

2004

Chief Inspector of Mines'

Annual Report

**Mining Operations Branch
Ministry of Energy and Mines**

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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 Mining Operations Branch, which functions through a central office in Victoria and four regional offices; Cranbrook, Kamloops, Prince George and Smithers, and a satellite office located 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 at (604) 688-9908, or from each mining operation. In addition, you may 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 Mining Operations 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 2003.

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 completion of audits to evaluate how well a safety and health program has been implemented at a mine.
- 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.

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 local Mines Inspector, in Kamloops, and the Director of Health and Safety, in Victoria.

1.2 Mining Administration Function - non-health and safety component

MANDATE/ACTIVITIES

The Mining Operations 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 sub-regional planning, and reviews of draft legislation and policies being developed by other agencies. Branch staff also provide 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.

Two thousand and four was another impressive year for the mining industry, with 8 applications currently in the Environmental Assessment Office review process. Commodity prices for nearly all metals and types of coal rose substantially over the year. British Columbia experienced a significant upturn in minerals-related exploration activity, continuing the trend from last year toward a resurgence in exploration spending. This increase in exploration has brought an elevated workload for the branch to permit and inspect these programs.

2.1 Occupational Health Group

ROLES AND RESPONSIBILITIES

The Health, Safety and Reclamation Code for Mines in B.C. 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 also 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. Training and assistance in program development is provided as needed. Audiometric technician training is scheduled periodically as needed.

A written, preventative training program to educate OHSC members in the recognition, evaluation and prevention of adverse health effects resulting in musculoskeletal disorders is also a requirement of the Code. Such musculoskeletal disorders may consist of low back injury, repetitive strain, overexertion or vibration-induced injuries and training includes early reporting of signs and symptoms of injury. The OH group provides its expertise in the development and implementation of this training.

STRUCTURE AND ORGANIZATION

During 2004 there were three people in the OH group with specialities in industrial hygiene, engineering and human factors/ergonomics.

SUMMARY OF ACTIVITIES

Occurrences and situations of note in 2004 that required attention from the OH group were:

- considerable concern by neighbours of smaller quarry and sand and gravel operations where dust and noise were involved, requiring a number of investigations.

In addition, the OH group:

- conducted on-site inspections of mines to fulfil their mandate to monitor workplace conditions.
- maintained and input data to the Mining Operations 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;
- conducted MSD Prevention training to safety representatives from 10 major mines; and
- organized this year's Open Pit and Small Underground Awards Competition and Awards Dinner.

2.2 Mechanical Engineering, Electrical Engineering

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.

STRUCTURE AND ORGANIZATION

In 2004 there were two staff members in the mechanical/electrical group. The demand on this small group to keep up with new mines being constructed or rehabilitated and improvements to existing operations for remains an on-going challenge.

SUMMARY OF ACTIVITIES

Mechanical Engineering

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 are involved in reviewing engineering drawings associated with the safety systems on such equipment, as a precursor to field inspections on the items. The branch endeavours 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.

Electrical Engineering

The new inspector performed electrical inspections at all major mines including the larger sand and gravel operations as well as some of the smaller operations. The new mines opening in the Northeast (Dillon and Pine Valley), along with the re-opening of Gibraltar and Mount Polley, required extra inspections and review of engineering specifications and drawings.

2.3 Competitions and Awards

ROLES AND RESPONSIBILITIES

The primary mandate of the Mining Operations 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 one of 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

The Provincial Mine Rescue competitions are judged by Branch mine inspectors and industry 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 Fernie on June 12, 2004.

Zone Competition

The East Kootenay Zone competitions were held in Sparwood and all the teams came from the Elk Valley Coal Corporation. The participating teams were as follows:

- Line Creek
- Greenhills
- Elkview
- Coal Mountain
- Fording River

The North / South / Central Zone competition was held at the Fernie Recreation Center June 10th. The participating Mine Rescue teams were as follows:

- Endako Mines Ltd.
- Imperial Metals Corp. - Huckleberry Mine

- Highland Valley Copper
 - Northgate Exploration Ltd. - Kemess Mine
 - Texada Quarrying Ltd.
- As well Quinsam Coal entered a Three Person First Aid team, attempting to qualify for the Provincial Competition.

Provincial Competition

The first, second and third placed teams from two regional zones became eligible to compete in the provincial competition on June 12, in Fernie, B.C. These teams were:

- Elkvalley Coal Corp. - Fording River Operation
- Elkvalley Coal Corp. – Greenhills Operations
- Elkvalley Coal Corp. – Line Creek Operations
- Northgate Exploration Ltd. – Kemess Mine
- Endako Mines
- Highland Valley Copper

Surface Mine Rescue Champions

The team from Highland Valley Copper won the 2004 surface mine competition, successfully defending their title as provincial champion. Team members were: Dirk Werring (Capt), Dale Konowalchuk (Vice-Capt), Neil Rideout, Steve Hippiisley, John Brennan, Peter Dreschsler, Robert Rudkowsky, 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 again in 2004.

Underground Mine Rescue Champions

Three underground mine rescue teams competed in the provincial competitions in 2004:

- Boliden Westmin (Canada) Ltd. - Myra Falls Operations
- Barrick Gold Mine - Eskay Creek Mine
- Quinsam Coal Corporation - Quinsam Mine

Barrick Gold Mines, Eskay Creek Mine won the competition in 2004. Team members were John Arnold (Coach), Peter Devloder (Captain), Tom Cheveldale (Vice Captain), Jason Hole, Sheldon Flostrand, Mitch Carter, Clark Milner (Co-ordinator), and Martin Rozell (Spare).

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. In 2004 the award was won by the team from Myra Falls Operations.

Underground Bench Technician

No competition was held.

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

Underground First Aid

This award was previously introduced by Cominco Ltd. for the best first aid by an underground mine rescue team. The award, known as the "Sullivan Cup", was presented to Barrick Gold Mines Ltd. – Eskay Creek Mine.

Three-Person First Aid

The first provincial miner's three-person first-aid competition was held in 1978. 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.

This year the competition was design by the personnel of the Elkvalley Coal Corporation, Elkview Coal Opeations, who supplied the judges, patients, props and medical supplies. Competing teams at the provincial level were as follows:

Elk Valley Coal Corp. - Coal Mountian Opeations
Elk Valley Coal Corp. – Elkview Operations
Elk Valley Coal Corp. – Line Creek Operations
Imperial Metals Corp. - Huckleberry Mine
Highland Valley Copper
Texada Island Quarrying Ltd.

The 2004 Three- Person First Aid winning team was from Elk Valley Coal Corp. - Elkiview Operations.

The National Western Regional Competitions

This biennial competition will be held next in September 2005.

SAFETY AWARDS COMPETITION

The presentation of awards at the 42nd (2003) Annual Mine Safety Awards took place at the Harbour Towers Hotel in Victoria on Monday April 19, 2004. The winners for 2003 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 2003 winner was Quinsam Operating Corp., Quinsam Coal.

The John Ash Award - Open-Pit Mines and Quarries

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 2003 winner was the Elk Valley Coal Corporation, Elkview Operations.

The Edward Prior Safety Award - Open-Pit Mines and Quarries

Is presented to the mine with the lowest compensable injury frequency rate for 200,000 to 1,000,000 hours worked. The 2003 award was won by the Elk Valley Coal Corporation, Coal Mountain Operations.

The Stewart-O'Brian Safety Award - Open-Pit Mines and Quarries

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 seven mines:

- Allard Contractors Ltd. - Pit "D"
- BPB Canada Inc. - Windermere Mining Operations
- Canada Pumice Corporation - Nazko Quarry
- Lafarge Canada Inc. - Central Aggregates
- Lehigh Northwest Materials Construction Aggregates Ltd. - Producers Mine
- Pitt River Quarries Ltd. - Pitt River Quarry
- Steelhead Aggregates Ltd. - Skway Pit

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 seven mines that qualified for certificates for work conducted in 2003:

- Allard Contractors Ltd. - Mission Pit
- Butler Brothers Supplies Ltd. - Langtry Pit
- Crystal Graphite Corporation - Black Crystal
- Hub City Paving Ltd. - Cassidy Pit
- Imperial Paving Ltd. - Ross Road Quarry
- Jack Cewe Ltd. - Jervis Inlet
- Okanagan Aggregates - Okanagan Pit

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 2004 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 (2003), experienced the lowest reportable injury frequency per 200,000 employee hours in all of Canada. There are two trophy categories: Canada and Regional. In the Canada Trophy for Coal Mines category, Quinsam Coal Corporation was the 2003 trophy recipient.

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 2004, F.W. (Fred) Hermann chaired the board, with R. Booth, A. Hoffman and D. Morgan administrator and member. 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 certification.

Shiftboss Certificates

Total Shiftboss Certification Activity 2004

Activity	New Certificates
Applications received	9
Examinations written	24
Number passed	24
Number of permanent certificates issued	22

Shiftboss Certificate Suspensions (Part 1.13.12 of the Code)

In 2004, there were no shiftboss certificate suspensions

Total Underground Coal Fireboss Certifications

There were two applications for underground Coal Fireboss Certifications in 2004; two Coal Fireboss certificates were issued.

Blasting Certificates

Blasting certification is required under Part 8.2.1 of the Code. Types of blasting certificates include:

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

Blasting certificates are now valid for 5 years. Provisional certificates can be issued for a period not exceeding 90 days. There were 10 blasting tickets issued in 2004.

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

During 2004, there were no suspensions of any blasting certificates.

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

Mine Rescue Certificates issued in 2004:

Type	Number Issued	Re-certified
Underground mine rescue	30	4
Surface (open-pit) mine rescue	76	15
Gravel pit mine rescue	4	0
Total Certificates Issued	110	19

2.5 Accidents and Incidents

DANGEROUS and/or UNUSUAL OCCURRENCES

In 2004 the accident Module of the MMS system has continued to be developed and the inspector has the responsibility to determine which incidents should be included, this has been influenced by workload and with staff reductions the Occupational Health and Safety Committee – OHSC at the mine has been the primary incident investigation tool of a mine incidents, with less involvement from the branch inspectors with consequently less incidents entered into the system.

The following accident information is produced from the MMS represents all of the year 2004 as input by each office. The percentage is useful in that it may be compared to subsequent years as the system is developed.

LOCATION	COUNT	%
PIT	103	48.1
PLANT / MILL	28	13.1
MAINTENANCE (SHOP)	19	8.9
MAINTENANCE (FIELD)	15	7.0
HIGHWALL	6	2.8
DUMP	8	3.7
TAILINGS POND	7	3.3
OFFICE	2	.9
DRY	3	1.4
UNDERGROUND GENERAL	12	5.6
UNDERGROUND FACE	5	2.3
UNDERGROUND OUTBYE / HAULAGE DRIFT	2	0.9

WORK PRACTICE	COUNT	%
EQUIPMENT FAILURE	69	32.0
INADEQUATE PLANNING	28	13.0
INADEQUATE MANAGEMENT	33	15.0
INADEQUATE EQUIPMENT	8	4.0
POOR WORK STANDARDS	30	14.0
ABUSE OR MISUSE	5	2.0
TRAINING	21	10.0
NOT FOLLOWING WORK PROCEDURES	38	18.0
OPERATOR ERROR	85	40.0

EQUIPMENT	COUNT	%
HAUL TRUCK	68	31.8
GRADER	0	0
LOADER	9	4.2
SHOVEL	22	10.3
DOZER	12	5.6
DRILL SURFACE	7	3.3
DRILL UNDERGROUND	1	.5
PICKUP	11	5.1
LHD	4	1.9
CONVEYOR	5	2.3
ELECTRICAL	25	11.7
EXPLOSIVES	13	6.1
EXCAVATOR/BACKHOE	5	2.3
CRANE	3	1.4

FORKLIFT	2	.9
WATER TRUCK	1	.5
SCRAPER	1	0.5
SERVICE TRUCK	9	4.2

GENERAL INFORMATION	COUNT	%
# OF PERSONS INVOLVED	249	n/a
# OF PERSONS INJURED	38	n/a
NEAR MISS	49	23.0
TIME INTO SHIFT	139	65.0
GEOTECHNICAL	25	12.0
FATALITY (MINING RELATED)	1	n/a
FATALITY (NON MINING)	0	n/a
FIRE	42	20.0

FATALITIES

On the afternoon of September 1, 2004 a fatal accident occurred at the Bralorne Mine. The deceased was a 52-year-old lead miner and acting shiftboss.

The deceased had reentered the stope with his partner after a blast to inspect the area. They had done a walk through and then the deceased wanted to scale some loose material off the back near the north end of the stope. He directed his partner to a safe area at the entrance to the stope and proceeded to scale the loose rock. A large piece of rock fell without warning from the hanging wall behind him, with fatal consequences.

2.6 Summary of Mine Production

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

Statistics 2004¹

Coal Mines	Annual Rated Plant Capacity (Tonnes)	Actual Tonnes Produced	% of Capacity	Days Mill Operated	Average Employment	Contract Employment
Basin	400,000	40,000	10%	0	18	-
Coal Mountain	3,717,000	2,540,000	68%	238.0	179	-
Elkview	7,000,000	5,917,000	85%	257.0	727	-
Fording River	9,500,000	9,238,000	97%	338.0	791	-
Greenhills	5,000,000	4,927,000	99%	313.0	446	-
Line Creek	3,600,000	2,510,000	70%	237.0	280	10
Quinsam Coal	780,000	589,000	76%	260.0	86	1
Dillon	240,000	53,700	22%	31	12	-
Willow Creek	900,000	240,000	27%	122	15	55

¹ The Mining Industry in British Columbia – 2004 PricewaterhouseCoopers

² Mine started production in 2005

Metal & Precious Metal Mines	Annual Rated Mill Capacity (Tonnes)	Actual Tonnes Milled	% of Capacity	Days Mill Operated	Average Employment	Contract Employment
Bralorne	37,000	19,000	51%	275	46	10
Endako	10,950,000	9,350,000	85%	365	246	-
Eskay Creek	91,000	113,000	124%	365	180	135
Gibraltar	13,250,000	2,407,000	18%	78	37	4
Highland Valley Copper	49,640,000	50,623,000	102%	365	880	85
Huckleberry	7,483,000	6,867,000	92%	365	209	-
Kemess South	19,072,000	18,590,000	97%	330	349	65
Mount Polley ²	7,300,000	-	-	-	49	30
Myra Falls	1,460,000	940,000	64%	362	376	-

2.7 Volume of Inspections

The Mine Management System (MMS) allows tracking of mine visits and the issuance of orders at mines. The following figures represent inspections performed by the Mining Operations Branch. When an inspector conducts a mine site inspection, the inspector passes on to other branches information they may need to attend to. Note the number of inspections is not an 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 to conduct an inspection varies from region to region.

As can be seen in Figure 1, the graph of inspections and staff by year, there has been a significant reduction in the number of inspections that corresponds to the reduction in staff.

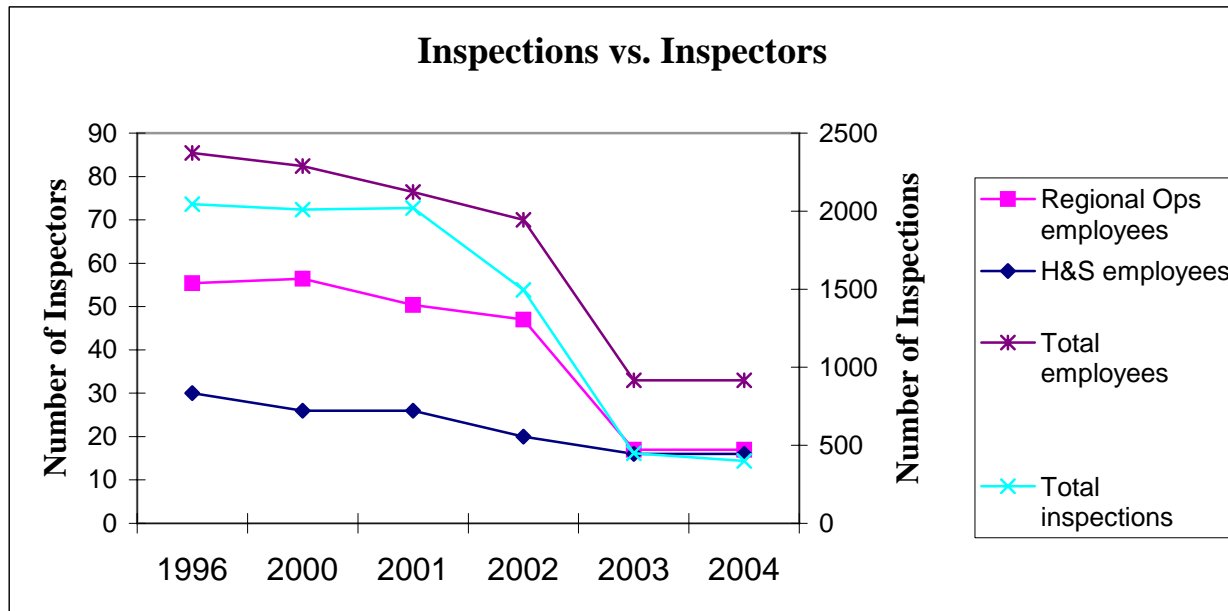


Figure 1

In 2004 the mines branch conducted 399 inspections and mines inspectors issued 1,279 orders and shut down 18 pieces of equipment. The following were recorded for 2004 in the MMS.

Mine Type	Inspe c- tions	H&S Orders	Equipment Shutdowns	Enviro. Orders	Dang. Occ.	Invest.	Training	Meeting	Other
Abandoned Mine	1	0	0	0	0	0	0	1	2
Custom Mill	3	17	0	0	0	0	0	0	1
Coal - Surface	50	220	1	0	130	0	3	4	5
Coal- Underground	7	58	0	0	0	0	0	0	0
Coal Exploration	0	0	0	0	0	0	0	0	0
Exploration- Surface	48	28	9	25	4	0	0	1	0
Exploration- Underground	20	68	1	3	3	1	0	6	0
Industrial Minerals - Surface	40	118	0	1	5	0	1	3	6
Industrial Minerals- Underground	0	0	0	0	0	0	0	0	0
Metal Leach- Surface	0	0	0	0	0	0	0	0	0
Metal Mine - Surface	43	217	3	1	39	0	5	9	1
Metal Mine- Underground	35	191	1	1	24	1	1	3	3
Non Assignable/ Unidentified	2	3	0	0	0	0	0	0	0
Placer-Surface	29	15	0	19	0	0	0	0	0
Placer- Underground	0	0	0	0	0	0	0	0	0
Rock Quarry	25	29	0	0	1	0	0	0	5
Sand/Gravel Pit	96	315	3	11	1	1	2	7	0
TOTALS	399	1,279	18	61	207	3	12	34	47

2.8 Audit Program

The safety audit program is designed to investigate how well a safety and health program has been implemented at a mine. The audit program has been revised to reflect the new 2003 Code and to put more emphasis on the findings of branch staff through document search and interviews to determine the facts. The report reflects the views of the mines branch who draw their conclusions as a result of the interviews with management and staff and research of the mines records.

In 2004 there were two audits performed, the first was a trial of the new process at Quinsam Coal mine where the management and staff critiqued our methods and report to ensure that the audit findings would be of value to the industry and the mine in particular.

The second audit was at the Bralorne mine following the fatal accident that occurred there. The audit looked at their policy and procedures and how well they were applying them.

3.1 Notices of Work

The following Notices of Work and permit information were entered into MMS in 2004.

TYPE	NOTICE OF WORK APPLICATIONS	PERMITS ISSUED	AVERAGE DAYS TO ISSUE
Mineral and Coal (Exploration)	387	284	22
Mineral and Coal (other)	73	56	30
Placer	225	205	29
Sand & Gravel	88	79	59
Total	773	624	29

The breakdown of the 2004 Notice of work by area is as follows:

REGION	PLACER	SAND & GRAVEL	MINERAL AND COAL	TOTAL
Kootenay	17	19	100	136
Central	19	25	95	139
Southwest	2	22	36	60
Northeast	128	16	119	263
Northwest	65	12	119	196
Total	231	94	469	794

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, Fernie and Elk Valley areas
- Northeast = Prince George, Omineca, Horsefly and Valemont areas
- Northwest = Smithers, Skeena and Queen Charlottes areas

2004 Notices of Work by Month

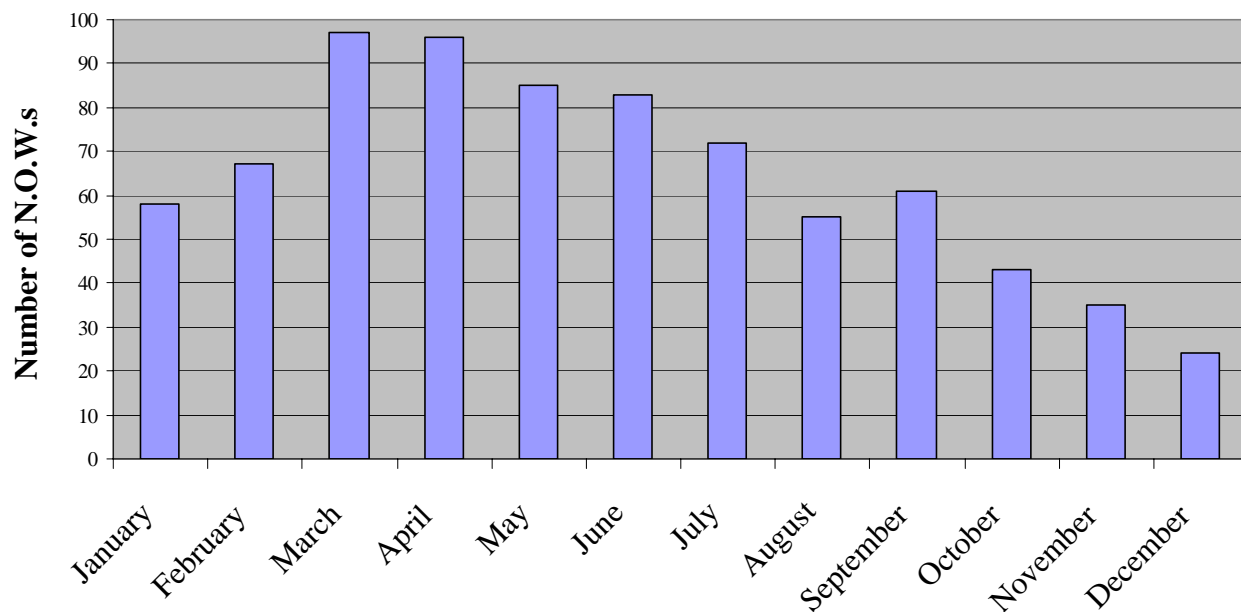


Figure 2

4.1 Reclamation

ROLES AND RESPONSIBILITIES

Reclamation and environmental protection are a major component of all mineral exploration and mine development activities in BC. Since 1969, mining companies have been required by law to reclaim all lands disturbed by mining. BC was one of the first jurisdictions in Canada to enact mine reclamation legislation, and the first to extend this policy to exploration sites. Reclamation and environmental protection are the responsibility of each mining company. Mining companies are required to obtain a permit approving the mine plan, the program for 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 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 activity;
- 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 national Mine Environment Neutral Drainage (MEND) Committee and National Orphaned and Abandoned Mines Initiative (NOAMI).

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, based out of Victoria, comprises a senior reclamation agrologist, a senior reclamation geologist, a senior mine review geologist, a mine review geologist and one administrative staff.

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 2004, permitting activity for major mines remained high. Three new permits were issued for the Churchill Copper Mine, Dillon Coal Mine and Pem 100 Quarry, and 32 amendments were made to existing permits (Table 1).

Summary of permit activity for 2004 on major mines

TYPE	NEW PERMITS	AMENDMENTS
Metal	1	25
Coal	1	6
Quarries	1	1
Total	3	32

Permit revisions were made at Eskay Creek, Kemess Mine, Taurus, Kitsault, Britannia, Golden Bear, Highland Valley, Bralorne Gold, Mount Polley, Gibraltar, Premier Gold, Cirque, QR, Sable, Johnny Mountain, Elkview, Fording River, Dillon, and Windermere Mining. Under the *Environmental Assessment Act*, reviews were conducted for Kemess North, Sea to Sky, Morrison, Red Chris, Orca Sand & Gravel, and Galore Creek. The section also organized and/or participated on public committees reviewing activities at the Brenda, Quinsam, 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, MOT, 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 continues to result in a constructive climate for information exchange and dissemination of new technology.

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 2004 was mine review, mine inspections and technology transfer.

Reclamation Securities and Funds

All mines operating in BC must deposit security with the government to provide reasonable assurance that reclamation costs do not fall on provincial taxpayers. Over 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 \$189.5 million by the end of 2004.

Reclamation Security Deposits Held by the Province of B.C., 1984 to 2004

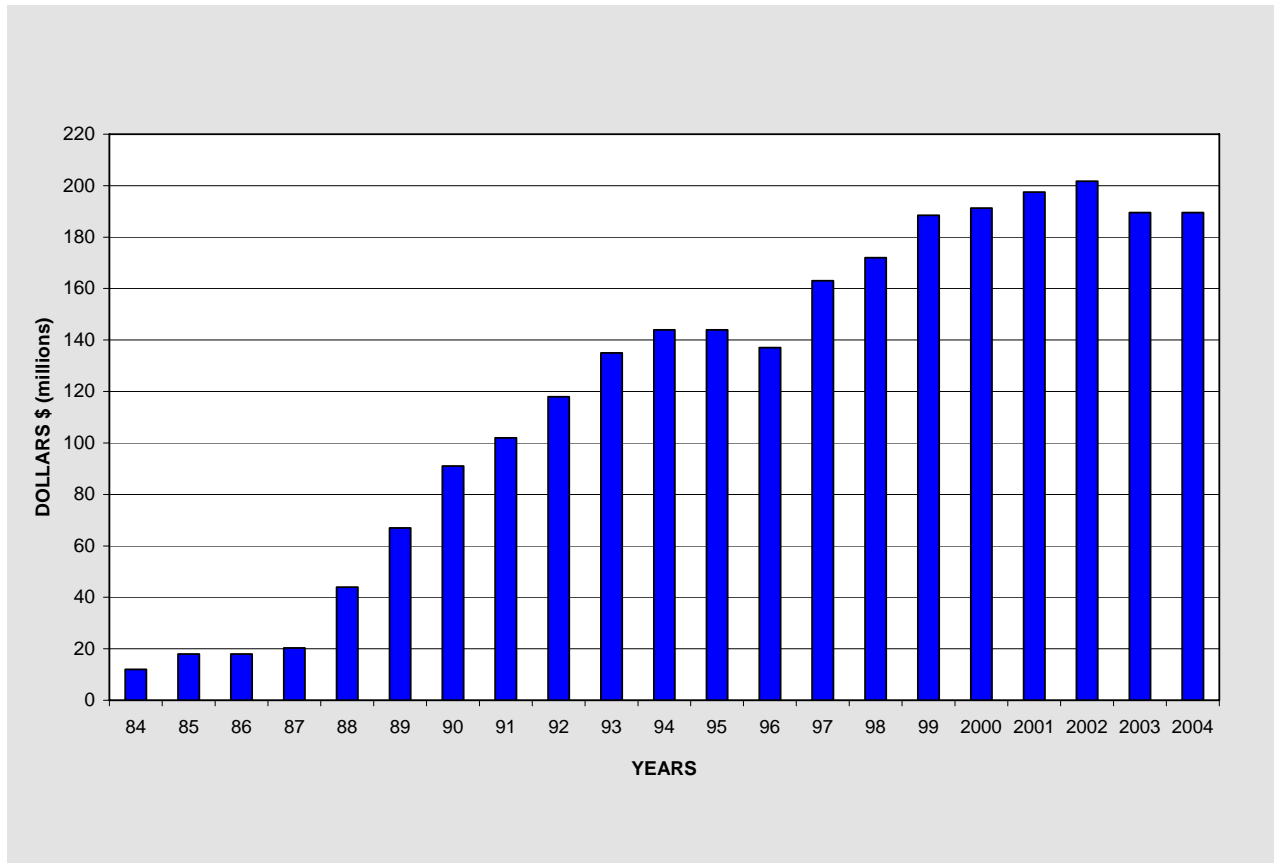


Figure 3

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 28 years.

National Orphaned/Abandoned Mine Initiative (NOAMI)

The National Orphaned/Abandoned Mines Advisory Committee was struck in March 2002 at the request of Canadian Mines Ministers. The Advisory Committee has been asked to study the issue of orphaned/abandoned mines and to develop initiatives and partnerships to implement remediation programs across Canada.

The Advisory Committee takes direction from Mines Ministers and reports back to Mines Ministers through the Intergovernmental Working Group on the Mineral Industry (IGWG).

At their annual meeting in Halifax, 2003, Mines Ministers endorsed recommendations put forward by NOAMI, including two priority areas for immediate action: 1) development of intergovernmental cost sharing arrangements to address remediation of high priority sites; and 2) development of a policy framework that addresses legislative/regulatory issues associated with specific challenges presented by orphaned/abandoned mines.

The Advisory Committee consists of representatives of federal/provincial/territorial governments, the Canadian mining industry, environmental non-governmental organizations and Aboriginal peoples and their communities. Committee members are responsible for communication with their constituencies. The Ministry of Energy and Mines represents the Province of British Columbia on the Advisory Committee.

Mine Reclamation Symposium

The 28th Annual Mine Reclamation Symposium was held from June 21 - 24, 2004 in Cranbrook, B.C. with a theme of "The Four 'R's: Reclamation, Revegetation, Research and Risk". Delegates toured the Sullivan Mine, Elkview, and Fording River Operations.

The Annual British Columbia 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.

The recipient of the British Columbia Jake McDonald Mine Reclamation Award was Bullmoose Operating Corporation for its work at the Bullmoose Mine.

The Bullmoose open-pit coal mine is located in the eastern foothills of the Rocky Mountains, approximately 45 km west of Tumbler Ridge, B.C. The mine produced metallurgical coal for twenty years, from 1983 until April 4th, 2003, when production ceased. Mining activities at Bullmoose have resulted in the disturbance of 788 hectares at the mine site. This area has been progressively reclaimed to an end land use of wildlife habitat, to match the pre-mining capability of the area.

In addition to the progressive reclamation conducted throughout the mine life, major reclamation in preparation for closure began in 2002, with the remedial resloping of a substantial area of waste rock dumps in the sub-alpine mine area. This resloping was undertaken in response to noted reclamation challenges encountered on these high-elevation sites, and was conducted to improve reclamation success on these areas. These efforts continued on a larger scale in 2003, which saw 8,654 equipment hours devoted to reclamation, resulting in the recontouring of 207 hectares of disturbed area, and an additional 8 ha of exploration roads. The 2003 reclamation program also included initial revegetation treatments (seeding and fertilizing) on 184 ha, and planting of almost 90,000 tree and shrub seedlings.

By the end of 2003, 82% of the total disturbance footprint had been revegetated, with over half of this work accomplished in 2002 and 2003. Additional substantial allocation of effort in site preparation and revegetation has been undertaken or is planned for 2004, to complete as much of the remaining reclamation as possible.

Bullmoose has also been active and invested significant effort in undertaking and supporting reclamation research and monitoring programs, designed to evaluate and optimize reclamation success on the mine site. Environmental personnel at the mine have utilized their long history of site-specific research and assessment work to continually improve operational reclamation, and to identify areas where remedial reclamation is required. A major effort undertaken by the mine site in preparation for closure was to conduct an assessment of existing reclamation, using newly available remote-sensing technology to provide information on revegetation and productivity across the entire mine footprint.

These activities demonstrate Bullmoose's commitment to ensuring successful reclamation on their property. In the preparation-for-closure and post-closure period, Bullmoose has devoted all possible resources to timely reclamation of remaining disturbances, to ensure that this land is returned to a productive state as soon as possible. They have further backstopped these resources with comprehensive research and assessment programs, to evaluate their reclamation performance and make certain that their reclamation efforts are appropriately targeted and have a high probability of success.

It is on this cumulative history of reclamation, and in particular on Bullmoose's exemplary reclamation efforts in the preparation-for-closure and post-closure periods, that they were being awarded the 2003 B.C. Mine Reclamation Award.

Four citations were also awarded:

- Coal mine reclamation - was awarded to Elk Valley Coal Corporation for on-going work at the Fording River Operations.
- Metal mine reclamation - was awarded to Teck Cominco Metals Ltd. for the Sullivan Mine.
- Mineral Exploration reclamation - was awarded to Newmont Exploration of Canada Limited for work at Trout Lake Molybdenum property.
- Placer mine reclamation - was awarded to Westrail Construction Limited for reclamation at the Ruby Creek property.

Metal Leaching and Acid Rock Drainage Workshop

The 11th annual workshop was held in Vancouver on December 1 and 2, 2004. This year, the workshop focused on the performance of dry covers.

Industry Reclamation Record

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

Since the late 1960's, 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 2003, expanded to cover 41,693 hectares. Reclamation (where revegetation has been successfully established for one year or more) has occurred on over 36 percent or 15,119 hectares (Figure 4).

Metal mines have disturbed 23,515 hectares, and 8,452 hectares (or 36 percent), have been reclaimed (Figure 5).

Coal mines have disturbed 18,410 hectares, and 7851 hectares (or 42 percent) have been reclaimed (Figure 6). The sharp increase in disturbance and reclamation at metal mines during the late 1990's reflects the construction and development of three new mines at Huckleberry, Mt. Polley, and Kemess South and the closure and commencement of mine reclamation at others.

The data presented in Figures 4, 5, 6 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. With the general resurgence of mining in the province it is expected the rate of disturbance will proceed at a faster rate than seen in the previous years. The rate of reclamation is expected to remain constant.

Land Disturbed and Reclaimed by Metal and Coal Mines in BC, 1969 - 2004

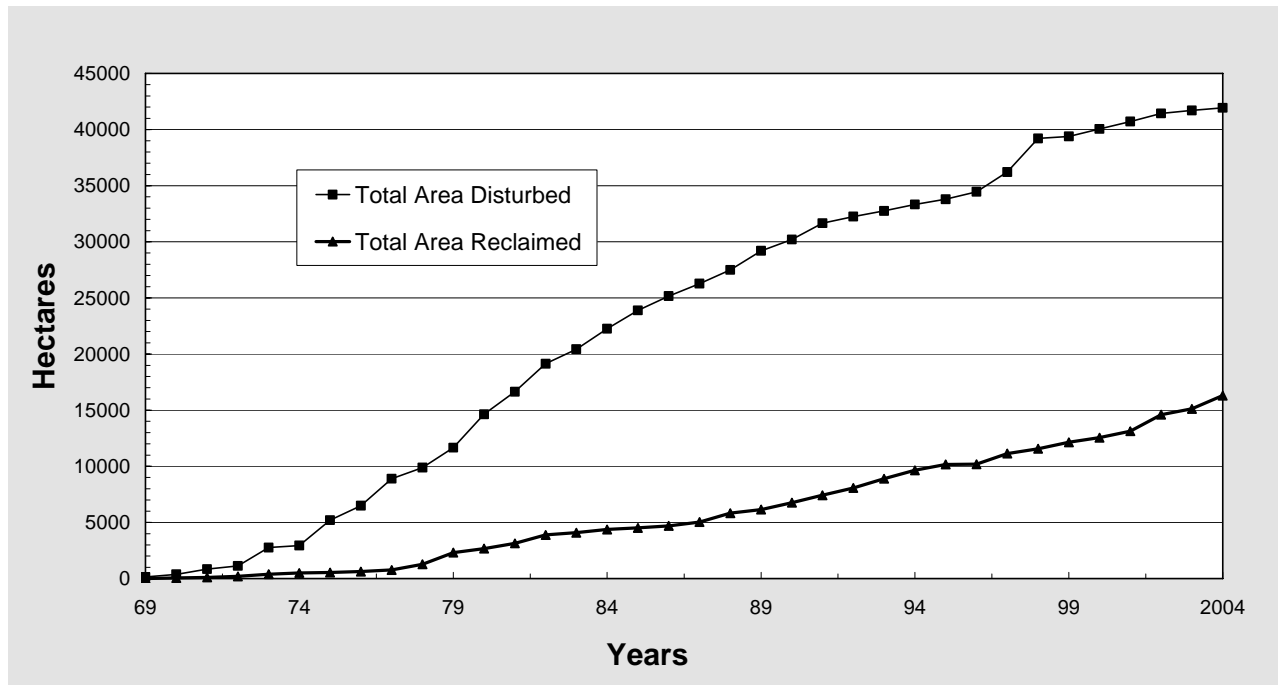


Figure 4

Area Disturbed and Reclaimed by Metal Mines in BC, 1969 - 2004

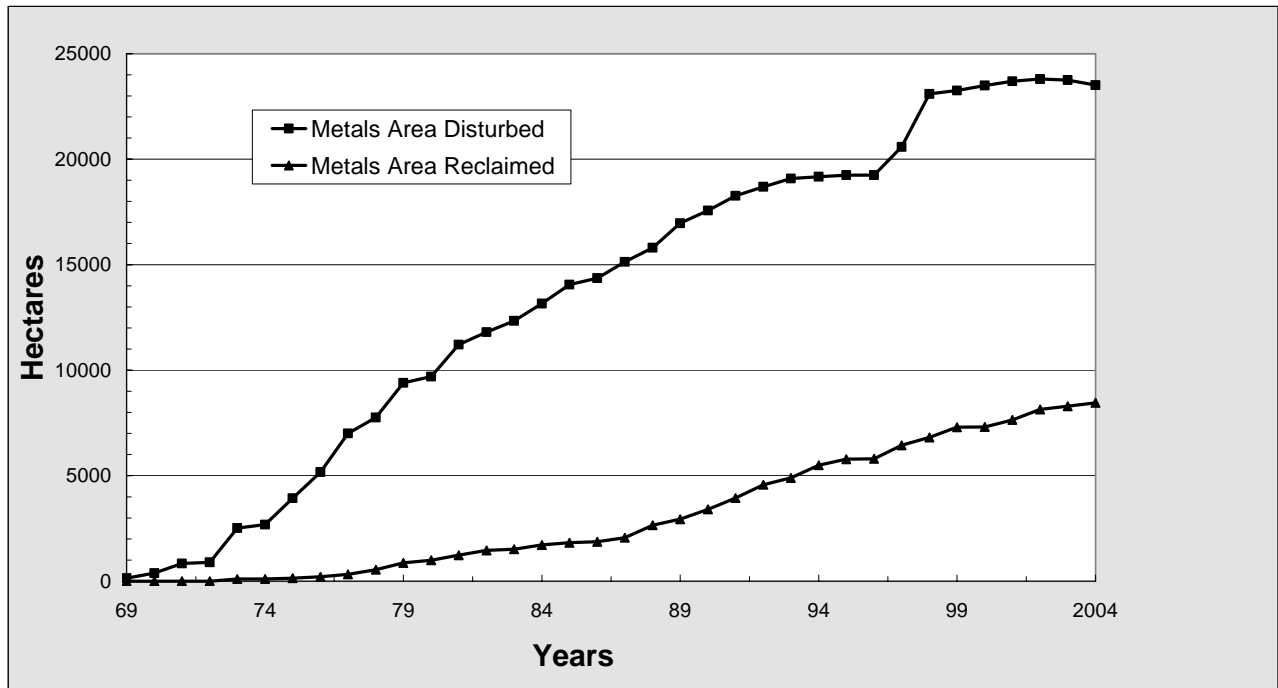


Figure 5

Area Disturbed and Reclaimed by Coal Mines in BC, 1969 - 2004

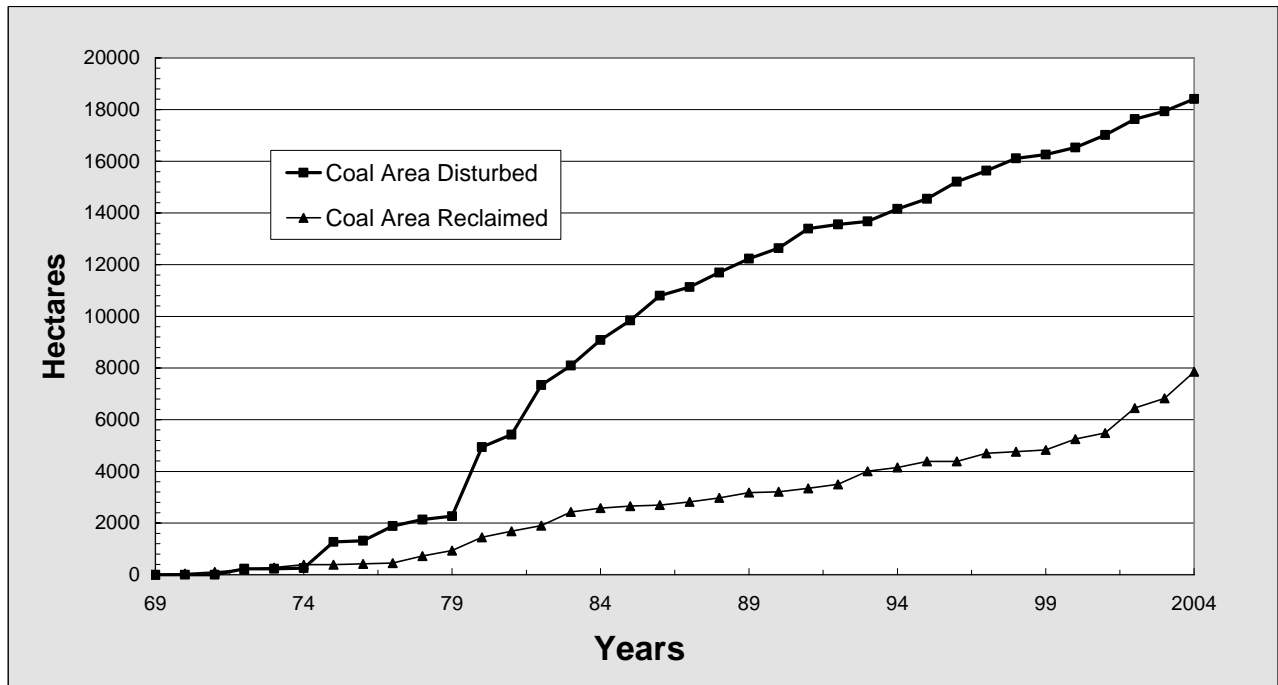


Figure 6

4.2 Geotechnical/Mining Roads

ROLES AND RESPONSIBILITIES

The geotechnical section is responsible for completing inspections at operating and closed mines with the focus on performance of tailings dams, waste dumps, excavations and foundations. Mining projects are reviewed for public health and safety, the safety of mine workers and for protection of land and watercourses.

The geotechnical section provides technical review of proposed mining developments for project approval under the BC Environmental Assessment Act and technical review of applications for approval under the Mines Act.

The geotechnical section tracks geotechnical incidents and carries out follow up reviews. The section also responds to mine road enquiries.

The geotechnical section provides geotechnical advice and develops policy for:

- Tailings impoundments and dams, sediment control structures, waste rock dumps, soil overburden dumps;
- Open pit and underground development;
- Mine roads;
- Risk evaluation for worker protection and public health and safety, and environmental impact of geotechnical projects.

SUMMARY OF ACTIVITIES

- In 2004 the geotechnical section conducted 22 inspections.
- Permits or permit amendments were issued for construction and operation of major structures associated with tailings impoundments and waste rock dumps.
- Environmental assessment reviews were undertaken for several new mine projects.

An external geotechnical review panel completed a review of performance and development plans at the Kemess South tailings storage facility.



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