

2001

Chief Inspector of Mines

Annual Report

Ministry of Energy and Mines
Mining Division

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Foreword

The Chief Inspector of Mines is appointed by the Minister of Energy and Mines to administer the Mines Act and the Health, Safety and Reclamation Code for Mines in British Columbia.

The Chief Inspector of Mines is also the director of the Mines Branch which functions through a central office in Victoria and five regional offices: Cranbrook, Kamloops, Nanaimo, Prince George and Smithers, plus a satellite office located in Fernie. Personnel in each of the regional offices are generally comprised of a regional manager supported by diverse technical and administrative staff. The regional manager in the Cranbrook office is responsible for the satellite office in Fernie.

Information about the Ministry and copies of Ministry publications are available through the following options:

Ministry Web site:
www.gov.bc.ca/em

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Further information on the activities of the various mining companies can be found in the Canadian Mines Handbook published each year by Northern Miner Press Limited (604) 688-9908 or from each mining operation. In addition, you can contact the Mining Association of B.C. (604) 681-4321 and the Coal Association of Canada (403) 262-1544. Each issue annual reports on the status of those sectors.

1.1 Mine Health and Safety Function

MANDATE/ACTIVITIES

The Mines Branch function derives its mandate from the Mines Act and its accompanying Health, Safety and Reclamation Code for Mines in British Columbia (the Code).

The Code is reviewed on an ongoing basis, by the code review committee comprising representatives from labour, industry and government, and chaired by the Chief Inspector, to ensure it remains current with new technology, mining practices and health and safety concerns. The current edition of the Code was released in April 1997.

The key mandate of the branch, with respect to health and safety, is to ensure worker health and safety, and public safety. In order to accomplish this, the branch functions include:

- the review of health and safety related aspects of mining and exploration proposals;
- mine inspections and the close monitoring of mining activity for conformance with the Mines Act and Code, and the approval of mine plans with regard to health and safety concerns;
- the collection of data and maintenance of records with respect to accidents, dangerous occurrences, inspection frequencies and audiometric (hearing test) data; and,
- participation in research projects.

As part of the ongoing development of the Mines Branch, a new system of managing Notices of Work, mine visits, and dangerous occurrences has been implemented to replace an old DOS system that failed during the year. The new system is known as the Mine Management System (MMS) and is being expanded and developed to include all of the branch functions associated with a mine and our visits to the mine. In 2001 inspectors began entering mine visits and dangerous occurrences. We also included all variances into the system.

1.2 Mining Administration Function - non-health and safety component

MANDATE/ACTIVITIES

The Mines Branch administers and regulates the full mining cycle, including exploration, development, production, reclamation and closure for metal, placer, industrial mineral and coal mines, and gravel pits and quarries. This mandate includes the review of applications and issuance of permits under Section 10 of the Mines Act for all mining activities including major mining projects subject to the Environmental Assessment Act, establishment of geotechnical and reclamation standards and security levels, participation in regional and subregional planning, and in reviews of draft legislation and policies being developed by other agencies. Branch staff also provides guidance and assistance to companies and individuals exploring for minerals, and monitor exploration and mining activities in order to provide policy advice to government.

In addition to health and safety functions, branch inspectors address environmental and social sensitivities of proposed and permitted mines. The process for review of Mines Act permit applications includes consultation with other government agencies and affected stakeholders, including First Nations, to identify concerns to be addressed through site-specific permit conditions. Inspectors monitor mining activities to ensure compliance with these permit conditions and take enforcement actions if necessary.

1.3 Land Use

MANDATE/ACTIVITIES

Branch staff participates in all levels of strategic and operational land-use planning throughout B.C. This includes regional, subregional (referred to as LRMP), landscape unit, local resource use, watershed management, wildlife management, recreational, access management, and sensitive area planning, as well as selection of new protected areas. In addition, various interagency referrals, including commercial recreation applications, proposed road deactivation, and draft Municipal Act zoning bylaws are handled. The overall aim is to optimize opportunities for exploration development of the province's subsurface resources in a context that integrates these activities with other land uses.

In June 2001, regional mineral land planning staff were transferred to the Ministry of Sustainable Resource Management together with responsibilities for strategic level land use planning and resource management. The above issues continue to be addressed through a collaborative approach between the two Ministries.

2.1 Occupational Health Group

ROLES AND RESPONSIBILITIES

The Health, Safety and Reclamation Code for Mines in B.C. (the Code) requires that mine managers develop a written occupational hygiene-monitoring program. Larger operations in particular are required to establish procedures and to perform their own measurements of chemical and physical hazards to which workers were exposed in the workplace. This includes, among others, dusts, silica, respirable combustible dust, noise, gases and fumes, radiation (ionizing and non-ionizing) and heat/cold stress.

The Occupational Health (OH) group provides its expertise in recognizing, evaluating and controlling these conditions as well as assistance in developing individual programs. In addition, the group makes comparative measurements to ensure companies follow proper methodology and obtain accurate results. Underground mine ventilation and workplace hazardous materials information system programs are also included in the group's responsibilities.

Mine managers are also required to provide their occupational health and safety committees with training with respect to the prevention and reporting of musculoskeletal disorders. Such disorders include lower back pain, carpal tunnel syndrome and tendonitis.

The OH group was also involved in providing training to occupational health and safety committees at mines in these subjects.

STRUCTURE AND ORGANIZATION

During 2001 there were five people in the OH group, a manager, two industrial hygiene inspectors and one administrative assistant. The first Inspector of Mines, Ergonomics was hired in January 2001.

SUMMARY OF ACTIVITIES

There were a wide variety of occurrences and situations in 2001, which required attention from the OH group. Of note were:

- considerable concern by neighbours of smaller quarry and sand and gravel operations where dust and noise were involved, requiring a number of investigations; and
- the review of several asbestos abatement projects during building renovations and demolitions at minesites across the province.

In addition, the OH group:

- maintained, upgraded software, and input data to the Mines Branch audiometric database, which records the results of hearing tests that are undertaken at mine sites across the province;
- provided training courses for mines' industrial audiometric technicians; and
- provided training to mine safety personnel with respect to occupational health hazards and applicable occupational monitoring methods.

In addition to the above, OH inspectors conducted on-site inspections of mines to fulfil their mandate to monitor workplace conditions.

2.2 Mechanical Engineering, Electrical Engineering and Emergency Preparedness

ROLES AND RESPONSIBILITIES

Mechanical and electrical inspectors ensure that all mechanical and electrical equipment installed and used at mines complies with the Mines Act and the applicable codes and standards, and that the equipment is maintained in acceptable condition so that its operation causes no hazard to people or property.

The emergency preparedness inspector ensures that all mines have an emergency preparedness plan capable of being implemented at any time in response to any emergency occurring at the mine site. Emergency preparedness plans are integrated with a province-wide protocol that provides for aid and assistance from outside sources, to any mine experiencing an emergency, if required.

STRUCTURE AND ORGANIZATION

In 2001, there were eight staff in the mechanical/electrical group: one manager, two engineers, four technicians.

SUMMARY OF ACTIVITIES

Mechanical Engineering

Inspections were carried out at all of the major mining operations, including the larger quarries and sand and gravel pits.

Several submissions of data pertaining to new or modified off-highway haul trucks were approved, and numerous minor modifications on various items of mobile equipment were also reviewed, with approvals issued in the majority of cases.

Delivery of new machinery and equipment to mines, together with the steady upgrading of much of the existing items, results in mines in British Columbia maintaining their competitive capabilities. At the same time, safety systems on new and upgraded equipment are usually enhanced, often as a result of new technology employed in such systems. The highly automated and complex control systems found on the equipment demands a high level of skill from those who operate and maintain the equipment. Branch staff involved in reviewing engineering drawings associated with the safety systems on such equipment, and subsequently having to perform field inspections on the items, endeavor to keep abreast of the many changes and innovations. In addition, inspectors, in collaboration with the mines, have to ensure that people operating equipment are aware of how equipment modifications may affect its operating functions, and ensure operators understand the consequences of failures occurring in installed control or sensing systems.

Responsibility for the mine safety audit system remains the responsibility of the manager of the section. The safety audit program is designed to investigate how well a safety and health program has been implemented at a mine. A mine is visited by an audit team, consisting of between two and five staff members and a representative cross section of employees at the mine, who are interviewed, and an inspection is conducted of the records forming part of the safety and health program instituted by the company. Audit questions and record checks are based primarily on the requirements of the Mines Act and regulations pertaining to the health and safety of workers. Both the interviews and records checks enable the auditors to determine whether the program is well administered, and to determine how much knowledge employees have about how to perform their work tasks in a safe and healthful manner. When the on-site portion of each audit is completed, the information is analyzed and a report is issued to the mine manager who then discusses its contents with the occupational health and safety committee.

Strengths and weaknesses of the program are highlighted in the report and a plan of action to improve the occupational health and safety program is developed at the mine. Follow up of the implementation records checks enable the auditors to determine whether the program is well administered.

Electrical Engineering

Electrical inspections were conducted at all major mines including the larger sand and gravel operations as well as the smaller operations that demanded an in-depth electrical inspection. Most mines are still continuing to upgrade their electrical equipment and systems in order to increase efficiency and reduce power consumption costs.

Emergency Preparedness

Mine emergency preparedness plan guidelines and mine emergency management plans were established in 1991, first published in October 1992 and last updated in January 1997. The guidelines are distributed to the mining industry to use when setting up on-site preparedness plans. The management plans are distributed to proponents within the plan and are also for use by ministry staff.

Mine Rescue Stations

Regional mine rescue stations were consolidated in 1999. All mine rescue equipment is now located in a single centrally located station in Kamloops. The station is under the supervision of the regional office administrator/resident engineer and the manager, emergency preparedness, in Victoria.

Mine Rescue Certifications

To qualify for mine rescue certification, mine employees must complete approved training and must pass written exams developed for various types of mining, as per Part 3 of the Health, Safety and Reclamation Code for Mines in British Columbia.

The Mines Branch is responsible for certifying miners in several categories of mine rescue, as listed below.

Mine Rescue Certificates issued in 2001:

Type	Number Issued	Re-certified
Underground mine rescue	21	23
Surface (open-pit) mine rescue	117	41
Gravel pit mine rescue	7	15
Total Certificates Issued	145	79

Mine Rescue Instructor Certificates issued in 2001:

Type	Number Issued
Underground	4
Surface (open-pit)	8
Total Instructor Certificates	12

2.3 Competitions and Awards

ROLES AND RESPONSIBILITIES

The primary mandate of the Mines Branch is to ensure worker health and safety, public safety and suitable reclamation and protection of the land and watercourses affected by mining and exploration work.

The Mines Act, and the Health, Safety and Reclamation Code for Mines in British Columbia stipulate the legal responsibility of provincial mining companies in meeting this mandate; however, many B.C. mining companies and their individual workers voluntarily and consistently exceed these legal requirements. Through the efforts of these individuals, companies and staff of the Ministry of Energy and Mines, mining is among B.C.'s safest heavy industries.

Mine rescue competitions, first-aid competitions, and safety awards all contribute to the overall climate of safety. Reclamation awards acknowledge those companies that go beyond what is called for in their mining plans, by conducting superior research and introducing innovative techniques to restore the land.

MINE RESCUE COMPETITIONS

Branch mine inspectors and industry judge the Provincial Mine Rescue competitions personnel who are responsible for all aspects of worker and public safety in B.C.'s mining industry. This year's competition was held in Campbell River on June 9th.

Surface Mine Rescue Champions

The East Kootenay Zone competitions were held in Sparwood. The participating teams were as follows:

- Luscar Ltd. – Line Creek Resources
- Fording Coal Ltd. - Greenhills Operations
- Elkview Coal Corporation – Elkview Mine
- Fording Coal Ltd. - Coal Mountain
- Fording Coal Ltd. – Fording River Operation

The North / South Central Zone competitions were held in Campbell River on June 7th. The participating mines were as follows:

North Zone

- Mount Polley Mining Corporation
- Bullmoose Operating Corp. – Bullmoose Mine
- Northgate Exploration Ltd. – Kemess Mine
- Imperial Metals Corp. - Huckleberry Mine

South/Central Zone

- Highland Valley Copper
- Mount Polley Corporation - Mount Polley Mine
- Ashgrove Cement Company – Blubber Bay Quarry
- Leigh High Cement - Texada Quarrying Limited

The first and second placed teams from each regional zone are eligible to compete in the provincial competition on June 9, in Campbell River. These teams are:

East Kootenay Zone

- Luscar Ltd. – Line Creek Resources
- Elkview Coal Corp. – Elkview Mine

North Zones

- Imperial Metals Corp. - Huckleberry Mine
- Mount Polley Corporation - Mount Polley Mine

South Central Zone

- Highland Valley Copper
- Mount Polley Mining Corporation

Provincial Competition

Surface Mine Rescue Champions

The team from Highland Valley Copper won the 2001 surface mine competition and is the provincial champion. Team members were: Derrik Werring (Capt), Dale Konowalchuk (Vice-Capt), Neil Rideout, Susan Lavigne, John Brennan, Peter Dreschsler, Peter Lapointe, Spare, Gerry Wong (Coach).

Surface Bench Competition

The surface bench competition originated in 1995. The trophy is awarded to the surface mine rescue team that excels at the practical bench competition. The practical bench task is designed to test the individual team members on their knowledge and practical skills in mine rescue equipment and techniques. The competition is held in memory of Maurice Boisse, Mine Rescue Team Coach, Island Copper Mine. Highland Valley Copper won the award in 2001

Underground Mine Rescue Champions

Three underground mine rescue teams competed in the provincial competitions in 2001 as follows:

- Homestake Canada Inc. - Eskay Creek Mine
- Cominco Ltd. - Sullivan Mine
- Quinsam Coal Corporation - Quinsam Mine

- Boliden Westmin (Canada) Ltd. - Myra Falls Operations

Boliden Westmin (Canada) Ltd. - Myra Falls Operations team won the underground mine rescue competition and are the provincial champions. Team members were: Rick Kretzschmar (Capt), Alan Day (Vice-Capt, Dayton Ostrosser, Keith Notter, Rory McFadden, Joe Fic, Brad Paris, Spare, Brant Klein, Technician, Bill Conley (Coach).

Underground Bench Competition

The underground bench competition originated in 1978. The competition is held in memory of the late Barry Abbott, Captain of the Cominco HB mine rescue team whom, in 1976, won the Canadian Championship. The award was won by the team from Quinsam Coal Corporation - Quinsam Mine, Tony Robson (Captain).

Underground Bench Technician

The underground bench technician plays a very important role prior to and during a mine emergency. The Technician is responsible for the care, maintenance and servicing of the mine rescue teams' breathing apparatus. The underground bench technician task was prepared to test the technician's skills and competency at assembling and testing breathing apparatus. The bench technician competition was won by Ron Schofer of Cominco Ltd., Sullivan Mine.

First Aid Competitions

In the first-aid category there are two separate competitions; three-person first-aid competition; and the first-aid component of the underground and surface mine rescue competition.

Three-Person First Aid

The first provincial miner's three-person first-aid competition was held in 1978. The competition simulates accident situations - the local St John Ambulance Brigade and the BC Provincial Council design the problem, supply the judges, patients, props and medical supplies. After doing a short written exam the three team members render first aid. The St. John's standard course is the training standard, and only those who work in or about a mine are permitted to enter this competition.

This competition was designed as an extension of training for workers in basic first-aid skills, in order that they may assist their fellow workers at the face or at the work place in the event of an injury or medical emergency.

Competing teams at the provincial level were as follows:

- Bullmoose Operating Corp. – Bullmoose Mine
- Cominco Ltd. - Sullivan Concentrator
- Cominco Ltd. – Sullivan Mine
- Highland Valley Copper
- Kemess Mines
- Texada Quarrying

The 2001 champion team was from Cominco - Sullivan Mine. The team members were Rick Peacosh (Capt.), Vic Mann, Ian Biddlecombe and Ron Schofer (Coach).

First-Aid Component

The judging of the first-aid component is in conjunction with the provincial surface and underground mine rescue competition.

Underground First Aid

Cominco Ltd. introduced a new award for the best first aid by an underground mine rescue team. The award known as the "Sullivan Cup" was presented to Homestake Canada Inc. – Eskay Creek Mine.

The National Western Regional Competitions

To improve Canada's mine rescue mutual aid response capability, the national mine rescue committee, consisting of representatives from across Canada, has divided the country into three specific regions - East, Central and West. The rationale is based on the expediency of responding with teams and equipment from adjacent provinces and territories and to coordinate procedures within those jurisdictions.

The national western regional committee, consisting of representatives from Alberta, B.C., Saskatchewan, Northwest Territories, United States and the Yukon Territories, in conjunction with the city of Fernie (sponsor of the event), initiated underground and surface mine rescue competitions in 1993. The competitions are conducted on a biennial basis and serve to provide a medium for mine rescue teams to exercise their skills and to promote and coordinate an interchange of procedures and training standards.

The Fifth National Western Regional Mine Rescue Competition was held in Fernie, B.C. on September 14th and 15th, 2001; the next is due in 2003.

The teams eligible to compete in 2001 were the underground and surface mine rescue winners from the 2000 and 2001 provincial, territorial and United States competition events.

The following teams competed in the Underground Competition:

Boliden Westmin - Myra Falls Operations, Campbell River, BC
CAMECO - McArthur River Operation, Saskatchewan
Helca Mining - Lucky Friday Mine, Central Mine Rescue, Idaho
Homestake - Eskay Creek, Smithers, BC
Hudson Bay Mining & Smelting - Ruttan Operation, Manitoba
IMC Potash - Colonsay Mine, Colonsay, Saskatchewan
Miramar Con Mine - Yellowknife, NWT
OCI - Green River, Wyoming

Cominco's Polaris Mine and the MSHA Blue Team from Arlington Virginia were unable to compete due to the 911 terrorist incidents in the United States of America.

The overall winner was Boliden Westmin, Myra Falls Operations
Second Place went to Cameco, McArthur River Operations, Saskatoon, Sask.

The following teams competed in the Surface Mine Competition:

Luscar Ltd. - Poplar River Mine, Coronach, Saskatchewan
Powder River Coal Co. - Caballo Mine, Gillette, Wyoming
BHP Diamonds - Ekati Diamond Mine, Yellowknife, NWT
OCI of Wyoming, Green River, Wyoming
Highland Valley Copper, Logan Lake, BC
Luscar Ltd. - Line Creek Mine, Sparwood, BC
Syncrude Canada Ltd., #501, Fort McMurray, AB
Syncrude Canada Ltd., #502, Fort McMurray, AB

The overall winner was: Highland Valley Copper, Logan Lake, BC

Safety Awards Competitions

The presentation of awards at the 40th (2001) Annual Mine Safety Awards took place at the Harbour Towers Hotel in Victoria on Monday April 15, 2002. The winners for 2001 were as follows:

Small Underground Mines

This award was donated by the West Kootenay Mine and Industrial Safety Association in 1951 to encourage and promote safety in small underground mines. Since 1956, the competition has been open to qualifying mines throughout the province. The award is given to the mine having 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 calendar year. A fatality automatically disqualifies a mine for that year. The 2001 winner was Quinsam Operating Corp., Quinsam Coal.

Open-Pit Mines and Quarries

The John Ash Award

Is presented to the mine that has worked more than 1,000,000 hours in a year and attained the lowest compensable injury frequency rate. The 2001 winner was Elkview Coal Corporation, Elkview Mine.

The Edward Prior Safety Award

Is presented to the mine with the lowest compensable injury frequency rate for 200,000 to 1,000,000 hours worked. The 2001 award was won by Northgate Exploration Ltd., Kemess Mine.

The Stewart-O'Brian Safety Award

Is presented to the mine with the lowest compensable injury frequency rate for 35,000 to 200,000 hours worked. The award was shared by four mines:

- Ash Grove Cement Company - Blubber Bay Quarry
- Steelhead Aggregates Ltd. - Skway Pit
- Lafarge Construction - Central Aggregates
- Allard Contractors Ltd. - Pit "D"

Certificates of Achievement

Certificates of achievement are presented to those mines with a zero compensable injury frequency rate and which have accumulated 15,000 to 35,000 employee hours. There were a total of eleven mines that qualified for certificates for work conducted in 2001:

- Steelhead Aggregates Ltd. - Cannon Road Pit
- Fraser Valley Aggregates – Pit No. 15
- Okanagan Aggregates Ltd. – Okanagan Pit
- Coquitlam Sand & Gravel – Mantle Creek Pit
- Lafarge - Cannon Pit
- A.G. Appel Enterprises Ltd. Casorso Pit
- Imperial Paving Ltd. - Ross Road Pit
- Fraser Pacific Enterprises Inc. - Sumas Shale Quarry
- Westroc Inc, - Windermere Mining Operations
- Coast Aggregates Ltd. - Mamquam Pit
- Allard Contractors Ltd. - Mission Pit

Occupational Health and Safety Committee (OHSC) Award

This award is presented to the occupational health and safety committee at a mine that has demonstrated excellence in its operations and policies that relate to their OHSC. The 2001 award went to Westroc Inc., Windermere Mining Operation.

National Safety Awards - John T. Ryan Trophies

The John T. Ryan trophies are awarded by the Mine Safety Appliances Canada Limited as a memorial to the founder of the company. The 2000 Canada trophies were awarded by the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) to the metal mine, the coal mine and the select mine which in the previous year (2000) experienced the lowest reportable injury frequency per 200,000 employee hours in all of Canada. There are two trophy categories, Canada and Regional.

Metal Mines

Awards for this category include a Canadian trophy and four regional trophies. B.C. mines compete in the B.C. and Yukon region, based on statistics from 2000. The 2000 Canada winner was Cameco Corporation, Rabbit Lake Operation, Saskatoon, Saskatchewan. The 2000 regional winner from B.C. and Yukon was Homestake Canada Inc., Eskay Creek Mine.

Coal Mines

There is a single Canadian trophy in this category which recognizes both surface and underground mines. The award in 2001 is based on statistics from 2000 and was presented to:

- Luscar Limited, Sheerness Mine, Hanna, Alberta

A Special Award Certificate for outstanding achievements in mine safety for 2000 was presented to Quinsam Coal Corporation, Quinsam Coal. The Management and workers of Quinsam Coal were recognized for substantially reducing their total reportable injuries rate.

Select Mines

Awards for this category, which are restricted to open-pit and strip mines for any mineral (excluding coal), were presented in 2001 based on statistics from 2000. There is a Canadian trophy and a Western Region trophy awarded. B.C. mines compete in the Western Region, which includes all of Canada, west of the Manitoba-Ontario border. The 2001 Western Region award was won by PCS Potash, Rocanville Division.

The 2001 Canada trophy was won by Georgia-Pacific Inc. Canada, Gypsum Operations, Port Hawkesbury, Nova Scotia and

2.4 Examinations and Certifications

Section 26 of the Mines Act requires that every person employed at a mine, where required by the Code, be under the daily supervision of a person who holds a valid and appropriate certificate as required by the Code. The appropriate certification is specified in Part 1.12 of the Code. Recipients of a valid permanent certificate require re-examination every five years regarding their current knowledge of the Code.

BOARD OF EXAMINERS

The Board of Examiners comprises the Chief Inspector of Mines as chair and other inspectors appointed by the Chief Inspector. During 2000, F.W. (Fred) Hermann chaired the board, with R. Booth, A. Hoffman, E. Mehr and J. Worsfold (administrator) as members. The board is responsible for examination of applicants for shiftboss certificates and certificates of competency, for considering applications for interchange certificates of competency, for issuing certificates and for conducting a review of all suspended certificates. The board is also responsible for administering blasting and supervisor certification.

Shiftboss Certificates

Seven different types of shiftboss certificates are issued:

- Open-pit
- Open-pit restricted (sand and gravel pit)
- Open-pit restricted (placer)
- Underground metal
- Underground restricted (crushing and conveying)
- Underground restricted (placer)
- Underground coal (Fireboss statistics included under certificate of competency)

A provisional certificate, which may be issued on a one-time basis, is valid for a period of six months.

An applicant for a shiftboss certificate must hold an appropriate blasting certificate (if blasting is carried out), a mine rescue certificate (surface or underground as required), and a valid first-aid certificate. The applicant must also have obtained acceptable experience in and about a mine and pass a written examination on knowledge of the Mines Act and the Code.

Under Part 1.13.10(1) of the Code, a holder of a shiftboss certificate must revalidate every five years. This is accomplished by successfully writing an examination on knowledge of the Mines Act and the Code as well as holding valid appropriate supporting certifications (blasting, mine rescue and first aid).

Total Shiftboss Certification Activity 2001

Activity	New Certificates	Revalidation
Applications received	45	86
Examinations written	29	86
Number passed	29	86
Number of permanent certificates issued	29	86
Provisional certificates issued	15	N/A

Shiftboss Certificate Suspensions (Part 1.13.12 of the Code)

In 2001, there was one shiftboss certificate suspension.

1. Underground Certificate #UG 2264: Suspended for thirty days (February 12 – March 14, 2001), under Part 1.13.8(1) Health, Safety and Reclamation Code for Mines in BC. Part 1.13.8 states that a shiftboss certificate is valid only if the other certificates required by the code are enforce. Suspension of the blasting ticket automatically suspends the shiftboss certificate.
Reinstatement requirements: Automatic with Blasting Certificate, revalidation.

CERTIFICATES OF COMPETENCY

Managers and certain other supervisory officials at an underground coal mine, when required by the Chief Inspector must hold a certificate of competency. Three types of certificates are issued:

- a first-class certificate which is required when 30 or more persons are employed underground;
- a second-class certificate which is required when fewer than 30 persons are employed underground; and,
- an underground coal fireboss certificate may be used if fewer than 10 persons are employed.

An applicant for a certificate of competency must hold the necessary academic certification, have obtained acceptable experience and must pass written examinations on mining practice and technology and on knowledge of the Mines Act and the Code. An interchange certificate may be granted to an applicant who holds an equivalent certificate granted by a jurisdiction outside the province, when they have proven their knowledge of the Code.

There were no new or revalidated first- or second-class certificates of competency issued during 2001. There were no recorded suspensions, cancellations or reprimands for either first- or second-class certificates of competency for 2001.

Total Underground Coal Fireboss Certifications 2001

Activity	New Certificates	Revalidation
Applications received	1	1
Examinations written	1	1
Number passed	1	1
Number of permanent certificates issued	1	1
Provisional certificates issued	0	0

Supervisor Certificates

Every worker, other than those supervised by a shiftboss or the holder of a certificate of competency, and other than office employees, must work under the supervision of the holder of a supervisor certificate. Currently, four types of supervisor certificates are issued:

- Open-pit
- Sand and gravel or placer
- Underground
- Exploration

These four replace the previous 12 categories to better recognize that the workforce can, and does, move about the mine site. Where 12 workers or less are employed in a surface mine operation, supervision by the holder of a supervisor certificate, rather than the shiftboss certificate, may be acceptable.

An applicant for a supervisor certificate may be required to hold a valid first-aid certificate and must pass a written examination on knowledge of the Mines Act and the Code. A provisional certificate, which may be issued on a one-time basis by the mine manager, is valid for a period of six months.

Supervisor Certificate Statistics Activity 2001

Activity	New Certificates
Number of permanent certificates issued	242
Provisional certificates issued	75

Blasting Certificates

Blasting certification is covered under Part 8.2 of the Code. Types of blasting certificates are:

- Basic
- Exploration
- Surface
- Underground
- Underground coal (Shotfirer)
- Electrical
- General-which includes all categories (except Underground Coal)

Blasting certificates do not have an expiry date. Provisional certificates can be issued for a period not exceeding 90 days. During 2000, 81 blasting certificates were issued.

Blasting Certificate Suspensions (Parts 8.2.6, 8.2.7 of the Code)

During 2001, there were seven suspensions of blasting certificates.

1. #37087 Suspended one month (February 12 – March 13, 2001) Failure to act when unexploded powder found, contravention of Parts 8.3.9(1)(a) and 8.6.6 of the Code.

Reinstatement Requirements: Automatically.

2. #40994 Suspended for three months (March 2 - June 2, 2001) Failure to follow Parts 8.8.1(1), 8.7.3 (2) and 8.7.1(1) of the Code for not properly marking a misfired hole, allowing drilling in loose rock without an offset pattern and allowing drilling within 300 mm of a bootleg.

Reinstatement Requirements: Rewrite Surface blasting exam and obtain a mark of 85% or higher.

3. #40867 and #42512 Suspended for four months (June 12, 2001 – October 12, 2001) under Parts 8.3.9 of the Code for committing careless acts with explosives.

Reinstatement Requirements: None stated.

4. #40464 Suspended for one month (July 23 – August 22, 2001) under Parts 8.7.1(2) and 8.3.9(1)(a) of the Code for drilling within 5 meters of a loaded hole without supervision by your shiftboss and careless act with explosives when the shock tube was damaged.

5. #42278 Suspended two weeks (September 6, 2001 – March 6, 2002) under Parts 8.2.7 of the Code failure to properly store explosives.

Reinstatement Requirements: Re-application for certification.

6. #36823 Suspended for two weeks (November 20, 2001 – December 4, 2001) under Parts 8.6.2(1) and 8.6.2(2) of the Code which requires the blaster to clear the blast danger zone of all persons and adequately guard the blast danger zone from access before blasting takes place.

Reinstatement Requirements: None stated.

2.5 Accidents and Incidents

Dangerous and/or Unusual Occurrences

In 1999 the Ministry reviewed requests from the mines that we stop requiring the labour intensive MINACC to be filled in at the minesite, or that the MINACC be made compatible with their systems. To this end, the Ministry reviewed its computer needs which resulted in a plan to develop the Mine Management System (MMS) to replace MIS (Mine Information System). This system is being developed with a staged implementation starting with the replacement of the basic Mine Information System, then the peripheral systems that include MINACC. This implementation will continue throughout the year 2000, and was being expanded in 23001 to include all of the branch offices.

The following accident information is produced from the MMS. The MMS was newly implemented in 2000 and the information presented represents all of the year 2001 as each office converted to the system. The percentage is useful in that it may be compared to subsequent years as the system is developed.

LOCATION	COUNT	%
PIT	132	48.7
PLANT / MILL	35	12.9
MAINTENANCE (SHOP)	26	9.6
MAINTENANCE (FIELD)	22	8.1
HIGHWALL	3	1.1
DUMP	9	3.3
TAILINGS POND	5	1.8
OFFICE	0	0.0
DRY	1	0.4
UNDERGROUND GENERAL	11	4.1
UNDERGROUND FACE	7	2.6
UNDERGROUND OUTBYE / HAULAGE DRIFT	2	0.7

WORK PRACTICE	COUNT	%
EQUIPMENT FAILURE	93	34.0
INADEQUATE PLANNING	36	13.0
INADEQUATE MANAGEMENT	28	10.0
INADEQUATE EQUIPMENT	13	5.0
POOR WORK STANDARDS	55	20.0
ABUSE OR MISUSE	3	1.0
TRAINING	18	7.0
NOT FOLLOWING WORK PROCEDURES	71	26.0
OPERATOR ERROR	94	35.0

EQUIPMENT	COUNT	%
HAUL TRUCK	73	26.9
GRADER	2	0.7
LOADER	16	5.9
SHOVEL	31	11.4
DOZER	22	8.1
DRILL SURFACE	14	5.2
DRILL UNDERGROUND	1	0.4
PICKUP	20	7.4
LHD	2	0.7
CONVEYOR	7	2.6
ELECTRICAL	30	11.1
EXPLOSIVES	12	4.4
EXCAVATOR/BACKHOE	6	2.2
CRANE	14	5.2
FORKLIFT	3	1.1

GENERAL INFORMATION	COUNT	%
# OF PERSONS INVOLVED	339	
# OF PERSONS INJURED	51	
NEAR MISS	52	19.0
GEOTECHNICAL	12	4.0

2.6 Summary of Mine Production

The table below summarizes production and average employment at major British Columbia mine sites.

Statistics 2001¹

Coal Mines	Annual Rated Plant Capacity (Tonnes)	Actual Tonnes Produced	% of Capacity	Days Mill Operated	Average Employment	Contract Employment
Bullmoose	2,300,000	1,894,000	82	268	301	-
Elkview	6,000,000	5,517,000	92	274	674	-
Fording Coal Mountain	3,833,000	2,478,000	65	236	169	-
Fording Greenhills	4,500,000	4,906,000	109	321	380	-
Fording River	9,500,000	9,400,000	99	336	756	-
Line Creek	3,600,000	2,762,000	77	355	473	-

¹ The Mining Industry in British Columbia – 2001 PricewaterhouseCoopers

Metal & Precious Metal Mines	Annual Rated Mill Capacity (Tonnes)	Actual Tonnes Milled	% of Capacity	Days Mill Operated	Average Employment	Contract Employment
Endako	10,950,000	9,386,000	86	365	200	2
Eskay Creek ²	91,000	98,000	108	365	123	94
Golden Bear ³	N/A	88,000	N/A	183	50	-
Highland Valley	49,640,000	48,892,000	98	365	942	66
Huckleberry	7,665,000	7,416,000	97	365	194	-
Kemess	18,558,000	15,361,000	83	303	422	-
Mount Polley ⁴	7,300,000	5,386,000	74	275	230	6
Myra Falls	1,460,000	979,000	67	336	401	-
Sullivan ⁵	3,000,000	1,320,000	44	181	396	15

1. The Mining Industry in British Columbia - 2001 Price Waterhouse Coopers.
2. Eskay Creek ships ore as well as milling ore. Actual tones shipped were 121,000.
3. Golden Bear closed in October 2001. Golden Bear operated from inventory this year, and did not mine or mill any fresh ore during 2001.
4. Mount Polley was placed on care and maintenance in September 2001.
5. Sullivan closed in December 2001.

2.7 Volume of Inspections

In 2000, the Ministry introduced the Mine Management System (MMS) that allowed the tracking of mine visits and the issuance of orders at mines. The system was introduced progressively throughout the year, and the attached report reflects a part year on the MMS. As the two systems were not compatible, the total inspections for the year combining the two systems are presented as a total above the chart.

The following figures represent inspections performed by the Mines Branch. When an inspector conducts a mine site inspection on behalf of the branch, the inspector passes on to other branches anything that they may need to attend to. Note that the number of inspections is not a good indicator of the relative volume of activity of each office. Some regions contain a few very large mining operations, whereas others contain hundreds of smaller operations. Therefore, the length of time it actually takes to conduct an inspection varies from region to region.

While conducting inspections 2,025 during 2001, mines inspectors issued 4,221 orders and shut down 52 pieces of equipment. The following were recorded for 2001 in the MMS system which was introduced late in 2000:

Type	Inspections	H&S Orders	Equipment Shutdowns	Environmental Orders	Dang.Occ.	Invest.	Training	Other
Abandoned Mine	8	17	0	1	1	1	0	7
Custom Mill	3	10	0	0	1	0	0	3
Coal-Surface	83	215	0	9	145	7	3	28
Coal-Underground	12	48	0	0	0	0	2	2
Exploration-Surface	171	225	1	90	19	1	1	58
Exploration-Underground	23	46	0	8	2	0	0	4
Industrial Minerals - Surface	134	358	0	46	12	3	4	19
Industrial Minerals-Underground	3	12	0	0	0	0	0	1
Metal Leach-Surface	6	0	0	0	0	0	0	9
Metal Mine - Surface	130	471	7	6	35	4	7	52
Metal Mine-Underground	66	305	1	6	31	2	1	22
Non Assignable/ Unidentified	1	5	0	0	0	0	0	0
Placer-Surface	287	102	0	249	0	0	0	6
Placer-Underground	1	0	0	0	0	0	0	0
Rock Quarry	147	257	6	43	1	1	1	12
Sand/Gravel Pit	950	1,344	37	348	4	0	8	25
TOTALS	2,025	3,415	52	806	251	19	27	248

3.1 Notices of Work

The following Notices of Work and permit information was entered into MMS in 2001. The MMS system was developed and implemented throughout 2001.

TYPE	NOTICE OF WORK APPLICATIONS	PERMITS ISSUED	AVERAGE DAYS TO ISSUE
Mineral and Coal (Exploration)	336	148	38
Mineral and Coal (other)	79	46	63
Placer	592	135	57
Sand & Gravel	205	107	69
Total	1212	436	53

The breakdown of the 2001 Notice of work by area is as follows:

REGION	PLACER	SAND & GRAVEL	MINERAL AND COAL	TOTAL
Kootenay	40	17	67	124
Kamloops	43	47	76	166
Nanaimo	16	54	65	135
Prince George	398	69	128	595
Smithers	94	18	79	191
Other				1
Total				1212

The areas covered by the regions are as follows:

Southwest = Nanaimo, Lower Mainland and Vancouver Island areas

Central = Kamloops, Okanagan and Thompson areas

Kootenay = Cranbrook and Elk Valley areas

Northeast = Prince George, Omineca, Horsefly and Valemont areas

Northwest = Smithers, Skeena and Queen Charlottes areas

4.1 Reclamation

ROLES AND RESPONSIBILITIES

Reclamation and environmental protection are a major component of all mineral exploration and mine development activities in B.C. Since 1969, mining companies have been required by law to reclaim all lands disturbed by mining. B.C. was one of the first jurisdictions in Canada to enact mine reclamation legislation, and the first to extend this policy to exploration sites. Mining companies are required to obtain a permit approving the mine plan, the program of protection of the land and watercourses, and the

reclamation program. Mining companies must also place a security deposit with the province to ensure that the reclamation permit conditions are completed.

The environmental protection and reclamation objectives of the province's *Mines Act* and Code are to ensure:

- land and watercourses on mine sites in BC are reclaimed to a level of productivity equal to that which existed prior to mining;
- disturbed lands and water courses are re-integrated into the surrounding landscape;
- mining and mitigation requirements associated with metal leaching and acid rock drainage (ML/ARD) are conducted in a manner which prevents significant impacts to downstream or on-site biota and minimizes any reduction in post-mining productive capability of the site.

In order to achieve these objectives, the reclamation section:

- conducts detailed technical reviews of new projects or project revisions under the *Environmental Assessment Act*;
- conducts detailed technical reviews and issues permits for operating and closed mines with outstanding reclamation responsibilities under Section 10 of the *Mines Act*;
- inspects mine reclamation work and results;
- administers reclamation security deposits on behalf of the provincial government;
- organizes a number of provincial committees and activities which conduct technology transfer, review Ministry practices and enhance government/industry/public/academia cooperation, including the Technical and Research Committee on Reclamation, the Annual Reclamation Symposium, the Annual ML/ARD Workshop and the MEM Expert Advisory Committee for ML/ARD; and
- participates in national and international committees conducting research and technology transfer, including the mining industry's International Network for ARD Prevention (INAP) and the federal government's National Mine Environment Neutral Drainage (MEND 2000) Committee.

The reclamation section has expertise in the technical areas of soil restoration, re-vegetation, land capability, erosion control, geology, geochemistry, and metal leaching and acid rock drainage. Technical assistance is provided from within the Ministry on geotechnical and mining issues and by the Ministry of Water, Land and Air Protection (MWLAP) on biological and effluent discharge requirements.

STRUCTURE AND ORGANIZATION

The Reclamation Section is comprised of the manager, a senior reclamation agrologist, a senior reclamation geologist, a senior mine review geologist and two administrative staff located at headquarters. There are a total of four reclamation inspectors located in Cranbrook, Kamloops, Prince George and Smithers.

Summary of Activities

Permitting

The section enforces the reclamation provisions of the *Mines Act* through permit conditions and detailed technical reviews aimed at finding environmentally sound, economically viable solutions that enable industry to remain internationally competitive without compromising the province's rigorous environmental standards.

During 2001, permitting activity remained high. Although no new permits were issued, 21 amendments were made to existing permits (Table 1).

Table 1: Summary of permit activity for 2001

Type	Amendments
Metal	15
Coal	5
Quarries	1
Total	21

Permit revisions were made at Huckleberry Mines Ltd., Kemess Mine, Sullivan Mine, Mount Polley, Myra Falls, Craigmont Mine, Samatosum, Island Copper, Britannia, Premier, Similkameen, Venus Mill, Giant Nickel, Endako, Line Creek, Quinsam, Greenhills, Elkview, Quintette, Bullmoose, and Fording River. Under the *Environmental Assessment Act*, reviews were conducted for Sustut Copper. The section also organized and participated on public committees reviewing activities at the Brenda, Endako, Equity Silver and Sullivan mines.

Cooperation and Consultation with Stakeholders

The section works closely with industry, other government agencies, First Nations and the public to inform them of our activities and ensure that all concerns are considered. For reclamation permits involving mechanical disturbance of the land surface, applications are referred to other government agencies, the public, and First Nations where their interests are affected. The section provides regular assistance to MWLAP, MOTH, Environment Canada, First Nations and the public on ML/ARD issues.

Cooperation facilitated by the reclamation section between industry, the public, government, and the academic community through its various activities continues to result in a constructive climate for information exchange and dissemination of new technology.

Reclamation is the responsibility of each mining company. In order to improve industry practices, consultation with First Nations and general public understanding, the Ministry documents the conclusions of its technical reviews, enabling effective, constructive First Nations and public consultation. In addition, the Ministry has produced specific guidelines on a number of reclamation issues including the reclamation of gravel pits and the prediction and prevention of metal leaching and acid rock drainage.

Metal Leaching and Acid Rock Drainage (ML/ARD)

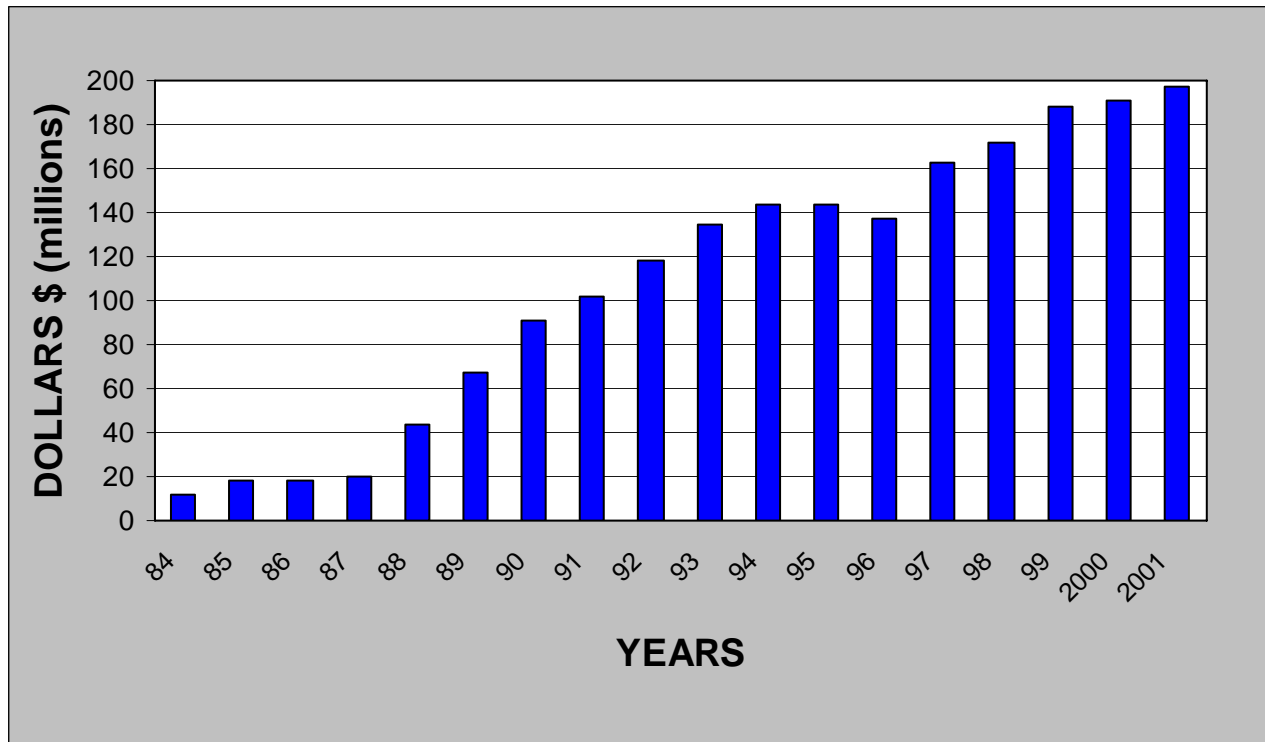
The Ministry has produced a provincial ML/ARD policy, a more detailed set of ML/ARD guidelines, and a manual of recommended methods for the prediction of ML/ARD. These documents indicate what constitutes acceptable mine design and adequate technical evidence. They provide a checklist for industry and also inform the public of regulatory conditions and environmental protection requirements.

The major ML/ARD activity in 2001 was mine review; with ML/ARD reviewers providing a major part of reclamation permit conditions.

Reclamation Securities and Funds

All mines operating in B.C. must deposit security with the government to ensure that reclamation costs do not fall on provincial taxpayers (i.e., if a mining company goes bankrupt). In the past few years, the value of security deposits has increased to reflect more closely the true costs of reclamation. The total value of securities held by the province rose from \$10 million in 1984 to more than \$197.5 million by the end of 2001.

Reclamation Security Deposits Held by the Province of B.C., 1984 to 2001



Review of Contaminated Sites Policy

During 2001, Ministry staff continued to work closely with industry, environmental groups and the Ministry of Water, Land and Air Protection to resolve issues related to overlap of legislation between the *Mines Act* and the *Waste Management Act*. An independent consultant was hired to review the issue of environmental liability and provide recommendations on how best to ensure reasonable environmental protection and help contribute to a sustainable mining industry.

Historic Mine Sites Project

A project initiated in 2000, and completed in 2001, inventoried historic mine sites to determine the scope of the problem in British Columbia. Sites were identified by reviewing existing Ministry MINFILE data and by undertaking field inspections. Longer-term objectives of the project included identifying high priority sites where environmental or health and safety issues exist, and determining if reclamation is necessary.

Field based inspections were conducted in July, August and September 2000, and included sites from all regions of the province. This work was undertaken with mines inspectors in each regional office in order to provide logistical support, and to rely on their experience and knowledge of the historic sites in their region. Sixty sites were inspected,

and mine drainage was sampled and analyzed for heavy metals and site-specific information was recorded.

Although the first phase of the Historic Mine Sites project was completed in 2001, the documentation and characterization of historic mine sites in British Columbia remains largely incomplete. The preliminary scoping of historic mine sites undertaken for this project, although rudimentary, has provided the Ministry of Energy and Mines a starting point in better understanding the issue. The work of this project also provides a basis by which future programs can be developed in an efficient and practical manner.

The concerns with historic mine sites principally relate to environmental degradation and public health and safety issues. Environmental issues include mining disturbances that have resulted in impacts to water quality from metal contaminated effluent. Health and safety issues include mine workings that pose threats to the public and include open shafts, adits, unstable ground and other mine infrastructure such as old buildings, structures and equipment.

Based on the water quality results coupled with the mine inspections, a number of sites were identified as having a potential for environmental impacts.

Mine Reclamation Symposium

The 25th Annual Mine Reclamation Symposium was held from September 24 to 27, 2001 in Campbell River, B.C. with a theme of "Water Management." Delegates also toured the Island Copper mine and were privileged to see an excellent program of reclamation involving waste rock dump reforestation, recreation of the shoreline ecosystem and conversion of the open pit into a pit lake.

The Annual B.C. Mine Reclamation Award

The annual reclamation award and up to five citations are awarded for outstanding achievement in mine reclamation and have been presented at the BC Mine Reclamation Symposium every year since 1977.

This year, the British Columbia Mine Reclamation Award was presented to Huckleberry Mines Limited, for its excellence in the prevention of metal leaching and acid rock drainage at the Huckleberry mine.

The Huckleberry mine is a porphyry copper-molybdenum deposit located southwest of Houston. Imperial Metals Corporation has successfully operated it since 1997, mining approximately 10 million tonnes of ore a year. The mine site includes two open pits, a tailings impoundment, and a plant site.

The Huckleberry mine is a textbook example of good planning to prevent metal leaching and acid rock drainage. The mine has greatly reduced the environmental risk and post-closure liability of the site by having a detailed knowledge of material characteristics, and

a reclamation plan that is compatible with the mine plan, site environmental conditions and surrounding land uses.

Huckleberry was commended for their commitment to resolving closure issues, well in advance of the estimated eight years until closure. The mine has already completed test work to demonstrate how the mill process will be modified to create a non-PAG tailings beach at the end of mining. In addition, research is ongoing to assess possible mitigation strategies for ARD generated from PAG talus in the East Zone Pit. By addressing closure issues now, the Company will be able to incorporate mitigation requirements into the mine plan, creating a cost-effective solution.

Six citations were also awarded:

- Coal mine reclamation - was awarded to Fording Coal Limited for their continuing efforts at the Greenhills Operations.
- Metal mine reclamation - was awarded to North American Metals Corporation for their exceptional road reclamation efforts at the Golden Bear Mine.
- Sand and gravel reclamation - was awarded to Construction Aggregates Limited for their work at the Sechelt Operation.
- Mineral Exploration reclamation - was awarded to Noranda Mining and Exploration for their work on the Tommy Jack property.
- Coal Exploration reclamation – was awarded to Luscar Ltd. for its exploration work at the Telkwa Coal property and at Line Creek.
- Placer mine reclamation - was awarded to Daniel Romanow for his work undertaken on the Grace Placer Claims located on Barry Creek near Wells.

Metal Leaching and Acid Rock Drainage Workshop

The 8th annual workshop was held in Vancouver on November 28 and 29, 2001. This year, the workshop focused on new developments, various aspects of ML/ARD prediction and the use of water covers as a mitigation strategy.

Technical and Research Committee on Reclamation

This committee has been active in promoting and fostering reclamation research and information exchange for more than two decades. Members are drawn from the Ministry of Energy and Mines, Ministry of Water, Land and Air Protection, mining companies, the Mining Association of B.C., the University of B.C., and the Coal Association of Canada. This committee has been responsible for the organization of the annual B.C. Mine Reclamation Symposium for the past 25 years.

INDUSTRY RECLAMATION RECORD

The mining industry in B.C. currently consists of large-scale open pit metal mines, open pit coal mines, underground metal mines and one underground coal mine.

Since the late 1960s, land occupied by the mining industry has steadily grown. Major coal and metal mines, which occupied less than 1,000 hectares in 1969, had, by the end of 2001, expanded to cover 40,707 hectares. Reclamation (where revegetation has been successfully established for one year or more) has occurred on over 32 percent or 13,128 hectares (Figure 1).

Metal mines have disturbed 23,692 hectares, and 7,645 hectares (or 32 percent), have been reclaimed (Figure 2).

Coal mines have disturbed 17,015 hectares, and 5,483 hectares (or 32 percent) have been reclaimed (Figure 3). The sharp increase in disturbance and reclamation at metal mines during the late 1990's reflects the construction and development of three new mines Huckleberry, Mt. Polley and Kemess South and the closure and commencement of mine reclamation at others.

The data presented in Figures 1, 2 and 3 indicate that disturbance has been increasing at a faster rate than reclamation. This can largely be explained by the expansion of the mining industry during the past 30 years. Now that there has been a general industry decline, where mines are closing at a rate faster than they are opening, the rate of reclamation is expected to exceed the rate of disturbance.

Figure 1 - Land Disturbed and Reclaimed by Metal and Coal Mines in BC, 1969 - 2001

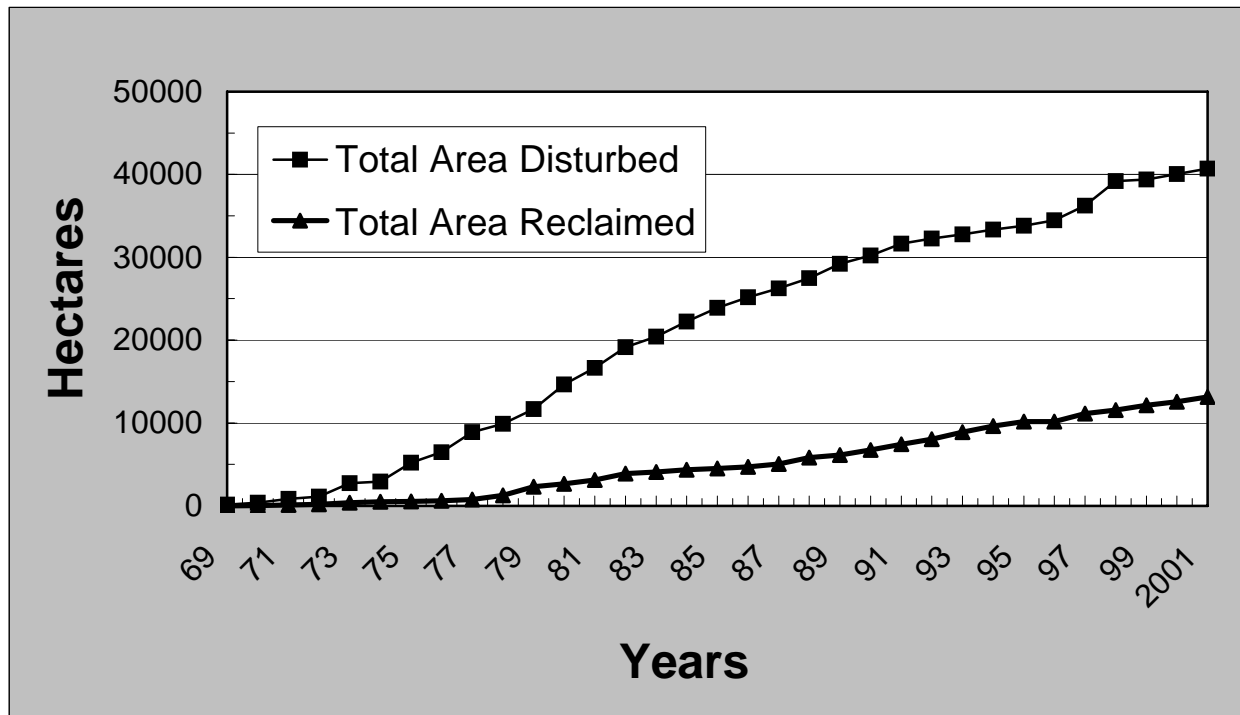


Figure 2 - Area Disturbed and Reclaimed by Metal Mines in BC, 1969 - 2001

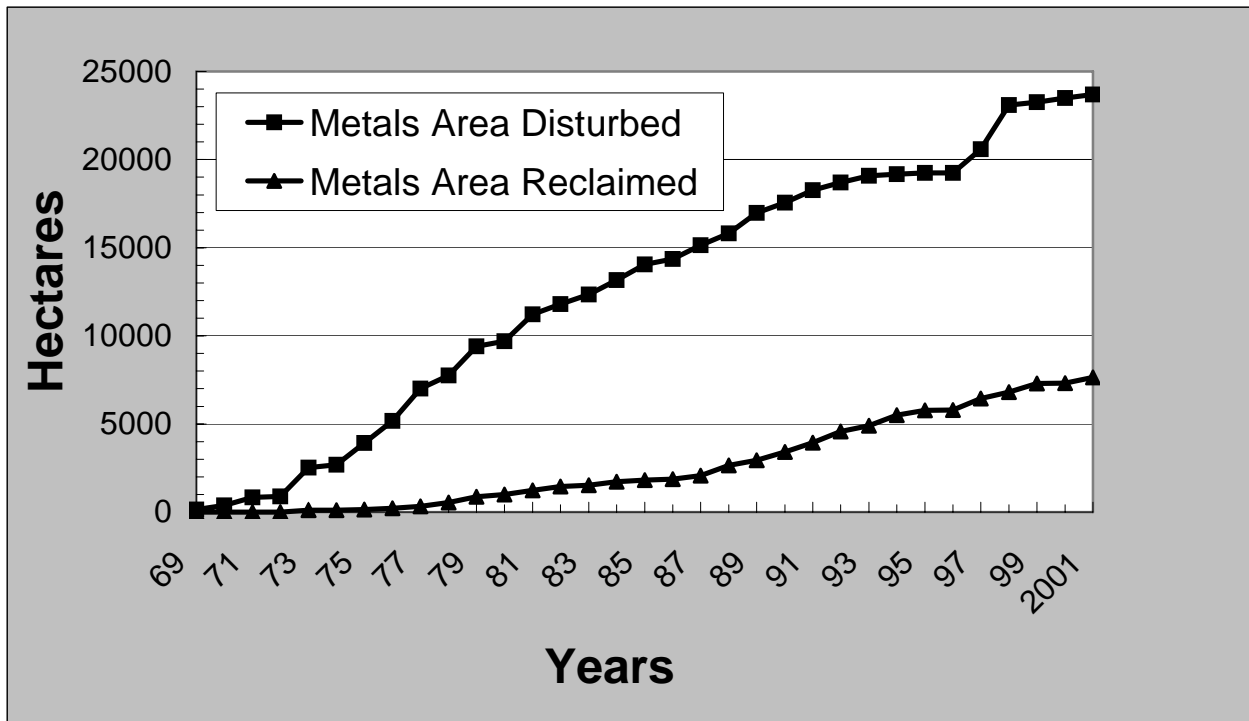
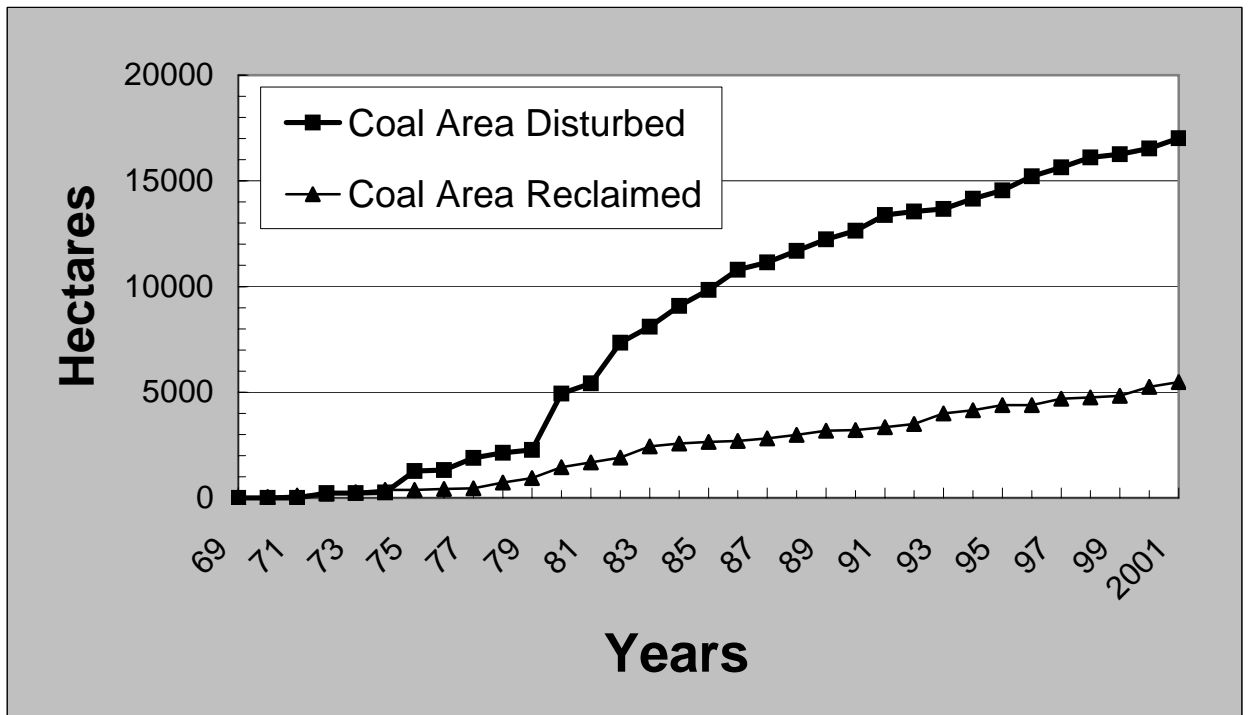


Figure 3 - Area Disturbed and Reclaimed by Coal Mines in BC, 1969 - 2001



4.2 Geotechnical/Mining Roads

ROLES AND RESPONSIBILITIES

The geotechnical section reviews mine designs for the project review stage of the Environmental Assessment Act process, as well as the application of the Mines Act under Section 10. Other duties include the inspection of major geotechnical works at mines, the assessment of geotechnical performance for worker protection and public health and safety, and for protection of land and watercourses.

The section provides in-house technical expertise and policy advice for:

- Tailings impoundments and dams, sediment control structures, waste rock dumps, soil overburden dumps;
- Open pit and underground rock mechanics;
- Roads, including route selection, standards and construction; and
- Risk evaluation for worker protection and public health and safety, and environmental impact of geotechnical projects.

ORGANIZATION

The section consists of a manager and an administrative assistant.