCATION: 49°45'N 116°00'W
OWNER(S): Cominco Ltd.

NAME: Westroc Windermere Operations
TYPE: open pit industrial mineral
PRODUCT(S): gypsum
LOCATION: 50°29'N 115°52'W
OWNER(S): Westroc Industries Ltd.

NON-OPERATING MINES/MINE CLOSURES:

No significant closures were reported during the year.

MAJOR EXPLORATION/DEVELOPMENT PROJECTS:

Gill (49°10'N, 116°15'W): a surface drill program was undertaken by South Kootenay Gold Fields Inc.

McNeil (49°23'N, 115°59'W): an extensive road construction and diamond drill program was undertaken by South Kootenay Gold Fields Inc.

Star (49°12'N, 116°15'W): road construction and a drilling program were undertaken by Cominco Ltd.'s Kootenay Exploration.

Stoney (49°11'N, 115°55'W): road construction and a drill program were undertaken by Minnova Inc.

Vine (49°26'N, 115°50'W): an extensive surface drilling program was undertaken on a mineralized vein structure by Kokanee Exploration Ltd.

4.1.5. Inspection District #12

OPERATING MINES:

NAME:	Balmer Operations
TYPE:	open pit coal
PRODUCT(S):	metallurgical and thermal coal
LOCATION:	49°45'N 114°45'W
OWNER(S):	Westar Mining Ltd.

NAME:	Byron Creek Collieries
TYPE:	open pit coal
PRODUCT(S):	thermal and metallurgical coal
LOCATION:	49°30'N 114°40'W
OWNER(S):	Esso Resources Canada Ltd.

NAME:	Fording River Operation
TYPE:	open pit coal
PRODUCT(S):	metallurgical and thermal coal
LOCATION:	50°12'N 114°52'W
OWNER(S):	Fording Coal Ltd.

NAME:	Greenhills mine
TYPE:	open pit coal
PRODUCT(S):	metallurgical and thermal coal
LOCATION:	50°10'N 114°50'W
OWNER(S):	Westar Mining Ltd.

NAME:	Line Creek Mine
TYPE:	open pit coal
PRODUCT(S):	metallurgical and thermal coal
LOCATION:	49°57'N 114°46'W
OWNER(S):	Shell Canada Ltd., operated by Crows Nest Resources Ltd.

NON-OPERATING MINES/MINE CLOSURES:

No significant closures were reported during the year.

MAJOR EXPLORATION/DEVELOPMENT PROJECTS:

Most exploration work in District #12 was done by existing coal operations to further define reserves on their properties. Fording Coal Ltd. carried out exploration work in the Eagle Mountain, Lake Pit Phase III, Lake Mountain and Henretta Creek areas of its property. Westar Mining Ltd. conducted a diamond drill hole program at the north end of its Greenhills property to determine the coal structure. Crows Nest Resources undertook various exploration projects.

Exploration was also undertaken by R. Stanfields, Fox Geological and Westroc Industries Ltd.

4.1.6. Summary of Activities

The Kootenay Regional Mine Development Review Committee operated out of the Fernie Office, chaired by A. Whale. During 1989, the following projects were dealt with:

- The Line Creek Rock Drain Proposal was approved. This is the largest rock drain so far designed.

- A change in the method of construction of Westar's Mine Lagoon D was approved.

- The approval process was begun for Fording Coal Ltd.'s Kilmarnock Creek Project. The failure of the South Spoil Stage I into Kilmarnock Creek on October 26 complicated this process.

District Inspectors were involved in several safety related matters during the year including the following:

- The Workplace Hazardous Materials Information System (WHMIS) was introduced to the mines in the Elk Valley.

- Several truck accidents occurred at Westar Mining Ltd.'s operations. Investigation revealed that the wrong brake friction material was being used.

- An incident was investigated at Westar's operations in which a 200' length of gas pipe slid down a steeply inclined conveyor tunnel for several hundred feet while being installed.

- A drier blew up at Line Creek mine. Diesel fuel in the coal was investigated.

- Two shiftboss certificates and three blasting certificates were suspended for an incident which occurred in late 1988.

- A blasting incident at Byron Creek Collieries damaged several buildings and resulted in the suspension of the blaster and a change in the mines blasting procedures.

- Greenhills' North Dump failed on November 22.

- Attended the Vancouver Supreme Court in Westar Mining Ltd.'s litigation with an insurance company over a fire.

Inspectors judged at Mine Rescue Competitions held at Line Creek, Westar Operations, Fording Coal and Sullivan mine, as well as at the Regional Mine Rescue Competition in Fernie. P.J. Switzer was the chief judge at the Provincial Surface Mine Rescue Competition and other members of the office staff assisted.

A vote at Byron Creek Collieries which approved a 12-hour shift was supervised.

R. Booth upgraded in Mine Rescue and Ropes to become a Mine Rescue Examiner. Examinations were conducted by R. Booth and P. Switzer covering the area from Fernie to the Okanagan.

On April 5, 1989, a one-day course on safety inspections and the role of the Safety Committee was put on in Sparwood for the Safety Committee representatives of the United Mine Workers of America (UMWA).

The Geotechnical Seminar held in Victoria in March was attended, as well as inaugural meetings of the Rock Drain protocol group and a protocol meeting with the Parks Branch. Staff assisted when Deputy Minister Doug Horswill toured the Balmer, Greenhills and Fording coal operations.

4.2. KAMLOOPS REGIONAL OFFICE

4.2.1. Office Address

200-2985 Airport Drive, Kamloops, B.C., V2B 7W8.
Tel: (604) 828-4566 Fax: (604) 828-4726

4.2.2. Office Personnel

During the year, office personnel included:

F.J.T. Hancock	District Inspector and Resident Engineer/Office Administrator
E. Sadar	District Inspector and Resident Engineer
R. Heistad	Inspector of Mines - Mechanical
J.E. Beswick	Inspector of Mines
H.P. (Joe) Seguin	Inspector of Mines
L. MacCulloch	Secretary
J. Worsfold	Office Assistant

4.2.3. Area of Responsibility

The Kamloops Regional Office is responsible for Inspection Districts #3, #4 and #15, lying in the south-central portion of the province (see Map 1). The District Inspectors responsible are F.J.T. Hancock for Districts #3 and #15, and E. Sadar for District #4.

4.2.4. Inspection District #3

OPERATING MINES:

NAME:	Blackdome
TYPE:	underground metal
PRODUCT(S):	gold, silver (dore bullion and concentrates)
LOCATION:	$51^{O}20'N$ $122^{O}29'W$
OWNER(S):	Blackdome Mining Corporation; Min-Ven Gold Corporation

NAME:	Highland Valley Copper
TYPE:	open pit metal
PRODUCT(S):	copper, molybdenum concentrates
LOCATION:	$50^{O}29'N$ $121^{O}02'W$
OWNER(S):	Highland Valley Copper

NAME: Pavilion Lake
TYPE: quarry
PRODUCT(S): limestone
LOCATION: 50°49'N 121°39'W
OWNER(S): Continental Lime Ltd.; Pavilion Indian Band

NON-OPERATING MINES/MINE CLOSURES:

Frenier (Aurun) (51°20'N, 122°21'W): This open cut perlite mine, owned by Aurun Mines Ltd., did not operate during 1989.

MAJOR EXPLORATION/DEVELOPMENT PROJECTS:

Love Oil (50°48'N, 122°48'W): This is a gold/silver project operated by Coral Gold Corporation.

Second (51°04'N, 122°03'W): This is a gold project operated by Cyprus Gold (Canada) Ltd.

Spokane, Susan (50°52'N, 122°22'W): This gold/silver project was operated by MacNeill Industrial Inc.

4.2.5. Inspection District #4

OPERATING MINES:

NAME: Beaverdell (Highland Bell)
TYPE: underground metal
PRODUCT(S): silver (concentrates)
LOCATION: 49°26'N 119°04'W
OWNER(S): Teck Corporation

NAME: Brenda
TYPE: open pit metal
PRODUCT(S): copper, molybdenum (concentrates)
LOCATION: 49°53'N 120°01'W
OWNER(S): Brenda Mines Ltd.

NAME: Candorado
TYPE: tailings heap leaching
PRODUCT(S): gold (dore bullion)
LOCATION: 49°21'N 120°04'W
OWNER(S): Candorado Mines Ltd.

NAME: Dankoe Mill
TYPE: custom concentrator
PRODUCT(S): gold/silver concentrates
LOCATION: 49°03'N 119°41'W
OWNER(S): Dankoe Mines Ltd.

NAME: Falkland Quarry
TYPE: quarry
PRODUCT(S): gypsum
LOCATION: 50°30'N 119°30'W
OWNER(S): Lafarge Canada Inc.

NAME: Nickel Plate Mine
TYPE: open pit metal
PRODUCT(S): gold (dore bullion)
LOCATION: 49°22'N 120°02'W
OWNER(S): Corona Corp.

NAME: Revelstoke Flagstone Quarry
TYPE: quarry
PRODUCT(S): flagstone
LOCATION: 50°56'N 118°12'W
OWNER(S): A. McKenzie

NON-OPERATING MINES/MINE CLOSURES:

Goldstream Mine (51°38'N, 118°27'W): Goldstream Mine, an underground copper/zinc mine owned by Bethlehem Resources Corp., shut down in 1984 and remained non-operational in 1989.

MAJOR EXPLORATION/DEVELOPMENT PROJECTS:

Allendale (49°23'N, 119°20'W): a gold/copper project operated by Allendale Resources et al./Yukon Minerals Corp.

Brett (50°14'N, 119°39'W): a gold project operated by Huntington Resources Inc.

Crystal Peak Garnet (49°24'N, 119°55'W): This industrial garnet project is operated by Polestar Exploration Inc. A Prospectus was submitted to the M.D.R.P. in September and the review is on-going.

Elk (49°50'N, 120°19'W): a gold project operated by Fairfield Minerals Ltd.

Vault (49°22'N, 119°39'W): a gold project operated by Canadian Nickel Company Ltd.

4.2.6. Inspection District #15

OPERATING MINES:

NAME:	Afton
TYPE:	open pit metal
PRODUCT(S):	copper, gold, silver (concentrates)
LOCATION:	50°39'N 120°30'W
OWNER(S):	Afton Operating Corporation; Teck Corporation

NAME:	Buse Lake
TYPE:	quarry
PRODUCT(S):	silica rock
LOCATION:	50°37'N 120°02'W
OWNER(S):	Lafarge Canada Inc.

NAME:	Harper Ranch
TYPE:	quarry
PRODUCT(S):	limestone
LOCATION:	50°40'N 120°04'W
OWNER(S):	Lafarge Canada Inc.

NAME:	Samatosum
TYPE:	open pit metal
PRODUCT(S):	silver, gold, copper, lead, zinc (concentrates)
LOCATION:	51°10'N 119°47'W
OWNER(S):	Minnova Inc.; Rea Gold Corporation

NAME:	Similco (Copper Mountain)
TYPE:	open pit metal
PRODUCT(S):	copper, silver, gold (concentrates)
LOCATION:	49°20'N 120°33'W
OWNER(S):	Princeton Mining Corp.

NON-OPERATING MINES/MINE CLOSURES:

No significant closures were reported during the year.

MAJOR EXPLORATION/DEVELOPMENT PROJECTS:

Chu Chua (51°22'N, 120°02'W): This copper/gold project was operated by Minnova Inc.

Edith (50°36'N, 120°21'W): Cominco Exploration conducted work on this copper/gold project.

G Claims (51°12'N, 120°14'W): This feldspar project was operated by Michael Resources.

Kamad (51°08'N, 119°49'W): Work on this massive sulphide deposit was carried out by Homestake Mining (Canada) Ltd.

Lost Horse Gulch, Oriole (49°21'N, 120°30'W): Similco Mines conducted work on this copper/gold property.

Treasure Mountain (49°25'N, 121°03'W): Work was carried out on this silver/lead/zinc project by Huldra Silver Inc.

4.2.7. Summary of Activities

Review and approval of major mine developments and existing mine expansions included the Afton Ajax Project, Samatosum Mine and Similco Mine.

Review and approval of proposals for mineral exploration included placer operations, sand and gravel pits, and quarries, with a total of 257 proposals being reviewed.

Other work of the office included:

- The inspection of producing mines and mineral exploration projects to audit and enforce oompliance with the Mines Act and Regulations.

- The investigation of accidents, dangerous or unusual occurrences, applications for variance from Mines Act or Regulation requirements, and complaints from the public or industry.

- Participation in inter-agency local resource use plans and Regional Mine Development Review Committee activities.

- Administration of Regional Office systems and the contract inspection program.

4.3. NANAIMO REGIONAL OFFICE

4.3.1. Office Address

1A - 3411 Shenton Road, Nanaimo, B.C., V9T 2H1.
Tel: (604) 755-2486. Fax: (604) 755-2474

4.3.2. Office Personnel

During the year, office personnel included:

R. Bone	District Inspector and Resident Engineer/Office Administrator
J.C. Alvarez	Inspector of Mines
H.A. Armour	Inspector of Mines
E.W. Beresford	Inspector of Mines
G. Peachey	Secretary
K. McKay	Office Assistant
L. Quinn	Office Assistant (laid off December)

4.3.3. Area of Responsibility

The Nanaimo Regional Office is responsible for Inspection Districts #7 and #8 (see Map 1) under R. Bone as District Inspector for both Districts. The office administers Branch programs in the Vancouver Island and Lower Mainland areas.

4.3.4. Inspection District #7

OPERATING MINES:

NAME:	Clayburn (Fire Clay)
TYPE:	underground and open pit industrial mineral. The open pit started in February, 1989 and the underground ceased in June, 1989.
PRODUCT(S):	fireclay
LOCATION:	49°05'N 122°15'W
OWNER(S):	Clayburn Industries Ltd.

NAME:	Pitt River Quarry
TYPE:	open pit
PRODUCT(S):	granodiorites (rip rap, road and asphalt aggregates)
LOCATION:	49°15'N 122°43'W
OWNER(S):	Pitt River Quarries Ltd.

In addition, there were nine sand and gravel operations in District #7. The following list provides the name, location and owner of each:

Allard Pit (49°19'N, 122°46'W), Allard Construction Ltd.
Blackham (49°03'N, 122°16'W), Blackham Construction Ltd.
Bradner Road and Huntingdon Road (49°02'N, 122°24'W), Valley Rite Mix
Cannon Contracting (49°10'N, 122°17'W), Lafarge Concrete (Pacific Region)
Cewe Pit (49°19'N, 122°46'W), Jack Cewe Ltd.
Columbia Bitulithic (49°02'N, 122°28'W), Columbia Bitulithic
Lefeuvre Road Pit (49°02'N, 122°28'W), Valley Gravel Sales Ltd.
Sabre #7 (50°05'N, 123°02'W), Sabre Transport Ltd.
Sechelt Aggregates (49°29'N, 123°45'W), Construction Aggregates

NON-OPERATING MINES/MINE CLOSURES:

Carolin Gold Mine (49°31'N, 121°18'W) remained closed down, but limited exploration was carried out during the year.

MAJOR EXPLORATION/DEVELOPMENT PROJECTS:

Harrison Lake Gold: Bema Gold continued a drilling program on the property.

Giant Copper: Bethlehem Resources continued to explore this property located adjacent to Manning Park.

4.3.5. Inspection District #8

OPERATING MINES:

NAME:	Blubber Bay
TYPE:	open pit
PRODUCT(S):	limestone (chemical, cement and agricultural)
LOCATION:	49°47'N 124°37'W
OWNER(S):	Ash Grove Cement West Inc.

NAME:	Ideal Quarry
TYPE:	open pit
PRODUCT(S):	limestone (cement)
LOCATION:	49°34'N 124°30'W
OWNER(S):	Ideal Cement Company Ltd.

NAME:	Imperial Quarry
TYPE:	open pit
PRODUCT(S):	limestone (chemical)
LOCATION:	49°45'N 124°30'W
OWNER(S):	Imperial Limestone Company Ltd.

NAME:	Island Copper Mine
TYPE:	open pit metal
PRODUCT(S):	copper and molybdenum (concentrates)
LOCATION:	50°37'N 127°32'W
OWNER(S):	BHP-Utah Mines Ltd. and Gordon Milbourne

NAME:	Myra Falls Operation
TYPE:	underground metal
PRODUCT(S):	copper, zinc concentrate
LOCATION:	49°34'N 125°35'W
OWNER(S):	Westmin Resources Ltd.

NAME:	Quinsam Coal
TYPE:	open pit coal
PRODUCT(S):	thermal coal
LOCATION:	49°55'N 125°33'W
OWNER(S):	Brinco Coal Corp.

In addition, there were 17 rock/sand and gravel operations in District #8. The following list provides the name, location and owner of each:

Attree and Allandale Road Pits (48°25'N, 123°30'W), Columbia Ready Mix Ltd.
Cumberland Road Pit (49°38'N, 125°00'W), Lafarge Concrete
Dolan's Concrete (49°10'N, 124°45'W), Womak Holdings
Drinkwater (48°47'N, 123°45'W), Duncan Paving
Duncan (48°45'N, 123°45'W), Butler Bros.
Haylock Pit (49°18'N, 124°20'W), Haylock Bros. Paving Ltd.
Hub City (49°04'N, 123°53'W), Hub City Paving
Hyland (49°38'N, 125°00'W), Hyland Precast Inc.
Keating X-Road Pit (48°34'N, 123°25'W), Butler Bros. Ltd.
Lafarge Cassidy Pit (49°04'N, 123°53'W), Lafarge Concrete

Norm's Pit (50°02'N, 125°22'W), Norm's Backhoe
Producers Pit (48°25'N, 123°28'W), Construction Aggregates Ltd.
Spruston Pit (49°04'N, 123°55'W), Spruston Aggregates Ltd.
Tayco (49°38'N, 125°00'W), Tayco Paving
A. Trace (50°01'N, 125°22'W), A. Trace and Sons
Upland (50°01'N, 125°22'W), Upland Excavating
Wain Road Quarry (48°41'N, 123°25'W), Peninsula Rock Products

NON-OPERATING MINES/MINE CLOSURES:

There were no reported mine closures during the year.

MAJOR EXPLORATION/DEVELOPMENT PROJECTS:

Chemainus Project: Falconbridge carried out an extensive drilling program during the year.

Debbie: In March 1989, Westmin Resources completed the underground exploration tunnel started in 1988. In the latter part of 1989, an underground drilling program was commenced from several drill stations situated through the tunnel.

Lara: Minnova continued the exploration of the Laramide Property, located in the Mount Sicker Formation near Chemainus, to further quantify the copper deposit.

Quinsam Coal Mine: An underground mine was started from the end of the open pit highwall to test mining conditions and support requirements. Information from the test mining period will be used to plan a large underground mine to be reviewed by the Vancouver Island Mine Development Review Committee.

Spud Valley Mine: McAdam Resources installed a small gold milling operation to process a bulk sample from an underground project at Zeballos, Vancouver Island.

Myra Falls Operation (Westmin Resources): The Thelwood Access and Bypass Tunnel, begun in November 1988, was completed in March, 1989 at an approximate cost of $4.9 million. The removal of acid generating tailings from the Pipeline Road was completed at an approximate cost of $1.0 million. A $6.2 million underground exploration program was completed.

4.3.6. Summary of Activities

The Vancouver Island Mine Development Review Committee meets in Nanaimo under the chairmanship of R. Bone. During 1989, the Committee was involved with the following major projects:

- BHP-Utah's Island Copper Mine South Wall Push Back plan for the installation of a slurry wall 1200 metres (4000 feet) in length by 0.75 metres (2.5 feet) wide at an average depth of 22.5 metres (75 feet). The expansion of the South Wall Push Back increased reserves by approximately 83 million metric tonnes.

- Westmin Resources' Reclamation Plan for permit renewal at Myra Falls.

- Review and approval of McAdam Resources' Spud Valley bulk sample project.

- The exploration drilling program on the Debbie property after completion of the underground tunnel.

- Ongoing environmental monitoring programs for acid mine generation.

Safety related matters that involved the Nanaimo Office included:

- The investigation into a fatal accident at Westmin Resources' H-W Mine at Myra Falls (see 6.1 no.3).

- A safety audit carried out at the Myra Falls Operation to examine all production aspects at the mine. The format will be used at other major mines throughout the province to complement the normal inspection program.

The Office coordinated a contract inspection program for Districts #7 and #8.

4.4. NELSON REGIONAL OFFICE

4.4.1. Office Address

403 Vernon Street, Nelson, B.C., V1L 4E6.
Tel: (604) 354-6125 Fax: (604) 354-6120

4.4.2. Office Personnel

During the year, office personnel included:

M.A. Mellor	District Inspector of Mines
A.L. O'Bryan	Inspector of Mines - Reclamation
D. Roach	Inspector of Mines (seasonal, part-time)
D. Bilinski	Secretary (resigned July)
S. Beatty	Secretary
D. Zukowski	Office Assistant

4.4.3. Area of Responsibility

The Kootenay Region is currently administered by two separate offices, one in Fernie and one in Nelson. The Nelson Regional Office is responsible for Inspection Districts #5 and #14 located in the south of the province (see Map 1). M.A. Mellor is the District Inspector.

4.4.4. Inspection District #5

OPERATING MINES:

NAME:	Imasco Crawford Bay Dolomite Mine
TYPE:	underground industrial mineral
PRODUCT(S):	dolomite
LOCATION:	49°35'N 116°45'W
OWNER(S):	International Marble & Stone Co. Ltd.

NAME:	Imasco Granite Mine
TYPE:	underground granite mine
PRODUCT(S):	granite
LOCATION:	49°11'N 116°37'W
OWNER(S):	International Marble & Stone Co. Ltd.

NAME:	Lost Creek Mine
TYPE:	underground industrial mineral
PRODUCT(S):	dolomite
LOCATION:	49°07'N 117°10'W
OWNER(S):	International Marble & Stone Co. Ltd.

NAME:	Silvana
TYPE:	underground metal
PRODUCT(S):	silver, lead, zinc
LOCATION:	49°50'N 117°11'W
OWNER(S):	Dickenson Mines Ltd./Treminco Resources Ltd. A change of ownership from Dickenson Mines to Treminco Resources Ltd. became effective on October 31, 1989.

NAME:	South Fork Silica Mine
TYPE:	open pit industrial mineral
PRODUCT(S):	silica
LOCATION:	49°12'N 117°13'W
OWNER(S):	331670 B.C. Ltd.

NON-OPERATING MINES/MINE CLOSURES:

There were no reported closures during the year.

MAJOR EXPLORATION/DEVELOPMENT PROJECTS:

Alpine Gold (49°12'N, 117°27'W): Surface diamond drilling exploration was carried out by Cove Resources Corp.

Carnation (49°58'N, 117°15'W): Treminco Resources carried out underground rehabilitation work at this site.

Golden Crown (50°34'N, 117°20'W): Surface and underground exploration was conducted by Attwood Gold Corp.

Great Western Star (49°20'N, 117°20'W): Surface diamond drilling and trenching was conducted by Pacific Sentinel Gold Corp.

Liz, Tag, Bid and Ace (49°13'N, 116°33'W): Legion Resources Ltd. carried out surface diamond drilling exploration.

Millie Mack (50°03'N, 117°44'W): Dragoon Resources/Greenstone Resources carried out trenching, drilling and bulk sampling.

Player Group (49°25'N, 117°24'W): Surface drilling and trenching exploration was carried out by Formosa Resources Corp.

Red Elephant Project (50°40'N, 117°10'W): Roper Resources conducted surface diamond drilling exploration.

Rely (49°12'N, 117°27'W): Surface exploration and diamond drilling was conducted by Pegasus Gold Corp.

Rossland Joint Venture (49°04'N, 117°48'W): Surface diamond drilling was conducted by Antelope Resources Inc. and Bryndon Ventures Inc.

Second Relief Project (49°19'N, 117°23'W): Surface exploration was carried out by Hawkeye Development Ltd.

Sumit (49°08'N, 117°09'W): Surface exploration was carried out by Baloil Resources Ltd.

Tillicum Mountain (49°59'N, 117°43'W): Esperanza Exploration carried out surface and underground exploration.

Whitewater (49°23'N, 117°20'W): Teck Corp. conducted surface diamond drilling.

4.4.5. Inspection District #14

OPERATING MINES:

NAME:	Skylark (O.B.)
TYPE:	underground metal
PRODUCT(S):	silver, gold
LOCATION:	49°05'N 118°37'W
OWNER(S):	Skylark Resources Ltd. Closed in April, 1989.

NON-OPERATING MINES/MINE CLOSURES:

Skylark (O.B.) (see 4.4.5.1): This mine closed in April, 1989 due to declining silver prices.

MAJOR EXPLORATION/DEVELOPMENT PROJECTS

No activity reported.

4.4.6. Summary of Activities

An auxiliary Inspector of Mines, D. Roach, was employed for the period of May 24th to November 30th to inspect surface mineral exploration projects and some gravel pit operations in Inspection Districts #5, #14, #6 and #12. His time was divided between the Nelson and Fernie District Offices.

Prominent events during the year were:

- the closure of the Skylark Mine in April due to declinlng silver prices; and
- the change in ownership of Silvana Mine near Sandon, B.C., from Dickenson Mines to Treminco Resources Ltd.

The Nelson Regional Office, with the assistance of all other District Inspectors of Mines, collected data for the Safest Small Underground Mine in British Columbia. The West Kootenay Mine and Industrial Safety Association trophy for this achievement was awarded to Mountain Minerals' Parson Barite Mine. The presentations for this 38th annual event take place at the Nelson Mining Banquet on March 3, 1990.

4.5. PRINCE GEORGE REGIONAL OFFICE

4.5.1. Office Address

1652 Quinn Street, Prince George, B.C., V2N 1X3.
Tel: (604) 565-6125 Fax: (604) 565-6015

4.5.2. Office Personnel

During the year, office personnel included:

R.W. Lewis	District Inspector and Resident Engineer
D. Turner	District Inspector and Resident Engineer
J.J. Sutherland	District Inspector of Mines
D. Miller	Inspector of Mines
T. Burroughs	Secretary
N. Wood	Office Assistant

4.5.3. Area of Responsibility

The Prince George Regional Office is responsible for Inspection Districts #9, #10, #11 and #13 (see Map 1) covering the northeast quarter of the province. The Inspection Districts in this area changed towards the end of 1989. During 1989, #13 was included with #10. However, in this report each District is covered separately.

The Inspectors responsible for each District changed during the year. For most of the year R.W. Lewis was responsible for District #9 and J.J. Sutherland was responsible for Districts #10, #11 and #13. Mr. Lewis passed away in October and District responsibilities were reorganized as follows: District #9, D. Turner; District #10, J.J. Sutherland; District #11, D. Miller; and District #13 vacant pending the arrival of S. Wuschke.

4.5.4. Inspection District #9

OPERATING MINES:

NAME:	Bullmoose
TYPE:	open pit coal
PRODUCT(S):	metallurgical coal
LOCATION:	55°17'N 121°26'W
OWNER(S):	Bullmoose Operating Corp. (Teck Corp.)

NAME:	Endako
TYPE:	open pit metal
PRODUCT(S):	molybdenum
LOCATION:	54°02'N 125°07'W
OWNER(S):	Placer Dome Inc.

NAME:	Gibraltar
TYPE:	open pit metal
PRODUCT(S):	copper
LOCATION:	52°00'N 122°56'W
OWNER(S):	Placer Dome Inc.

NAME:	Quintette
TYPE:	open pit coal
PRODUCT(S):	metallurgical and thermal coal
LOCATION:	55°01'N 121°13'W
OWNER(S):	Quintette Coal Ltd. (Denison Mines Ltd.)

NON-OPERATING MINES/MINE CLOSURES:

There were no reported closures during 1989.

MAJOR EXPLORATION/DEVELOPMENT PROJECTS:

Cirque (57°20'N, 125°30'W): This massive zinc, silver and lead deposit was under development by Curragh Resources Inc. The deposit would be mined using underground methods only, with zinc concentrates shipped to the Curragh Resources zinc smelter in Spain.

4.5.5. Inspection District #10

OPERATING MINES:

NAME:	Dahl Lake
TYPE:	quarry
PRODUCT(S):	limestone
LOCATION:	50°40'N 123°30'W
OWNER(S):	Star Equipment Co. Ltd.

There were nine surface placer mines in operation, all producing placer gold. The names, location and owners are listed below. Where the operation does not have a name, the placer lease numbers (PL#) are given.

Big Valley Resources; Cariboo Creek; L. Tattersall
McKeown Mines; Spanish Mountain; P. and V. McKeown
Settea Exploration; Bullion Pit; J. Budinski
PL# 3744, 3745,5907; Spanish Mountain; R. Hampton
PL# 1275, 15475; Quesnel River; G. Williams
Vardex Consultants; Bullion Pit; Vardex Consultants
Blue Ice Resources; Likely (Quesnel River); R. Harms and T. Borkowski
PL# 15782; Cariboo River; J. Curiston
Cascadia Mines and Resources; Keithly River; D. Dennis

NON-OPERATING MINES/MINE CLOSURES:

There were no reported closures during the year.

MAJOR EXPLORATION/DEVELOPMENT PROJECTS:

Hawkley, Omega: Drilling and trenching took place on this gold property located at Mackay River and owned by Amazon Petroleum.

Doreen: Drilling took place on this copper/gold/silver property loeated at Horsefly and owned by Gibraltar Mines.

Christmas: Drilling, trenoning and road construction was undertaken on this copper/gold property located at Eagle Creek and owned by Corona Corporation.

Cariboo Bell: Drilling was carried out on this project, located at Polly Lake and owned by Imperial Metals. This project has now reached the Mine Development Review stage, proposing a 15,000 tonne/day open pit copper/gold mine.

4.5.6. Inspection District #11

OPERATING MINES:

There were no reported mines operating in this District during 1989.

NON-OPERATING MINES/MINE CLOSURES:

Mosquito Creek (53°03'N, 121°36'W): This underground gold mine, which was placed on a care and maintenance basis in 1987, remained inoperative in 1989.

MAJOR EXPLORATION/DEVELOPMENT PROJECTS:

There were no reported exploration projects during the year.

4.5.7. Inspection District #13

OPERATING MINES:

NAME:	Endako
TYPE:	open pit metal
PRODUCT(S):	molybdenum
LOCATION:	54°02'N 125°07'W
OWNER(S):	Placer Dome Inc.

NON-OPERATING MINES/MINE CLOSURES:

No significant closures were reported during the year.

MAJOR EXPLORATION/DEVELOPMENT PROJECTS:

Airalta Ltd. (55°45'N, 124°40'W): a placer gold project owned by General Mineral Corp.

HC: Geochemical, geophysical, trenching and drilling activities were carried out under Noranda Inc. on this property located on Holy Cross forest road.

Kwanika Enterprises (55°41'N, 124°00'W): a placer gold project.

McConnell Creek: Geophysical, geochemical and drilling exploration was conducted under Placer Dome Inc.

Mill Rose Mining Ltd. (55°39'N, 124°31'W): a placer gold project.

Mt. Milligan (55°03'N, 124°05'W): Continental Gold carried out exploratory drilling on this site located north of Fort St. James at Rainbow Creek.

Snowbird: X-Cal Resources Ltd. conducted trenching and drilling work on this property, located on Bay Road.

Takla Rainbow (55°40'N, 125°17'W): Geophysical, trenching and drilling exploration was carried out for Imperial Metals Corp.

4.5.8. Summary of Activities

The Northeast Mine Development Review Committee operates from the Prince George Office. During 1989, the chair was occupied by D. Turner followed by E.J. Hall. The main developments overseen by the Committee were:

- Review of the Stage I submission of the Quesnel River gold property operated by QPX Minerals. Recommendations for further testing for drainage problems and habitat values were made before approval was granted.

- Review of proposals from Gibraltar Mines Ltd. regarding a contingency plan for acid mine drainage generation and treatment following closure of the mine. This review also recommended the increase of the reclamation bond to reflect a minimum of 1989 costs.

- Review of the Prospectus on the Mount Polley property near Likely, operated by Imperial Metals Corporation.

- Review of the Prospectus on Eureka Resources' Frasergold Project east of Likely.

The reclamation work at Boss Mountain Mine, which closed in 1983, continued in 1989 and should be complete by the fall of 1990.

Time spent on inspections was normal, with no major problems.

4.6. SMITHERS REGIONAL OFFICE

4.6.1. Office Address

2nd Floor - Courthouse Building, 3793 Alfred Avenue, Smithers, B.C., V0J 2N0.
Tel: (604) 847-7383 Fax: (604) 847-7603

4.6.2. Office Personnel

At year end, office personnel included:

D.W. Flynn	District Inspector and Resident Engineer/Office Administrator
B.H. Good	District Inspector and Resident Engineer
D.L. Porteous	Inspector of Mines
E.J. Hall	Inspector of Mines - Reclamation
E.C. Konschuh	Secretary
S. Ciampichini	Office Assistant
G. Baker	Office Assistant
J. Harris	Office Assistant (resigned March)

4.6.3. Area of Responsibility

The Smithers Regional Office is responsible for Inspection Districts #1 and #2 (see Map 1), with D.W. Flynn being the Inspector responsible for District #1 and B.H. Good being responsible for District #2. The office administers the Branch's programs in the northwest quarter of the province, including the Queen Charlotte Islands.

4.6.4. Inspection District #1

OPERATING MINES:

NAME:	Cassiar Mine
TYPE:	open pit (closed May 11, 1990), underground (expected to commence production in September 1990)
PRODUCT(S):	asbestos
LOCATION:	59°19'N 129°53'W
OWNER(S):	Cassiar Mining Corporation

NAME:	Johnny Mountain
TYPE:	underground metal
PRODUCT(S):	copper, gold, silver
LOCATION:	56°38'N 131°04'W
OWNER(S):	Skyline Gold Corporation

NAME:	Premier Gold
TYPE:	open pit metal
PRODUCT(S):	gold, silver
LOCATION:	56°03'N 130°02'W
OWNER(S):	Westmin Resources Ltd., Pioneer Metals Ltd, and Canacord Resources Ltd.

NAME:	Golden Bear
TYPE:	mainly open pit metal, with small seasonal open pit
PRODUCT(S):	gold, silver
LOCATION:	58°13'N 132°17'W
OWNER(S):	Homestake Mineral Development Ltd. and Chevron Minerals

NON-OPERATING MINES/MINE CLOSURES:

Erickson Gold, owned by Total Energold Corp., shut down until further ore reserves are outlined for a minimum life of two years.

Taurus Mine, owned by Taurus Resources Ltd., also shut down until more ore is found.

MAJOR EXPLORATION/DEVELOPMENT PROJECTS:

Anyox (55°27'N, 129°47'W): Tru-Grit Abrasives filed applications to remove slag from the old Anyox site and work is expected to begin in summer 1990.

Eskay Creek (56°38'N and 130°28'W): Prime Resources, Corona Corp. and Stikine Resources are exploring for gold in the Eskay Creek area north of Stewart. Surface drilling is ongoing and underground exploration is scheduled to begin in June. A prospectus has been filed with the Mine Development Steering Committee; the owners anticipate an open pit/underground combination mine.

Inel (56°36'N, 130°57'W): Underground exploration and drilling programs at Gulf International's Inel Gold Project on upper Bronson Creek will continue through the summer, 1990.

McLymont Creek (56°49'N, 13°55'W): An underground exploration is planned at Gulf International's gold project on McLymont Creek for the summer, 1990. Surface drilling has been ongoing for two seasons and will be confirmed as financing permits.

Snip (56°40'N, 131°06'W): Cominco's Snip Gold Project is being readied for production and is at the Stage III (permitting stage) of the Mine Development Review Process. Construction is expected to start in summer 1990, with underground production commencing in 1991.

Sulphurets (56°28'N, 130°11'W): Further construction at the Sulphurets Gold-Silver Project has been deferred until 1991. This will be an underground mine owned by Newhawk Gold Mines and Granduc Mines Ltd.

Windy Craggy (59°44'N, 137°44): Geddes Resources Ltd. is continuing with exploration on its huge copper-gold Windy Craggy project. A Stage I Report has been filed with the Mine Development Steering Committee. The company is continuing to upgrade its information base and will be submitting a revised mine plan and Stage II Report at a later date.

4.6.5. Inspection District #2

OPERATING MINES:

NAME:	Bell Copper Mine
TYPE:	open pit metal
PRODUCT(S):	copper and associated gold in concentrates
LOCATION:	55°00'N 126°12'W
OWNER(S):	Noranda Minerals Inc.

NAME:	Equity Silver
TYPE:	open pit metal
PRODUCT(S):	silver, copper in concentrates, silver and gold dore bars
LOCATION:	54°10'N 126°15'W
OWNER(S):	Equity Silver Mines Ltd.

NAME:	Lawyers Mine
TYPE:	underground metal
PRODUCT(S):	silver and gold in dore bars
LOCATION:	57°20'N 127°12'W
OWNER(S):	Cheni Gold Mines Ltd.

NAME:	Shasta Mine
TYPE:	small open pit and underground metal
PRODUCT(S):	gold and silver in dore bars
LOCATION:	$57^{O}17'N$ $127^{O}00'W$
OWNER(S):	Sable Resources/International Shasta

NON-OPERATING MINES/MINE CLOSURES:

Demolition and reclamation was in progress at both Granisle Mine, owned by Noranda Minerals Inc., and Wesfrob Mine, owned by Falconbridge Ltd.

MAJOR EXPLORATION/DEVELOPMENT PROJECTS:

Dome Mountain: The Dome Mountain gold/silver project of Teeshin Resources was granted approval in 1988; however, financing and ownership questions are still being resolved. Drilling has continued on the property to increase ore reserves. No applications for mine construction permits were received.

Telkwa: The Telkwa Coal Project (thermal coal) of Crows Nest Resources was granted approval-in-principle in 1986, but construction has not started due to poor market conditions. Exploration programs on the north side of the Telkwa River have indicated significant coal reserves. Early in 1990 the company submitted a revised project plan for review by the Mine Development Steering Committee.

Mount Klappan: Gulf Canada Resources submitted a Stage II Report for the Mount Klappan Anthracite Project (thermal coal) in 1987. The review comments have not been finalized. Only minor exploration and reclamation studies were conducted on the site.

Silver Queen: Major underground exploration and drilling programs were conducted at the Silver Queen Mine (gold, silver and zinc), a past producer owned by Pacific Houston Resources. A preliminary feasibility study did not support further development at this time. The property is being kept on a care and maintenance basis.

4.6.6. Summary of Activities

The Northwest Mine Development Review Committee operates out of the Smithers office. In 1989, B.H. Good was Chairman. The following were prominent in the Committee's work during the year:

- Development of the Laredo Limestone Quarry on Aristazabal Island on the central coast was reviewed and approved. No construction has taken place.

- Sable Resources' proposal for small scale mining on the Shasta property in the Toodogone area was reviewed and approved. Ore is being processed through the mill left by the Baker Mine.

- A Stage I Report from Catear Resources was reviewed and returned to the company for revision and re-submission with additional information.

- Westmin Resources submitted reports on waste handling and reclamation of the Province Zone which had been excluded from the approval-in-principle granted to the Premier Gold Project. Several questions remain to be answered before approval will be considered.

- Westmin Resources submitted a report on a proposed underground mining plan at the Premier property. Further information was requested and no conclusions have yet been reached.

In the area of safety and investigations, District Inspectors were involved in the following:

- The investigation of fatalities at Newhawk's Sulphurets property, Windy Craggy and Bell Copper (see 6.1).

- Inquests into fatalities at Johnny Mountain (occurred in 1988) and the Sulphurets property.

- The prosecution of Silver Hill Mines under the Mines Regulation (see 6.4).

The Bell Mine was given a section 6 approval for a major push-back of the pit wall to permit an additional year of production. In addition, the Branch continued to participate in the Equity Mine Surveillance Committee review of the closure plan for the Equity Mine.

4.7. INFORMATION SYSTEMS

In a continued commitment to enhance service to industry and to the public through the effective management of information resources, the Branch created and filled the position of Head, Information Systems. Several computerized systems are operational or under development which analyze health, safety, and environmental factors that are vital to the mining industry.

A prototype of the "Mine Accident Reporting System", developed by the Branch, was presented to the National Mine Accident Database Working Committee in Ottawa, and will provide the mechanism for involving other provinces in a nationwide system. British Columbia is setting the standard for mine accident reporting in Canada and will benefit from drawing on national experience in its accident prevention program.

PART 5: HEALTH AND SAFETY STANDARDS AND SPECIAL PROJECTS

5.1. ENVIRONMENTAL CONTROL

Role and Responsibilities
The Environmental Control Section is charged with monitoring the workplace environment at metal mines, coal mines, and industrial mineral mines and quarries throughout the province. It ensures compliance with the Mines Act Regulations with regard to the chemical, physical and radiated elements to which workers are exposed. Factors monitored include, but are not limited to: respirable dusts; noise; excessive heat or cold; and chemicals used in the mining, milling and concentrating of ores.

The audiologist is also responsible for training, examining and certifying audiometric technicians for the mining industry.

Structure and Organization
In 1989, the work was carried out by four persons including the Section Head and three Environmental Inspectors, one of whom is the audiologist.

Summary of Activities
The audiologist kept track of the occupational hearing loss of approximately 15,000 persons working in B.C.'s mining industry with the use of a computer-aided system. Mandatory annual hearing tests were carried out on persons working in high-noise areas.

The other Environmental Inspectors monitored factors such as dust, noise, lighting, radiation and temperature. During the year they made 48 detailed inspections which involved 36 different mining companies.

Two Inspectors were directly involved in the Safety Audit at Westmin Resources' Myra Falls Operation. The Section was also involved in a field study, done in cooperation with Westmin Resources Ltd., into the effectiveness of ceramic filters as a method of controlling emissions from diesel engines operating in an underground environment. When used in conjunction with fuel additives, these filters aid in controlling carcinogenic respirable combustible dusts produced during engine operation.

Of prime importance in 1989 was the completion of the review of industrial hygiene/workplace environmental regulations for the proposed new Health, Safety and Reclamation Code (see 1.2.2.). Although the Code will not be finalized until 1990, extensive progress was made. The Section's legislated mandate is expanded considerably to more accurately reflect concerns about the workplace environment.

The following tables show details of the audiometric and dust control programs during 1989.

Audiometric Training/Sound Survey Statistics, 1989

Audiometric technicians	
- number trained	24
- certificate renewal	42
Sound surveys	
- number conducted	24
- number of operations	24
Results:	
- workers wearing ear protection where required (%)	90[1]
- drill mufflers in use (%)	100
- properties performing audiometric tests on workers (%)	100[2]

[1] Approximate
[2] With the exception of a few small gravel pits

Dust Control Inspections, 1989

Type of Inspection	
Metal, Coal, Asbestos, Uranium, Limestone and Rock Quarries:	
- number of inspections	45
- number of operations	33
Percent meeting standards:	
Underground mines	
- drilling	90*
- other u/g operations	90*
- crushing plants	80*
Open Pit Mines	
- drilling	100
- other operations	100
- crushing plants	80*
Structural and Industrial Minerals:	
- number of inspections	3
- number of operations	3
Percent meeting standards:	100

* Approximate

5.2. MECHANICAL ENGINEERING

Role and Responsibilities
The Mechanical Section ensures that all mechanical equipment installed and used at mines complies with the Mines Act and applicable Codes and Standards, and that the equipment is maintained in acceptable condition such that its operation would cause no hazard to persons or property.

Structure and Organization
The Section consists of one professional mechanical engineer (Head, Mechanical-Electrical Engineering) and two mechanical technicians (Mechanical Inspectors in Fernie and Kamloops).

Summary of Activities
During 1989, on-site inspections were again curtailed due to a shortage of staff; however, inspections, together with investigations, and testing of new or modified equipment received most of the Section's attention.

The Section continued to provide input into the review of the Mines Act and Regulations (see 1.2.2.), although most of the sub-committee work pertaining to "Buildings, Machinery and Equipment" and "Hoists and Shafts" was completed early in the year.

Field testing of non-asbestos brake linings for large haul trucks produced more positive results than in 1988, leading to the hope that "the corner has been turned" in the successful introduction of these linings.

The Section, together with the Electrical Section, organized the biennial Mechanical-Electrical Symposium which was held in February and attracted delegates from all sectors of the mining industry. A total of 27 papers were presented on a variety of subjects, with the main theme of the mechanical engineering portion being devoted to non-asbestos brake linings. It is felt that the Symposium contributed significantly to the increased success experienced in testing non-asbestos linings during the year.

5.3. ELECTRICAL ENGINEERING

Role and Responsibilities
The Electrical Engineering Section is responsible for the approval and inspection of electrical installations at mines. Electrical equipment is inspected to ensure compliance with the Mines Act and the applicable Canadian Standards, and to ensure that all electrical equipment is operated in a safe manner.

Structure and Organization
The Section is staffed by one electrical engineer based in Victoria.

Summary of Activities
Electrical inspection activity continued throughout 1989, with emphasis on the underground mining developments in the northwest of the province, and the underground coal developments on Vancouver Island.

Of particular note was the Mechanical-Electrical Symposium hosted by the Branch in Victoria, which was attended by 130 delegates from the mining industry across Canada. The electrical portion of the meeting was devoted to a review of the research into open pit electrical grounding systems, a project funded by the Mineral Development Agreement and initiated by the Electrical Inspector of Mines.

Electrical Statistics, 1989

Metalliferous Mines

Reported power generated at company owned generating plants:	132 234 470 kWH
Reported power purchased from public utilities:	2 505 462 759 kWH
Total power consumption	2 637 697 229 kWH

The following table provides an analysis of connected load at operating metalliferous mines.

Connected Load at Metal Mines, 1989

equipment	rated power (KW)
trams and hoists	1 492
scraper hoists	5 069
electric shovels	28 301
electric drills	6 280
fans	12 812
pumps	8 213
rectifiers	4 253
M.G. sets	1 196
air compressors	18 565
sink and float	3 132
crushing	22 997
grinding	230 038
concentrating	44 156
magnetic separation	166
conveyors	35 959
mill pumps	43 629
fresh water pumps	46 603
workshops	12 098
miscellaneous	18 321
total	543 280

Coal Mines

Reported power purchased from public utilities: ..... 657 355 303 kWH

The following table provides an analysis of connected load at operating coal mines.

Connected Load at Coal Mines, 1989

equipment	rated power (KW)
draglines	0
ventilation and drying	3 230
electric shovels	42 437
electric drills	14 901
conveyors	10 283
hoisting	166
haulage	0
coal breaker	1 247
washing and screening	45 310
pumping	26 435
air compressors	3 980
miscellaneous	21 458
total	169 447

Industrial and Structural Minerals

Reported power generated at company owned generating plants..... 56 192 598 kWH*
* Includes power generated by Cassiar Mine.

Reported power purchased from public utilities ..... 27 832 464 kWH

Total power consumption..... 84 025 062 kWH

The following table provides a summary of power consumption at all types of operations since 1975.

Actual Consumption of Power (million kilowatt hours)

year	metal mines	industrial minerals	coal mines	total
1975	2 092.1	66.8	363.3	2 522.2
1976	2 125.7	80.9	211.2	2 417.8
1977	2 212.1	78.7	312.0	2 602.8
1978	2 057.9	67.9	289.2	2 415.1
1979	2 257.4	88.8	299.8	2 646.0
1980	2 359.3	95.1	277.9	2 732.3
1981	2 761.6	65.3	319.6	3 146.5
1982	2 605.5	77.5	330.4	3 013.4
1983	2 434.1	76.9	356.6	2 867.6
1984	1 975.0	91.2	578.4	2 644.6
1985	2 255.3	69.8	634.9	2 960.0
1986	2 338.4	51.1	581.8	2 971.3
1987	2 673.1	67.5	612.3	3 352.9
1988	2 871.7	75.2	667.7	3 614.6
1989	2 637.7	84.0	657.4	3 379.1

5.4. MINE RESCUE, SAFETY AND FIRST AID

Role and Responsibilities
Key functions of the Branch are to promote mine rescue, safety and first aid, and to provide assistance to the mining industry in these areas. This is done through training and certification; the provision of relevant publications; and the maintenance of mine rescue stations and equipment.

Structure and Organization
Regional mine rescue stations are located in Fernie, Nanaimo, Kamloops, Smithers, Prince George and Nelson. The stations are under the supervision of the Regional Office Administrator/Resident Engineer in each region and the Mine Emergency Preparedness Co-ordinator in Victoria.

Summary of Activities

Training and Certification
Due to the reduction in mine rescue staff following re-structuring of the Branch, training in mine rescue is now being conducted by the mining industry and/or other private agencies. Arrangements are underway to establish training programs at Cariboo College in Kamloops, and at the British Columbia Institute of Technology in Burnaby.

To assist mine management in the transition to providing qualified Mine Rescue Instructors, a mine rescue upgrading course was prepared by Branch staff. Courses were held in Nanaimo, Sparwood and Kamloops and will be held twice per year at various locations throughout the province.

In 1989, a total of 36 instructors were certified or re-certified, twelve for underground mine rescue and 24 for open pit mine rescue.

The examination of candidates and the issuance of certificates of proficiency in mine rescue work are still the responsibilities of the Branch. Examination and certification is conducted by designated staff in Victoria, Prince George, Kamloops and Fernie.

The following table shows the mine rescue certificates issued in 1989.

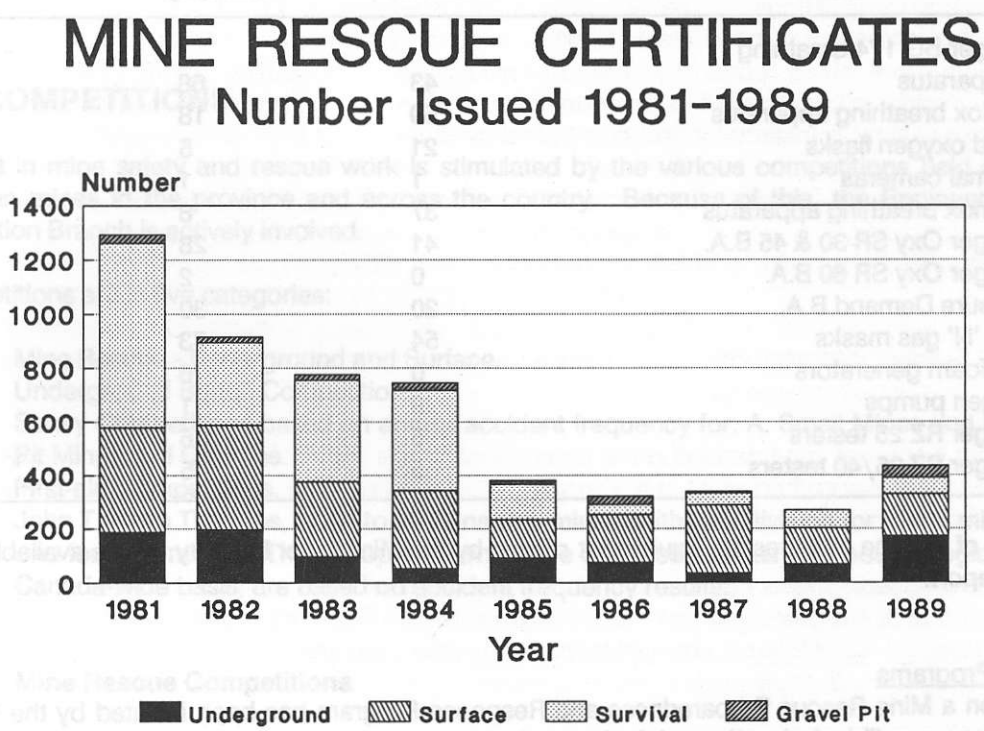
Mine Rescue Certifications, 1989

Type of Certificate	No. Issued
Survival mine rescue	62
Survival mine rescue instructor	0
Underground mine rescue	173
Underground mine rescue instructor	12
Surface (open pit) mine rescue	154
Surface (open pit) mine rescue instructor	24
Gravel pit rescue	45
Advanced mine rescue seals	0
Total Certificates Issued	470

Mine rescue certifications for the years 1981-1989 were as follows:

Mine Rescue Certificates, 1981-1989

Type of Certificate	Year								
	1981	1982	1983	1984	1985	1986	1987	1988	1989
Survival	685	308	379	376	133	40	45	65	62
Underground	187	198	99	52	92	76	36	69	173
Surface	390	390	277	290	142	175	252	134	154
Gravel pits	31	21	22	28	13	30	5	0	45
Total	1293	917	777	746	380	321	338	268	434



Emergency and standard first aid statistics will no longer be published in this report since the training is conducted by first aid training agencies or associations.

Publications

The Mine Rescue Training Manual underwent major changes. The Underground and Surface Mine Rescue manuscripts have been amalgamated into one general rescue manual, and the Survival and Gravel Pit mine rescue course modules have been included. In addition, the section on fire fighting has been improved and a section on rescue rigging added. The new publication will be available in July-August, 1990.

Mine Rescue Stations and Equipment

There were no capital expenditures for mine rescue equipment in 1989.

Underground mine rescue equipment owned by the Ministry of Energy, Mines and Petroleum Resources (MEMPR) and by industry in 1989 is shown in the following table.

Underground Mine Rescue Equipment, 1989

Item	MEMPR	Industry	Total
Draeger BG 174 breathing apparatus	43	68	111
Aerolox breathing apparatus	59	18	77
Liquid oxygen flasks	21	5	26
Thermal cameras	1	1	2
Chemox breathing apparatus	37	8	45
Draeger Oxy SR 30 & 45 B.A.	41	28	69
Draeger Oxy SR 60 B.A.	0	2	2
Pressure Demand B.A.	20	30	50
Type 'N' gas masks	54	73	127
H.E. foam generators	0	6	6
Oxygen pumps	9	1	10
Draeger RZ 25 testers	5	6	11
Draeger RZ 35/40 testers	5	5	10

Details of surface mine rescue equipment owned by the Ministry or industry will be available in the 1990 report.

Other Programs

Work on a Mine Rescue Preparedness and Response Program has been initiated by the Branch. The program will include other ministries and resource agencies as well as the mining industry, and will work in conjunction with existing underground and surface emergency response teams.

The program is being established in five stages:

1. Survey - an on-site mine rescue and equipment survey has been conducted.

2. Mineral Resources Division Mine Emergency Management Program - a draft has been prepared.

3. Mine Emergency Response Plan (MERP) - a plan prepared for the mining industry.

4. Introduction - MERP to be introduced to the mining industry.

5. Implementation - the plan to be implemented through 'hands-on' management/supervisory workshops.

Five mine safety associations, sponsored by the Ministry of Energy, Mines and Petroleum Resources and the Workers' Compensation Board, continued to operate in different areas of the province. These associations are:

1. the Vancouver Island Mine and Industrial Safety Association;
2. the East Kootenay Mine and Industrial Safety Association;
3. the West Kootenay Mine and Industrial Safety Association;
4. the South Central B.C. Mine Safety Association; and
5. the North B.C. Mine Safety Association.

These associations consist of representatives from industry, the Engineering and Inspection Branch, the Workers' Compensation Board and St. John's Ambulance. Each association promotes mine rescue training, first aid training and safety education in its district.

5.5. COMPETITIONS

Interest in mine safety and rescue work is stimulated by the various competitions held annually between mines in the province and across the country. Because of this, the Engineering and Inspection Branch is actively involved.

Competitions are in five categories:

1. Mine Rescue - Underground and Surface.
2. Underground Bench Competition.
3. Safety Competitions based on annual accident frequency for: A. Small Mines and B. Open Pit Mines and Quarries.
4. First-aid Competitions.
5. John T. Ryan Trophies, open to all Canadian mines, with one division for metal mines and one for coal mines. These trophies, which are awarded annually on both a regional and Canada-wide basis, are based on accident frequency results.

5.5.1. Mine Rescue Competitions

The Provincial Mine Rescue Competitions were held in Prince George on June 17, 1989.

Underground
Underground rescue teams compete directly in the Provincial Competition. In 1989, the winner of the Provincial Underground Mine Rescue Competition was Westmin Resources Ltd. There was no Canadian Championship.

Surface
District surface mine rescue competitions were held by the following safety associations in 1989: East Kootenay, South/Central and North. Both the first and second place teams went on to compete in the Provincial Championship. The district winners were as follows:

East Kootenay Mine and Industrial Safety Association:
- Byron Creek Collieries
- Westar Mining Ltd., Greenhills operation

South/Central B.C. Mine Safety Association:
- BHP-Utah Mines Ltd.
- Teck Corp., Afton Mines Ltd.

North B.C. Mine Safety Association:
- Cassiar Mining Corp.
- Noranda Minerals Inc., Bell mine

The Provincial Surface Mine Rescue Competition was won by Afton Operating Corp. (Teck Corp.), Afton mine.

There was no Canadian surface rescue competition.

5.5.2. Underground Bench Competition

The Provincial Underground Bench Competition was instituted in 1978. Competing teams must demonstrate their proficiency in the examination and testing of their apparatus prior to use. The event is in memory of the late B. Abbott, captain of the Cominco Ltd. H.B. mine rescue team in 1976 which won the Canadian Underground Mine Rescue Competition that year.

This competition was won by Westmin Resources Ltd. in 1989.

5.5.3. Safety Competitions

Small Mines

The West Kootenay Mine and Industrial Safety Association Trophy for Small Mines was donated in 1951 to encourage and promote safety in small mines. Since 1956, the competition has been open to qualifying mines throughout the province.

The award is given to the metal mine that has the lowest compensable accident rate after working from 2,500 to 30,000 shifts per year, at least one third of which were underground. The mine must have operated for at least nine months during the calender year. A fatality automatically disqualifies a mine for that year.

In 1989, the award was won by Mountain Minerals' Parson Barite mine.

Open Pit Mines and Quarries

Trophies are awarded by the Ministry of Energy Mines and Petroleum Resources to those operations having the lowest compensable injury frequency rate.

1. The "A" trophy goes to operations having from 35,000 to 200,000 man-hours per year.

2. The "B" trophy goes to operations having from 200,000 to 1,000,000 man-hours in the year.

3. The "C" trophy, introduced in 1987, goes to operations that worked a minimum of 1,000,000 man-hours during the year.

4. Certificates of Achievement are awarded to operations amassing 15,000 man-hours without accidents over a continuous period not previously used to obtain an award.

In 1989, the awards presentation and dinner was held at the Pan Pacific Hotel in Vancouver with 146 guests attending. The awards were presented by B. McRae, Assistant Deputy Minister, on behalf of the Honourable Jack Davis, Minister of Energy, Mines and Petroleum Resources. The banquet and proceedings were chaired by T. Vaughan-Thomas, Manager, Health and Safety Standards and Special Projects, in the absence of R.W. McGinn, Chief Inspector. The event was organized to coincide with Mining Week in B.C., held at the same hotel.

The winners in 1989 were as follows:

The "A" Trophy was awarded to Baymag Mines Ltd., located near Radium Hot Springs, B.C., for achieving an injury-frequency rate of 21.85.

The "B" Trophy was awarded to Westmin Resources Ltd., Premier Gold Project, located twelve kilometres north of Stewart, B.C., for achieving an injury-frequency rate of zero.

The "C" Trophy was awarded to Highland Valley Copper Ltd., located 55 kilometres south of Kamloops, B.C., for achieving an injury-frequency rate of 11.09 with 1,984,305 man-hours accumulated during 1989.

Certificates of Achievement were awarded to:
- Continental Lime Ltd., Pavilion Lake near Cache Creek;
- Allard Contractors Ltd., Albion pit near Haney, B.C.;
- Carr Sand and Gravel Delivery Ltd., Haney, B.C.; and
- Blackhams Construction Ltd., Roes Road Sand and Gravel for achieving an injury-frequency rate of zero in the 1989 competition year.

5.5.4. First Aid Competitions

In 1976 a three-person first-aid team became the competitive standard, and the first Provincial Three-Persons Miners' First-Aid event was held in 1978. First-aid training is designed to aid a fellow worker in the event of an accident at the workplace; thus, the competition simulates this situation. One team member acts as the patient and the other two render first-aid. The St. John Standard course was adopted as the training standard and only those who work in or about a mine are permitted to enter.

In 1989, first-aid competitions were held by the East Kootenay, South/Central and North Mine Safety Associations. First and second place teams went on to compete in the Provincial Competition. The winners in 1989 were as follows:

East Kootenay Mine and Industrial Safety Association:
- Westar Mining Ltd.
- Cominco Ltd., Sullivan Mine

South/Central B.C. Mining Association:
- BHP-Utah Mines Ltd., Team #1
- BHP-Utah Mines Ltd., Team #2

North B.C. Mine Safety Association:
- Quintette Coal Ltd.
- Equity Silver Mines Ltd.

The Provincial First Aid Competitions were held in Prince George on June 17, 1989, in conjunction with the Provincial Mine Rescue Competitions. The Provincial winner was Quintette Coal Ltd.

5.5.5. John T. Ryan Trophies

The John T. Ryan safety trophies were established in 1941 by the Mine Safety Appliance Company of Canada Limited to promote safety in Canadian metalliferous and coal mines. The administration of these annual awards is conducted by the Canadian Institute of Mining and Metallurgy.

There have been a number of changes in the regulations and qualifications over the years; however, there are now three categories open for annual competition.

1. Metalliferous Underground Mines - includes a Canadian trophy and four regional trophies. B.C. mines compete in the B.C. and Yukon Region.

2. Select Mines - includes open pit and strip mines for any mineral including coal. This has a Canadian trophy and two regional trophies. B.C. mines compete in the Western Region which includes all Canada west of the Manitoba-Ontario border.

3. Coal Mines - restricted to underground mines. There is a single Canadian trophy in this category; however, there are no underground coal mines in B.C.

Applications for these awards are submitted annually through the Chief Inspector of Mines. Awards are presented to the company or companies having the least number of compensable accidents in a continuous period in which 500,000 man-hours (120,000 for underground coal mines) of employment are recorded. If the 500,000 man-hours cannot be achieved in one year, they may be accumulated over a longer continuous time period but the complete calendar year must be included. No portion of that period may be used in another application for the same award. A fatality causes automatic disqualification for the period in which it occurs.

In 1989, trophy winners were as follows:

Metalliferous Underground Mines, regional trophy:
- INCO Ltd., Manitoba Division

Select Mines, regional trophy:
- no regional trophy was awarded.

5.6. EXAMINATIONS AND CERTIFICATIONS

5.6.1. Shiftboss Certificates

Section 24 of the Mines Act requires that every person employed underground or in open pit workings must be under the daily supervision of an official who is the holder of a shiftboss certificate issued under the Act. In addition, section 32 of the Mines Act specifies that every person employed in open pit workings at a coal mine 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 non-restricted blasting certificate (gravel pits excluded), a mine rescue certificate (surface or underground as requisite), and a currently valid first-aid certificate. The applicant must also pass an examination on the rules and regulations contained in the respective Acts.

Four different certificates are issued: one for underground metal mining operations; one for open pit coal mining operations; one for open pit metal mining operations; and one for sand-, gravel- and clay-removal operations. A fee of $50 is charged for the examination and the passing grade is 65%. Provisional certificates may be issued on a one-time basis for a period of six months.

The following tables show the certifications for 1989.

Total Shiftboss Certification Activity, 1989

Activity	Number
applications received	102
examinations written	86
number passed	75
number of permanent certificates issued	97

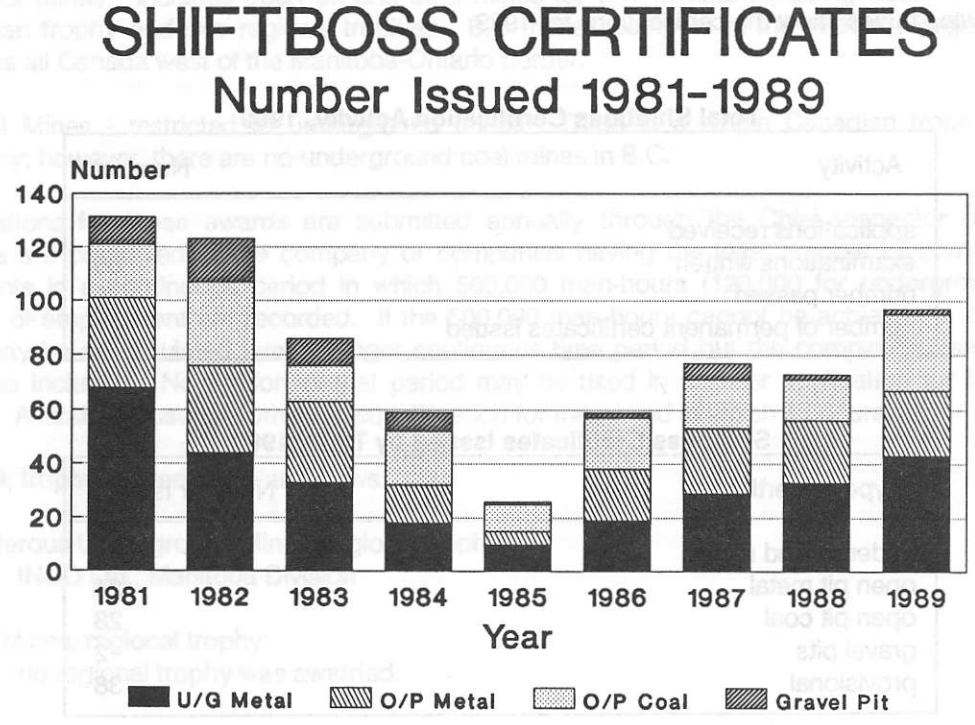
Shiftboss Certificates Issued by Type, 1989

Type of Certificate	Number Issued
underground metal	43
open pit metal	24
open pit coal	28
gravel pits	2
provisional	38

Shiftboss certificates issued from 1981-1989 are shown in the following table.

Shiftboss Certificates Issued by Type, 1981-1989

Type of Certificate	Year								
	1981	1982	1983	1984	1985	1986	1987	1988	1989
underground metal	68	44	33	18	10	19	29	33	43
open pit metal	33	32	30	14	5	19	24	23	24
open pit coal	20	31	13	20	10	19	18	15	28
gravel pits	10	16	10	7	1	2	6	2	2
Total	131	123	86	59	26	59	77	73	97



5.6.2. Certificates of Competency

Sections 32, 33 and 34 of the Mines Act require that managers and certain other supervisory officials at underground and open pit coal mines shall be holders of Certificates of Competency issued under this Act. A Board of Examiners, appointed by the Minister, is responsible for setting examinations for these certificates from time-to-time, for considering applications, for interchange certificates, and for issuing certificates.

Certificates are issued in accordance with section 35 of the Act. The certificates and corresponding fees are as follows:

First Class Certificate of Competency-Underground	$100.00
Second Class Certificate of Competency-Underground	$ 75.00
Third Class Certificate of Competency-Underground	$ 50.00
Mine Surveyor Certificate	$100.00

In 1989, one First Class Certificate of Competency was issued to Mr. T.A. Robson. No other certificates were issued.

5.6.3. Boards of Examiners

Two Boards of Examiners, each comprised of the Chief Inspector as chairman and two other inspectors appointed by the Minister as members, are responsible for the examinations of applicants and the issuance of Shiftboss Certificates and Certificates of Competency.

1. Mines Other than Coal Mines:
Under the Mines Act, this Board conducts the examination of applicants for underground and open pit shiftboss certificates, and issues certificates at all mines other than coal mines. In 1989, R.W. McGinn, Chief Inspector, was chairman, and R. Bone (Nanaimo) and E. Sadar (Kamloops) were members.

2. Coal Mines:
Under the Mines Act, this Board conducts the examination of applicants and issues shiftboss certificates and certificates of competency for coal mines. In 1989, R.W. McGinn, Chief Inspector, was chairman, and T. Vaughan-Thomas and R. Bone (Nanaimo) were members.

PART 6: ACCIDENTS AND INCIDENTS

6.1. FATAL ACCIDENTS

There were five fatal accidents in 1989 which are summarized below.

Summary of Fatal Accidents

1.
Stuart Husband (21 years old), an underground truck driver, died as a result of crushing injuries received in an accident underground at the **Newhawk Sulphurets mine** on **January 13, 1989** at 1010 hours.

Mr. Husband had parked his underground truck on an inclined ramp within one metre of another piece of stationary equipment. Access into the truck is via an opening in the front of the unit. It is believed that Mr. Husband inadvertently released the park brake as he was starting to climb aboard the unit, allowing it to roll forward and crush him against the other parked vehicle. Standard practices of nosing the truck into the wall of the tunnel or using wheel chocks would have prevented this tragedy.

2.
Claude Weber (46 years old), the mine foreman, and **Otto Sawatsky** (53 years old), a mine contractor's supervisor, were both fatally injured by the explosive force when an underground storage magazine was detonated. The explosion occurred at 1320 hours on **February 2, 1989**, at the **Newhawk Sulphurets mine**. The circumstances of the event were very unusual and an investigation by the R.C.M.P. indicated the incident was likely an intentional act. The R.C.M.P. assumed responsibility for further investigation as the incident is being treated as a criminal matter.

3.
Eric Simard (49 years old) was fatally injured when he was struck from behind by an empty eight-car ore-haulage train underground at the **Westmin H.W. mine**. The accident occurred on **April 14, 1989**, at 1210 hours.

Mr. Simard was walking in the middle of the roadway, although there was an adequate walkway adjacent to the track. Contributing factors may have been Mr. Simard's poor hearing, and the use of earplugs to protect against further hearing loss. An inquest is pending.

4.
Roger D. White (48 years old), a shiftboss, was fatally injured on **September 3, 1989**, at the **Windy Craggy Project** of Geddes Resources after being struck and run over by a Haggloader and the front bogie of a muck car.

The loader and car were part of a train made up of one eleven-tonne loci, two cars and one loader. The train was being pushed at the time, with the loader in the lead. The loci operator was not aware of having struck Mr. White. Visibility was reduced by smoke from a recent blast in the area, and by a curve in the drift.

The deceased knew of the encoming unit and had just thrown a track switch for it to enter the active working drift. The horn on the unit was being sounded and the unit was well lit. There were no witnesses and it is unknown why the deceased was in front of the unit.

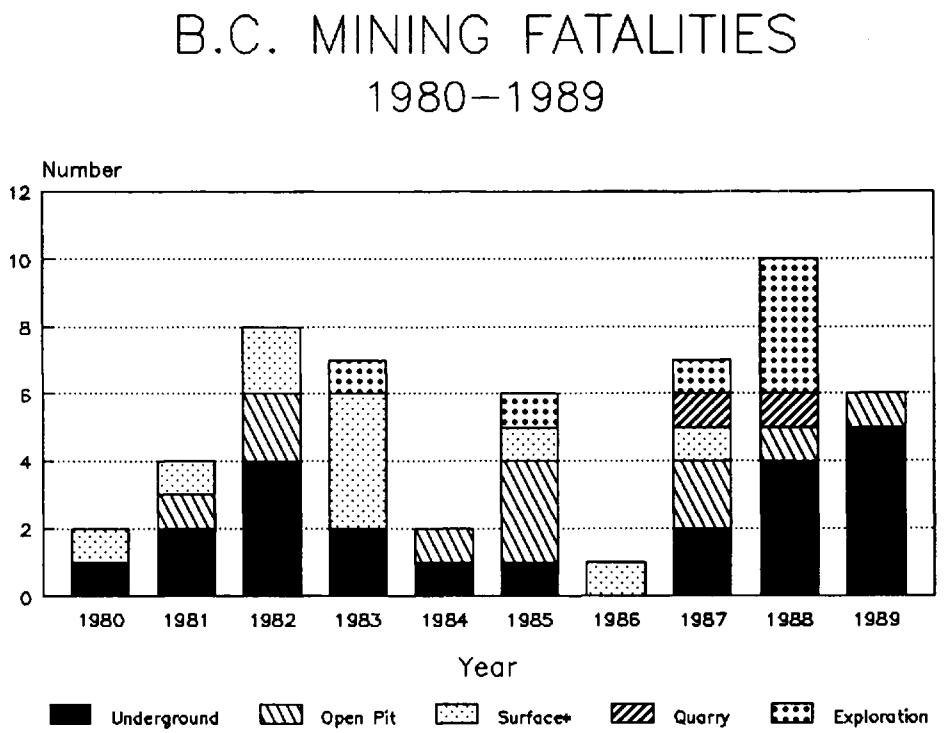
5.
Edward M.L. Poirier (25 years old), a haulage truck driver, was fatally injured when he was run over by the haul truck he was operating at the **Bell mine** of Noranda Minerals Inc. on **September 14, 1989.**

Mr. Poirier was driving a 77-tonne Lectra Haul ore truck. As he began his descent, shortly after entering the ramp to the open pit, he appeared to experience difficulty maintaining control of the vehicle. A witness saw the truck fishtail, then reported the driver seemed to gain control momentarily before losing control again.

It appears that Mr. Poirier thought the truck was going to go through the side berm and elected to jump as the truck hit the berm. The door latch was in good condition suggesting that he was not thrown from the cab. However, the truck did not go through the berm. The right front tires struck the berm causing the rear of the truck to rotate. Mr. Poirier was on the road in the path of the truck and was run over by the left rear wheels. The unit continued to rotate until the rear tires hit the berm. With the rotation momentum lost, the truck moved slowly across the ramp and came to rest against the wall.

The Coroner stated that the use of a seat belt could have prevented this fatality. Mr. Poirier would have been uninjured had he remained in the cab.

The following graph shows mining fatalities by location for 1980-1989.

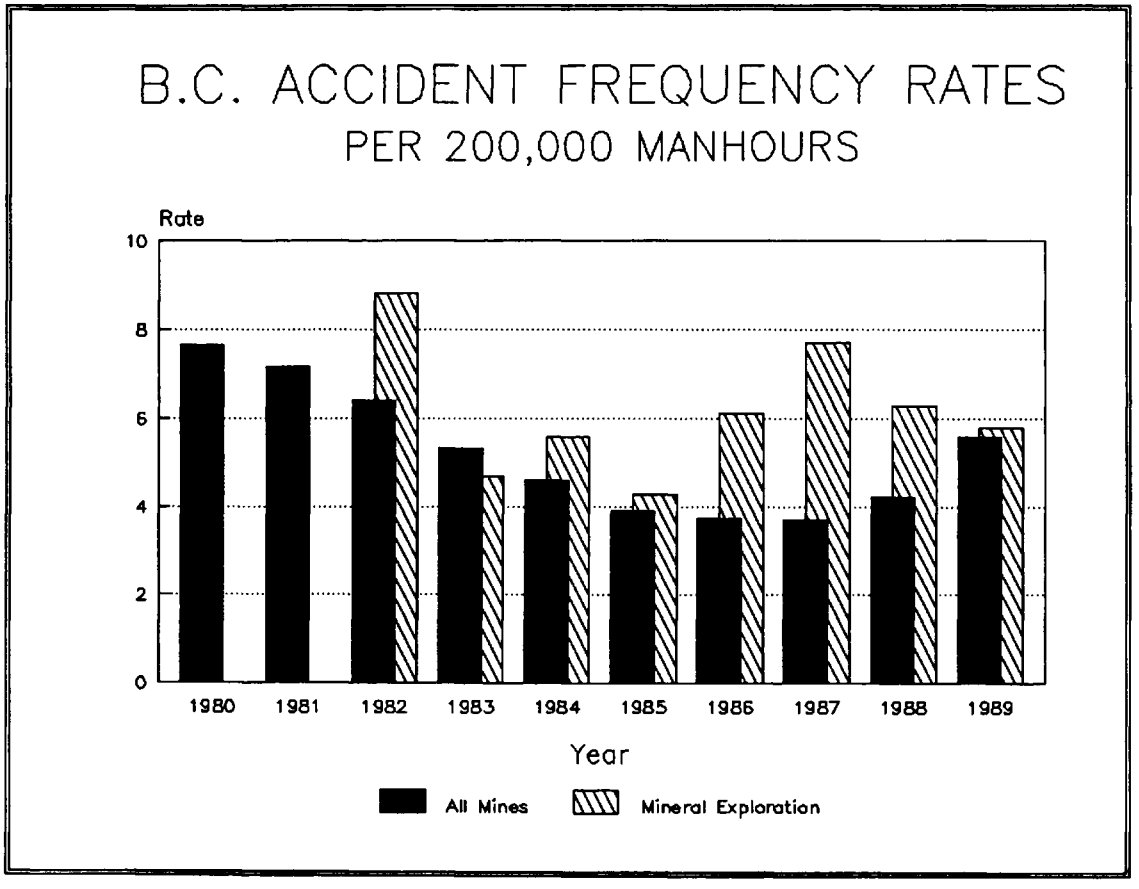


* Surface includes buildings, roads and other surface facilities.

6.2. ACCIDENTS CAUSING DEATH OR INJURY

The accident frequency rate at mines is reported as the number of lost workday accidents/200,000 exposure hours. In 1989 this rate averaged 5.47 for all operating mines and 5.8 for mineral exploration projects.

The accident frequency rates for 1980-1989 are shown in the graph below.



The following tables classify the accidents causing death or injury that were reported to the Branch by cause, occupation and parts of the body injured.

Accidents causing death or injury by cause

cause	1989	
	no.	%*
atmosphere	0	0.00
explosives	1	0.32
falls of ground	3	0.96
falls of persons	100	32.05
lifting/handling material	74	23.72
machinery and tools	100	32.05
transportation	1	0.32
miscellaneous	33	10.58
totals	312	100.00

* per cent of total accidents

Accidents causing death or injury by occupation of those injured

occupation	1989	
	no.	%*
underground		
chutemen	0	0.00
haulagemen	5	1.60
miners	35	11.22
helpers	1	0.32
timbermen and facemen	1	0.32
mechanics (electricians, supplymen, welders, etc.)	6	1.92
miscellaneous	1	0.32
surface		
mechanics, electricians, repairmen	79	25.32
mill and crusher workers	44	14.10
carpenters	0	0.00
labourers, surveyors, construction, etc.	26	8.33
miners, drillers, powdermen	19	6.06
equipment/machine operators	90	28.85
miscellaneous	5	1.61
totals	312	100.00

* per cent of total accidents

Accidents causing death or injury by parts of the body

part of the body	1989 no.	1989 %[1]*
eyes	19	5.29
head, face, neck	39	10.86
trunk	18	5.01
back	95	26.46
upper extremities	77	21.45
lower extremities	89	24.80
internal	22	6.13
general	0	0.00
totals	359[2]	100.00

[1] per cent of total accidents

[2] total number of times each part of the body was injured. More than one part of the body may be injured in each accident, so total number greater than shown on previous two tables.

6.3. DANGEROUS AND/OR UNUSUAL OCCURRENCES

Up to 1989, section 13 of the Mines Act has required that all dangerous and/or unusual occurrences at any mining operation be reported to the Inspector of Mines, and the local union of safety committee, within 24 hours of their happening, whether an actual injury occurred or not. However, with the introduction of the new Mines Act and the accompanying Health, Safety and Reclamation Code in 1990 (see 1.2.2.), the reporting requirements may change.

It is established that the detailed study of such occurrences, and the dissemination of information about the causes, can help to reduee future accidents. The Engineering and Inspection Branch studies these occurrences and distributes the information. Condensed summaries of all occurrences are compiled and issued periodically by the Branch. At the time of writing, the information is being transferred to a new computer program. This new system will facilitate access to the data, and enable more thorough analysis. Therefere, complete summary statistics for 1989 will be published in the 1990 report.

6.4. PROSECUTIONS

In early 1989, information was filed on an explosives violation by **Silver Hill Mines** stemming from an incident in August, 1988. The company was charged under the Mines Regulation for failure to store explosives properly. At a trial held on June 28, 1989, the company was found guilty on two charges and fined $1500.00 on each charge. The company filed a notice of appeal to the County Court which was heard on February 5, 1990. The appeal was allowed on one charge and the other charge was upheld.

St. Troy Mines Ltd. was prosecuted under the Mines Act in May, 1989, for failure to obtain a permit to perform exploratory work. A fine of $2000.00 was levied by the Court.

6.5. BLASTING CERTIFICATE SUSPENSIONS

Seven blasting certificates were suspended in 1989. All of the suspensions involved contraventions of section 95(1) and/or section 95(2) of the Mines Act Regulation. The infractions all involved drilling in bootlegs from previous blasts or drilling too close to existing bootlegs.

The suspensions were as follows:

D.P. Kuta	3 months
G. Friesen	4 weeks
V. Deland	3 weeks
M.A. Blomburg	2 months
G.R. Brown	2 months
R.M. Teal	2 months
T. Mountain	2 months